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MEDIA REPRESENTATION OF AI:

CASES OF US, UK, CHINA AND TURKEY

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YAPAY ZEKANIN MEDYA TEMSİLİYETİ
ABD, BİRLEŞİK KRALLIK, ÇİN VE TÜRKİYE VAKALARI

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S.

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Abbreviations

AI..... Artificial Intelligence

NLP.....Natural Language Processing

SRT.....Social Representations Theory

LDA.....Latent Drichlet Algorithm

GMO.....Genetically Modified Alghoritm

MDS.....Multidimensional scaling

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ABSTRACT

Media representations of algorithmic systems (coined as AI) in US, UK, China and Turkey are analyzed primarily under the theoretical lenses of Social Representations Theory and media frame detection, using Natural Language Processing (NLP) to explore 2837 news articles in 17 newspapers between the years 1983 and 2018 then machine-selected representative news are manually probed to explore topical dimensions, representational functions and media frames operationalized in AI-related news. Ideology has relatively a suppressed framing in AI representation.

Results show that representation of AI has a global nature with a dominant economic framing. It is mythified in terms of anthropomorphic characteristics, skills and commensurability with ultimate human traits. An ideological functional representation is present primarily in the cases of US, China and Turkey.

Most prevalent anchoring mechanism of AI is naming. For objectified algorithmic systems that have become consumption artefacts, naming revolves around the keyword "smart" while country -level macro representations the words "battle" or "quest" becomes apparent. Robot is a prevalent topic and also an objectification mechanism as it solidifies algorithms and enables meaning-making easier across country media corpora, yet at the same time carrying an emotional anchoring mechanism of fear originating from dystopian portrayals imported from culture industry to news articles. AI has an anchoring in antinomies and bears a cognitive polyphasia as the process of collective cognition through attitudinal social representation functions positions algorithmic systems through both fear and hope simultaneously. Another objectification was through personification as certain celebrities represented AI-related topics globally. Except for limited local named entities and personifications detected, majority of the topics were global with local nuances.

ÖZET

ABD, İngiltere, Çin ve Türkiye'de algoritmik sistemlerin (AI) medya temsilleri, 17 gazetede 1983 ve 2018 yılları arasında yayınlanmış 2837 haber üzerinden Doğal Dil İşleme (NLP) yöntemleri kullanılarak Sosyal Temsil Teorisi ve medya çerçevelemesi teorik düzlemlerinde incelenmiştir. Algoritma tarafından seçilen temsili haberler, AI ile ilgili haberler üzerindeki konuları, temsil işlevlerini ve medya çerçevelerini araştırmak için manuel olarak ayrıca taranmıştır.

Sonuçlar, AI'nin temsilinin baskın bir ekonomik çerçeveye sahip ve küresel olduğunu göstermektedir. Algoritmik sistemlerin Antropomorfik özellikleri, becerileri ve insan özellikleriyle eşölçülebilirliği mitselleştirilmektedir. İdeolojik bir işlevsel temsil, öncelikle ABD, Çin ve Türkiye vakalarında mevcuttur. İdeolojik temsiliyet, ekonomik temsiliyete göre çok daha geri plandadır.

AI'nin en yaygın demirleme mekanizması adlandırmadır. Bu süreç tüketim nesneleri haline gelen algoritmik sistemler için, "akıllı" anahtar kelimesi etrafında olurken, ülke düzeyindeki makro ifadeler "savaş" veya "mücadele/battle" kelimelerini ortaya çıkartmaktadır. Robot, tüm ülkelerdeki derlemler içerisinde anlam kazanmayı kolaylaştıran yaygın bir tema ve aynı zamanda bir nesnelleştirme mekanizması olarak gözlemlenmiştir. Kültür endüstrisinden haber makalelerine aktarılan distopik yaklaşımlar, duygusal bir demirleme mekanizması olarak korkuyu barındırmaktadır. Aynı anda hem "korku" hem de "umut" temalarının varlığı ile, AI çelişkili zıtlıklar (antinomy) üzerinden demirleme meskanizmasını kullanmakta ve bilişsel çokfazlılık taşımaktadır. Diğer bir nesnelleştirmenin, bazı ünlüler küresel çapta AI ile ilgili konuları temsil ettiği için kişileşme yoluyla olduğu gözlemlenmiştir. Yerel olarak birtakım adlandırmalar ve tespit edilen şahsiyetler dışında, temsiliyet taşıyan AI konularının çoğunlukla küresel olduğu görülmüştür.

INTRODUCTION

Computer assisted decision support systems now largely provide and maintain the critical assistance of many services in the society. The term AI has many stakeholders across disciplines while the concept of intelligent machines might be stretched back to Homer's *Iliad* (Lattimore, 1961) as three-legged machines (tripods) powered by "their own motion" serving the gods of Greek built by Hephaistos considered to be one of the earliest references to automata with agency. From Judaic Golem legend to Frankenstein, machinery with human-like capabilities is a social concept forged with imagination and thrusted by scientific discoveries, making phenomenon a critical yet rather overlooked subject of inquiry from social sciences perspective considering its fast-paced ramifications in the society.

Dwelling primarily on "Public Understanding of Science" literature, this thesis aims to enlighten how AI is being represented in media using quantitative text-mining tools and then grounding the meaning of these results by making a multi-country analysis of media news.

Scope of The Study

Primary research questions explored in this study are as followed;

- How is AI represented in major media in referred countries?
- What are the patterns and regularities representing AI in different country media?
- Which keywords and themes are associated with AI in current discourse and how are they formed in different countries?
- Does AI have a global representation? (How) Does it change by country? What are objectifying and anchoring mechanisms across country settings?

To answer these questions, research design has two epistemologically related yet methodologically self-standing journeys of understanding the concept of AI; First to create a map of AI terms covered in major media resources among the countries where AI research and application is leading global discourse and including Turkey

as a separate Turkish corpus. This cognitive map was then used to start a qualitative manual analysis on certain news text represented by salient topics across country in order to derive a detailed analysis through the lenses of Social Representations Theory and media framing practices of AI.

Understanding Science & Technology in the context of AI

Basing itself on multiple philosophical roots, studying the perception of science and technology has been a multi-theory academic focus among scholars where studies challenge the epistemology of the endeavor and the subjects of inquiry (Dierkes and Grote, 2005 p.2).

Computer assisted decision support systems (known as AI) codify human cognitive activities through a certain mechanism and disembed it from the immediacies of the face-to-face social contexts. This "power through the algorithm" (Lash,2007a) is pervasive, has a regulatory power on the verge of algorithmic revolution "that will touch all levels of our society" (O'Reilly, 2013) and believed to be replacing the self-critical reasoning process in favor of mechanistic rationality (Marcuse, 2004; Daston, 2012). Ziewitz (2015) argues that academic discourse on algorithms powering Intelligent Decision Support Systems (IDSS) have become a modern myth accentuated in an "intuitive" and "puzzling" drama. The term artificial Intelligence has become the umbrella term connoting all things related with intelligent decision-making capacity, be it in the products or in the processes. In addition to material effects and perception of technology, Mosco (2005) underlines that "computers and the world of what came to be called cyberspace embody and drive important myths about our time". Such an ambivalence of the term AI creates a sign system network operating at the global level yet socially embedded by country contexts differing through country specific media frames.

Artificial Intelligence as domain of science, technology and engineering is becoming an increasingly popular concept in both academic and business milieus with significant amount of recent discussions on its social and economic effects. (Ethan & Horvitz, 2017). As the topic itself requires technical background, all forms

of media create useful resources of information and shape views of all stakeholders with or without technical background and help them form opinions around this technology.

Science and technology topics have a dynamic nature of representation in discourse, with attention peaks and fade-outs, rediscoveries and re-namings from various socio-cultural perspectives when boundary conditions change (Felt & Nowotny, 1993). Topics around artificial intelligence is no exception. Although the research on the representation of AI in media is scarce, currently available literature suggests that AI is increasing its popularity in media with certain technological artefacts (like personal assistants, robots etc..) and has a dichotomic representation dispersed between dystopian and utopian scenarios (Fast and Horvitz, 2017).

Exploring the perception of science requires deconstruction of what is economically, culturally and politically grounded, independent of the general or specific advances in science and technology, as Felt (2000, p.4) addresses that "The way in which science and technology issues are dealt with in the public domain is governed to a large extent by the specific political context." This also suggests that a cross-country analysis has the potential of revealing what is socially, politically and economically grounded in the meaning-making of AI by illustrating media representations across countries.

Although primary media discourse underlines AI as standalone technological artefacts, AI is not an exception in the sense that everything technological is also political, value-loaded and has its own mythology making it possible to be conceived. After a semiotic grounding, all technology reveals ideology, political systems and culturally loaded representations. This study embarked on obtaining a map of how AI is being represented in media using quantitative text-mining tools and later used this map as a navigating tool to tackle different news frames across countries.

Primary theoretical nesting of the study is Social Representations. A social representation is "the ensemble of thoughts and feelings being expressed in verbal and overt behavior of actors which constitutes an object" (Wagner, Wolfgang, et al., 1999). While AI as a techno-scientific object is constituting an agenda in media, its social representation is possibly being formed as a social representation system "of values, ideas and practices" which is defined by Moscovici (1973).

Although public understanding and reception of new technologies might be approached by traditional attitudinal, risk perception or audience reception framework, Bauer (1999) suggests that "conceptual richness" of the Social Representations Theory is "better suited" for techno-scientific concepts especially for its strength of "characterizing the evolution of content, structure and functions of the voices and images of public concern" (ibid)

Significance of the study

Pfaffenberger (1992) argues that the *standard view of technology* depends on the material, pragmatic benefits and usages, where the motto "necessity is the mother of invention" acts as an overall imperative of value-free, purely functional approach towards technological concepts also mediating the process of meaning-making out of technology. According to Binford (1965), every artifact has anthropologically two dimensions; One being the primary pertaining to its functionality, and the secondary, related to that artifact's social meaning and symbolism. In this definition, secondary dimension of AI is critical as in the case of meaning-making of any new technological concept. As Basalla (1988) also clarifies; technology is a "*material manifestation of the various ways men and women throughout time have chosen to define and pursue existence. From this perspective, history of technology is part of the much broader history of human aspirations, and the plethora of made things are a product of human minds replete with fantasies, longings, wants, and desires.*" Although literature on Science and Technology Studies (STS) suggests such an in-depth understanding of technology including metaphysical aspects contributing heavily towards different modes of consciousness around technology,

in addition to and -not sufficient with- mere materiality of technical artefacts, AI has an unbalanced representation in media: Recent AI discourse positions embodied, fixated, anthropomorphic instances of intelligent decision support systems with popularized, black-boxed features and standalone entities. Assumed as both value-free and agentic, considered as either enhancer or threat to humans, AI is constructed in the form of various embodied objects like robots, personal assistants, problem solving super-powers etc.., each being given different identities depending on the cultural background of the society (Bartneck, Christoph, et al., 2007). Siri is as much a typical example of AI, as a recent Japanese robot making the AI umbrella semiotically complex even further while new technoscientific concepts are making news daily. Considering and despite the current media representation of AI in the symbol system, there's a gap for research to illuminate how symbolic grounding of AI media topics will mediate the new modes of understanding while new artefacts are constantly being injected into our lifeworlds as we humans stand very close to the functional technology and create the mythologies around them with firsthand exposures. As media discourse constructs "AI" within certain textual patterns and possible frames, defining the pillars of this discourse and tackling on which dimensions differentiates / unites in major global media with comparisons is the primary basis of this study which is unique in both in terms of epistemological approach and trans-disciplinary methodology. As it is further explained in method section of the study, methodological approach utilizes algorithmic, quantitative tools of machine-based text analysis for the purposes of social discourse analysis and qualitative interpretive readings of these machine-processed news results where either social scientists or computer scientists typically work in standalone terms and processes. A rather unique cross-disciplinary attempt is made in this study trying to bridge the methods of completely different academic approaches like Natural Language Processing and Social Representations, which is rare for the purpose of social science inquiries.

Schank, (1987) underlines that even AI practitioners seem confused around the definition of AI because of the recent history and the ambiguity of the term. This

study assumes it would be a well-fought battle for social sciences to further illustrate the details of grounding of the phenomenon of AI representation as it is being constantly, rigidly cultivated in society with mostly polarizing views.

Finally, from climate change to biotechnology, a large volume of literature with the motive of understanding the perception of science & technology has used Social Representations Theory (Moloney, Gail, et al, 2014; Christidou, Vasilia, Kostas Dimopoulos, and Vasilis Koulaidis, 2004; Wolfgang, and Kronberger. 2001) Artificial Intelligence is an exceptionally specific topic under techno-science with very limited reference from the paradigm of SRT.

In short, this research embarked into understanding a modern myth called AI which is in the process of creation, heavily represented in media, socio-culturally diffused into different audiences, yet at the time of this study rather scarcely-covered in social sciences especially with the methodological involvement of Natural Language Processing techniques.

CHAPTER 1

Literature Review

1.1 LITERATURE OF SCIENCE AND MEDIA COMMUNICATION

Scientific concepts, in the form of new discoveries or discussions mostly reach public through media (Brossard & Shanahan, 2003; Hornig, 1990) which acts as a key instrument on cultivating public ideas about scientific issues (Ramsey, 1999). Perception of science in both public and experts is largely influenced by popular media coverage (Faber, 2006; Listerman, 2010). Scheufele et al. (2005) states that attitudes towards new and vaguely understood techno-scientific concepts are especially determined by mass media attention. Media representation of science and technology concepts like nanotechnology which are ambivalent in nature is critical for the meaning-making process. Especially regarding new and unprecedented technologies, public perception is heavily influenced by media coverages (Scheufele & Lewenstein, 2005).

Science communication literature has plenty of examples on such science and technology topics like global warming, bioenergy, stem cell or biotechnology studying how these topics are represented in media. These studies show that mass media plays the intermediary role between science stakeholders and public by translating and framing scientific information for wider consumption (Boykoff et al, 2007; Skjølsvold 2012; Marks, 2007).

For some of the coverage on scientific issues, literature criticizes media for leaving the public either ill-informed (Hartz and Chappell, 1997), or making scientific claims appear much more factual, uncertain or confusing than they are. (Stocking, 1999; Friedman et al., 1999). This brings in the issue of media framing besides and sometimes before media representation. How media frames specific technologies provide us clues on public opinion formation and public understanding of any technology in the long run (Marks, 2007).

Primarily Goffman (1974) initiated the micro-level sociological definitions for framing with the assumption that meaning making of the world is not fully possible as people struggle to make sense of the world around them with their life experiences using their "primary frameworks". Framing works as a both macro and micro-construct (Scheufele, 1999). As a macro-construct, journalists operationalize framing as a complexity reduction tool required by their news-creation settings and formats. (Gans, 1979 as cited in Scheufele and Tewksbury, 2007).

According to Entman (1993), framing is about "selection and salience". A perceived reality becomes fractured for some aspects of it to be selected (by inclusion or exclusion) and made more salient in a way of communication. This might create an agenda by promoting a definition, an interpretation, moral evaluation or a recommended solution. (Gamson, 1992). Salience of newly-coined technoscience terms determine how the meaning-making of the concept will evolve in public mind. Entman (ibid) describes salience as "making a piece of information more noticeable, meaningful, or memorable to audiences" and it is one of the mediators of how public will perceive/process/store the concept according to the schemata of the receiving audiences. Media frames new concepts in order to make them more interesting, and especially in the case of scientific concepts, more understandable as well.

Media frames are not necessarily conscious decisions in the newsroom (Gitlin, 1980). A broader approach to framing proposed by Reese (2003) tackles frames as "organizing principles that are socially shared and persistent over time, that work symbolically to meaningfully structure the social world", emphasizing socially, politically and culturally underlying phenomena beyond the framing practice in media newsrooms. This determines how the interpretations will "lead to evaluations" (Entman, 2004). Patterns of emphasizing and tonality of media messages determine public thought and behavior around issues (McCombs, 2004)

Gitlin (1980) describes media framing as "persistent patterns of cognition, interpretation, and presentation, of selection, emphasis, and exclusion, by which symbol handlers routinely organize discourse, whether verbal or visual". According to Goodman, the way media selects and emphasizes particular facets of a news topic is definitive for the public especially in the cases of purely new and unexperienced topics, as most of the high-technology concepts naturally fall into this category. (Goodman and Goodman, 2006). In the most cases of recent techno-science developments arising from laboratories or R&D centers to public consumption both in the forms of relevant technologies at retail shelves or media-news stories around scientific concepts, there's a poorly experienced public facing a novelty.

There are specific framing devices used by media catalyzing the meaning making / storifying process of new concepts (like metaphors, symbols, visual cues etc.) especially in the cases of new technologies, effecting the way audiences should think about them. (Gamson & Modigliani, 1989).

Despite the nature of scientific development becoming more and more global, literature suggests that media framing has a lot to do with national news settings. Science communication still considered to be tied to local contexts (Groboljsek & Franc, 2012). An analysis cannot be completed with the assumption that even the most concrete form of a technoscientific concepts have global credence and meaning across countries as the dynamics of media framing and cultivation in specific settings do create differences in social representations. Political culture, social values, ideological stance and national interests approaching international news content might have impacts on news construction which in turn shaping the meaning making of public mind. (Rachlin, 1998; Chang, Wang, & Chen, 1998; Pan, Lee, Chan, & So, 1999). Hence understanding media framing in specific country settings provides us opportunities to further illustrate the dynamics of public understanding of science as well. Overall, literature suggests that media framing of techno-science is economically, culturally and politically grounded (Felt, 2000).

Importance of framing is critical in all policy-related news stories. (Chong and Druckman, 2007; Nelson et al., 1997) and although still limited, there's a pile of academic work in the area of computational analysis of framing as well. (Card, Dallas, et al., 2015; Nguyen et al., 2015; Tsur et al., 2015; Baumer et al., 2015) as some of them delve into identifying frames across issues (Card, Dallas, et al., 2015). Particularly critical to this study, work of Boydstun, Amber E., et al. (2013) classifies media frames by delineating a unified coding scheme for content analysis across issues, typically relevant for the case of AI, as the umbrella term for all algorithmic systems, it inherits a political nature at the broadest sense. As the process of frame discovery (identifying frames in a discourse about a particular issue) is complex and requires intensive manual work, this study produced a *Policy Frames Codebook* utilizing semi-automatic or fully automated methods to provide a generic approach for the categorization of frames across policy issues but also applicable in specific issues as well. The codebook summarized in Table 1 has 14 categories of frame dimensions which authors intend to address any policy issue in any communication context from news media to Twitter.

Table 1 Policy Frames Codebook of Boydstun, Amber E., et al. (2013)

Economic frames	The costs, benefits, or monetary/financial implications of the issue (to an individual, family, community or to the economy as a whole).
Capacity and resources frames	The lack of or availability of physical, geographical, spatial, human, and financial resources, or the capacity of existing systems and resources to implement or carry out policy goals.
Morality frames	Any perspective or policy objective or action (including proposed action) that is compelled by religious doctrine or interpretation, duty, honor, righteousness or any other sense of ethics or social responsibility.

Fairness and equality frames	Equality or inequality with which laws, punishment, rewards, and resources are applied or distributed among individuals or groups. Also the balance between the rights or interests of one individual or group compared to another individual or group.
Constitutionality and jurisprudence frames:	The constraints imposed on or freedoms granted to individuals, government, and corporations via the Constitution, Bill of Rights and other amendments, or judicial interpretation. This deals specially with the authority of government to regulate, and the authority of individuals/corporations to act independently of government.
Policy prescription and evaluation	Particular policies proposed for addressing an identified problem, and figuring out if certain policies will work, or if existing policies are effective
Law and order, crime and justice frames	Specific policies in practice and their enforcement, incentives, and implications. Includes stories about enforcement and interpretation of laws by individuals and law enforcement, breaking laws, loopholes, sentencing and punishment. Increases or reductions in crime.
Security and defense frames	Security, threats to security, and protection of one's person, family, in-group, nation, etc. Generally, an action or a call to action that can be taken to protect the welfare of a person, group, nation sometimes from a not yet manifested threat
Health and safety frames	Healthcare access and effectiveness, illness, disease, sanitation, obesity, mental health effects, prevention of or perpetuation of gun violence, infrastructure and building safety.

Quality of life frames	The effects of a policy on individuals' wealth, mobility, access to resources, happiness, social structures, ease of day-to-day routines, quality of community life, etc.
Cultural identity frames	The social norms, trends, values and customs constituting culture(s), as they relate to a specific policy issue
Public opinion frames	References to general social attitudes, polling and demographic information, as well as implied or actual consequences of diverging from or getting ahead of public opinion or polls.
Political frames:	Any political considerations surrounding an issue. Issue actions or efforts or stances that are political, such as lobbyist involvement, bipartisan efforts, deal-making and vote trading, appealing to one's base, mentions of political maneuvering. Explicit statements that a policy issue is good or bad for a particular political party.
External regulation and reputation frames	External relations with another nation; the external relations of one state with another; or relations between groups. This includes trade agreements and outcomes, comparisons of policy outcomes or desired policy outcomes.
Other frames	Any frames that do not fit into the above categories.

1.2 Studying AI Under Social Representations Theory

Preliminary culmination of the concept of social representations were first initiated and expressed as "collective representations", a term first coined by Durkheim. According to Durkheim (1893; 1895; 1898), collective representations are to be distinguished from the individual representations as one being more unique to the

individual and short-term, whereas the latter are mutually held by the society over generations changing in longer term, preserving what keeps them together acting in a uniform manner, constituting a cognitive model for individuals as well.

It was Serge Moscovici (1961) who elaborated the social psychology of representations underlining that Durkheimian definition needed more room for the interactions between the individual and the collective, suggesting a relatively more focused term "social representation" vs. the term "collective representation", laying the groundwork for Social Representations Theory (SRT). It started with the Moscovici's study of psychoanalysis and its transformation into a collective understanding in French society (Moscovici, 2008). Moscovici proposed that representations are not the outcomes of society as a whole, but the products of the social groups who constitute the society. He concentrated on communication processes, which he treated as the basis for formation and transmission of representations.

According to Farr (1996), to understand social psychological phenomena and processes, their embedding in historical, cultural and macro social conditions is critical without methodological individualism and functional separation of the subject from the object. Moscovici underlines the functional non-separation of subject from object as an object's location is contextual and it is an extension of the behavior of the group. (Moscovici, 1973, p. xi)

Original Moscovici (1961) study focused on how three segments (urban-liberal, catholic, communist) of French society encountered the concept using survey data and media analysis. Among these three different social segments, both the content and form of cultivation differed creating variety of representations (*Propaganda*, *Propagation*, *Diffusion*) of Psychoanalysis.

Propaganda was a communication process of communist milieus with strong in-group identity filtering concepts through class-conflict lenses and rejecting

psychoanalysis outright by cultivating and stereotyping it as an imperialistic American tool in a didactic media coverage.

Propagation was the process of Catholic social segment aimed to set boundaries for psychoanalysis where it should not cross the values of the church. Rather than stereotyping, Catholic milieus with strong in-group structure and identity, operationalized an attitude-shaping mechanism selectively, accepting certain aspects and rejecting ones (like its theory of sexuality) that are out of the ethical discourse of catholic liturgy.

Diffusion occurred in the group called urban-liberals whose structuration and identity bonds were relatively deemed to be weaker than the other two segments. Media communication was usually based on new opportunities with the aim of making audience more opinionated and there was little resistance among the group.

Moscovici (1973, p. xiii) explains SRT as

> "*a system(s) Of values, Ideas and practices with a twofold function: first, to establish an order which will enable individuals to orient themselves in their material and social worlds and to master it; and secondly, to enable communication to take place among members of a community by providing them with a code for social exchange and a code for naming and classifying unambiguously the various aspects of their worlds and their individual and group history.*"

According to Höijer (2011), SRT offers a "possibility to develop a theoretically based model of analysis" to study media especially in the setting of technoscience communication and representation.

SRT acknowledges primacy of certain symbols over the others during the representation process enabling members of a community with common codes to discuss, digest and this in turn results in the construction of realities (Moscovici,

2000). Representations are "network of ideas, metaphors and images, more or less loosely tied together" (ibid). Social representations are mechanisms of collective meaning-making leading to common cognitions which also operate as social bonds in societies or in any unit of social groups. They make it possible for us to "classify persons and objects, to compare and explain behaviors and to objectify them as part of our social setting" (Moscovici,1988).

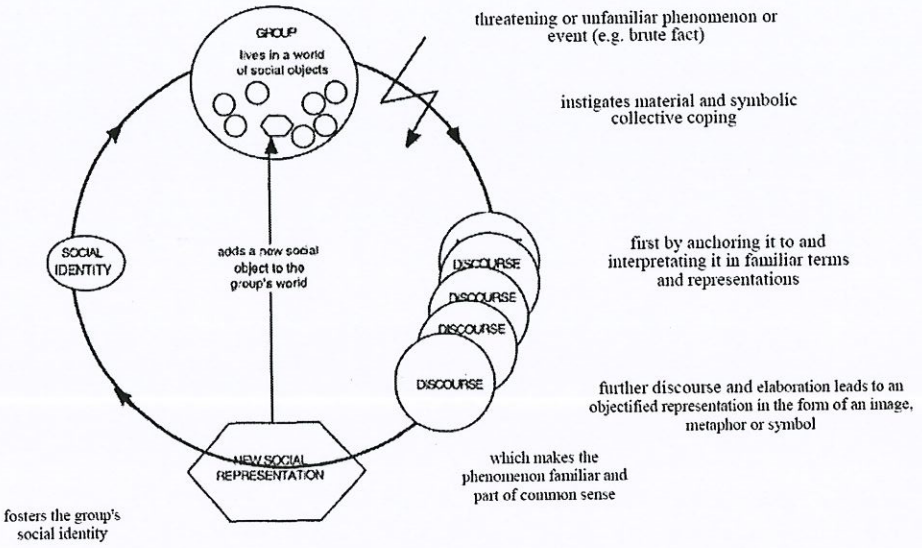
SRT acknowledges individual by keeping distance from social determinism yet considers individual as part of a transformation process embedded in and structured by society (Höijer, 2011). A representation is also a reflection of historical, cultural and economic contexts, circumstances and practices where individual has the flexibility to choose in "a veritable open market of representations" (Moscovici, 1984a)

As a hypothesis of the theory proposed by Serge Moscovici (Moscovici, 1961, 1976), SRT suggests the concept of polyphasia; the idea that individuals thinking on new topics are sometimes characterized by contradicting types of knowledge to make sense of their world. Most of the scientific issues exhibit this behavior as they transition from total unfamiliarity to social relevancy by becoming polarizing social debates, be in the case of climate change, gene-modification or the algorithmic systems.

SRT delineates representations in three types: *Hegemonic* representations, *emancipated representations* and *polemic representations*. Hegemonic representations are uniform and prevailing in macro social structures like countries. Many public perceptions about popularized science like living in Mars or AI fall into this category. Emancipated Representations belong to subgroups with a certain autonomy when interacting with other segments in society, while both members or the society can construct their thinking partially independent or in combinations from that segment of the society. An example might be the understanding of a new robotic innovation among hard-core mechatronics engineers drastically differing from the layman applause to the same phenomenon. *Polemic Representations* are contesting stand-offs between collective understandings among groups in society

or between societies. Whether global warming is a real threat or exaggerated or whether AI is a threat to humanity vs a great helper can be typical examples. Figure 1 presents a summary of social representation process according to Wagner, Wolfgang, et al (1999) .

Figure 1. Summary of social representation process according to Wagner, Wolfgang, et al (1999)



This mechanic of sociogenesis has relevance with most of the techno-science topics. While a social group's lifeworld encounters an unfamiliar phenomenon (object), coping mechanisms through first anchoring and then objectification gets into action by creating a further and differentiated discourse among members. This results in an objectified new representation, emerging as new metaphors or symbols, all critical elements of gaining familiarity and collective meaning-making which could lead to the rise of different social identities in time. Media plays a fundamental role during the process in terms of creating discourse, especially with recent fragmented availability of various interactive electronic forms.

Main objective of all social representations is to "make something unfamiliar, or unfamiliarity itself, familiar" (Moscovici 1984b) what Moscovici describes as the

consensual world of the common sense (Moscovici, 1984). This function encountered through symbolic coping is possible through certain communicative mechanisms including *anchoring* and *objectifying*, which are elementary concepts of the theory.

Anchoring relates to past and well-known social representations to make the unfamiliar familiar by facilitating understanding and comparison. What is new is attached to what has been experienced and known in the past. This can be possible by naming the phenomenon, conjuring a familiar emotion, theme, a familiar yet contradicting duality or a well-established metaphor. Marková, (2003) underlines the importance of dialogicality in social representations in the sense that making of meaning fundamentally requires a polarizing capacity to think in antinomies. Such polarizations might create tensions and conflicts and might even render themselves to a social debate. Markova (ibid) points out that under these socio-historical contexts new social representations are formed.

Objectifying creates familiarity by turning unfamiliar into a concrete object that can be familiarized by easily seeing and touching. A vivid example of objectification is "Dolly the sheep" as it stood for the genetic engineering processes when prevalent media shared pictures. (Bauer & Gaskell,1999). According to Moscovici (2000), objectifying is a more active process than anchoring, requiring more effort on the new phenomena individuals face in daily basis.

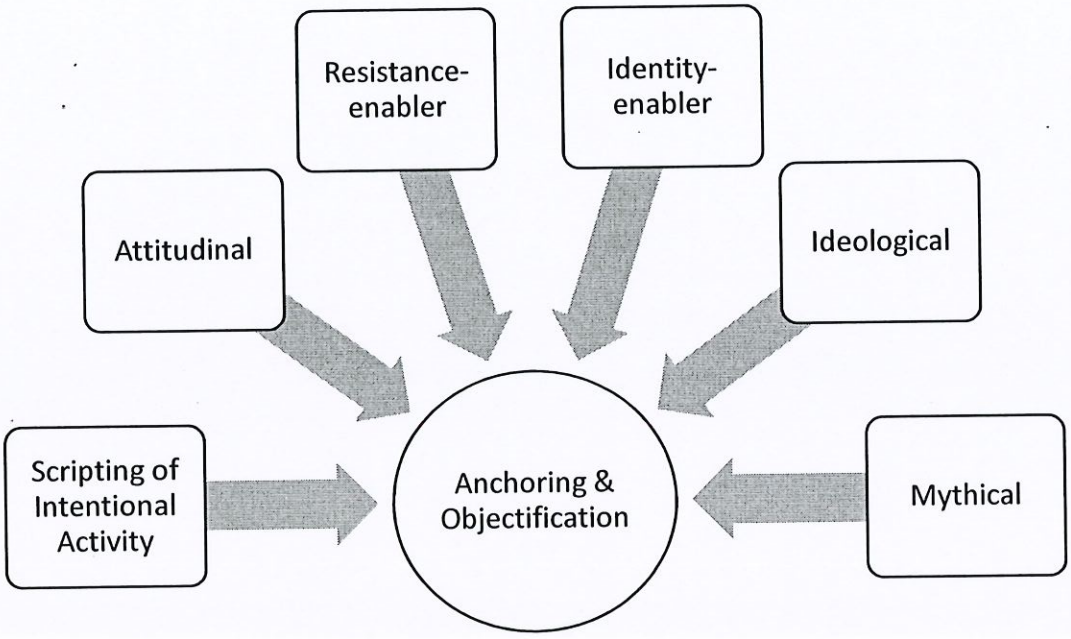
Emotional objectification is a process when an emotion triggering stimuli (a picture in media, news video etc.) establishes itself as the object for turning the unfamiliar into a concrete collective meaning (like a terrible flooding taking lives become the iconic representation for global warming etc..). In the context of algorithmic systems, an algorithmic failure in Boeing 737 MAX airplanes resulting in the crashing down 2 planes minutes after take-off in October 2019 and March 2019 with a death toll of 346 (Wichter, 2019) can be an example of a dystopian objectification event where an algorithm gains visibility through physical and dramatic phenomenon.

In cases where a prominent person is heavily associated with the phenomenon, objectification through personification occurs and person becomes the face and the symbol of the idea structuring a common meaning. Al Gore becoming the face of Global Warming or Mandela the freedom, Elon Musk the pioneer of the concept of living in Mars are examples of personified objectifications.

In this system, diffusion leads opinions, propagation emerges attitudes and propaganda forms stereotypes. Functions of representations operating in social groups might be ideological, mythical, identity-creating or inscription of activity among social milieus. (Bauer and Gaskell, 1999)

Bauer & Gaskell (*ibid*) elaborates on the units of analysis of social representation and differentiates between *modes of representation* being behavioral habits, individual cognition, informal and formal communication and *mediums* (sic) *of representation* being movement, words, visual images or non-linguistic sounds within a social milieu. Their analysis also summarizes how representations serve different functions in different groups, as groups in the sense that a common project, a collective memory and/or a jargon exists whether it is a national agenda or a research laboratory. This differentiation between structure and function is critical for setting of a framework in this study to analyze how social representation of AI gets operationalized in a country setting. Thus, functional outline of social representations by Bauer & Gaskell (ibid) has been used in this study as these functional aspects have the potential of manifesting anchoring and objectification of AI and giving us a convenient apparatus to make a hyper-country analysis of AI in media by adopting this as an academic frame in the newly-developing lenses of Social representation of science and technology communication. Figure 2 presents a summary of these functional aspects which the study will instrumentalize further during the analysis in Chapter 4.

Figure 2. Summary of Social Representation Functions according to Bauer and Gaskell (1999)



Mythical representations are originated in timeless stories with historical background giving legitimacy or motivation to a group in various possible supporting and opposing stances. *Ideological representations* bear a dominance of one group's particular project via different anchorings and objectifications. *Identity-enabler representations* re-inforce common memory and knowledge of a milieu, making the bond stronger. *Resistance-enabler representations* contest the ideology in which the group members are nested in, with the aim of leading to possible different attitudinal directions or fostering of current identity. *Attitudinal* functions aim about evaluating the project ideals and making judgements in different contexts to form a base attitude. *Planning or scripting of intentional activity* denotes an attempt of action in the course of projected ideas based on the formation of certain attitudinal directions. To illustrate how these definitions operate, Bauer & Gaskell (1999) use the example of nature as a protection of nature project among environmentalists, where a natural beauty might serve different

functions from defining an identity for an environmentalist person to be the legitimization basis for a mythical protest activism or taking a stance in the case of Genetically Modified Organisms (GMOs) where news coverage arises.

In the case of AI, such functional definitions provided us necessary theoretical realm to situate the findings of research as it is also one of the foci of this thesis study to explore how different national media operationalize the concept of AI in media representations through these different modes exhibited in Figure 2.

In daily communication of science, there's an inherent challenge of transitioning abstract and conceptual to meaningful for those who are not directly involved with it. As this happens through associations, metaphors and other mechanisms mentioned earlier, study of SRT takes the focus of analysis away from the dualistic "science vs public" to "different publics of science" Bauer & Gaskell (*ibid*).

Although considered as "highly relevant" for media studies (Höijer, 2011), SRT has also been criticized for certain drawbacks like its inadequacy for guiding empirical research (Bauer & Gaskell, 1999), lacking power dimensions in formation of representations (Vorlklein and Howarth, 2005) or its lack of guidance regarding practicalities of individuals or groups when forming representations ((Potter & Edwards 1999).

As a theory of communication creating links across society, individual, media and public, Numerous science communication scholars have used SRT to study representation of various scientific topics (Berglez et al, 2009; Höijer, 2010; Olausson, 2010) with currently the exception of AI.

As a current techno-science concept acting as the bedrock for how science, politics, media and everyday communication merges into new social representations, there is an academic validity of studying AI by exploring it through communicative mechanisms regarding how its related concepts are represented and in process transformed into a perception of common sense. AI is a recent phenomenon in the making yet it easily dwells into the framework of SRT and science representation studies, like the preceding science communication topics of climate change

(Olausson, ibid), GMO (Veltri and Suerdem, 2013) and Nanotechnology (Cacciatore, Dietram and et al., 2011).

1.3 Literature on Representation of AI

Popularization of science is bounded by various factors including motives and agendas changing across time (Burnam,1987). Although science communication literature has a relatively thicker volume of resources shedding light on how various science and technology topics from gene modification to climate change are communicated and represented in media, on the specific topic concept of AI, literature is quite scarce. This section will briefly outline what is academically available at the time of this study and considered as an input to this work.

In their various longitudinal analyses of representation of AI in a typical west-origin media corpus, Ethan & Horvitz (2017) found that AI discourse sharply increased in volume and changed in nature since 2009. Their study analyzed a long-term evolution of views expressed on AI in New York Times with certain indicators created to measure how AI is represented. These measures included both general ones like Engagement and Optimism vs Pessimism and also more specific ones falling under the categories of hopes and concerns around AI. Although their normative analysis of content shows that discourse has skewed towards more optimism around healthcare and education issues, specific concerns rise around certain AI-related topics like the "worries of loss of control of AI, ethical concerns for AI, and the negative impact of AI on work" (Ethan & Horwitz, ibid). Their findings show that perceptions of AI differ significantly along a 30-year time window in United States. While in 1980s the salient keywords are related to "space weapons", "driverless vehicles" become the dominant keywords in recent years showing us the dynamism of the concept. Using Amazon Mechanical Turk as a crowd-sourcing platform to analyze corpora, this study focused on the western (exclusively USA-based) views on Artificial Intelligence.

A similar study in the form of a report based on primary research analyzing American society's attitude towards AI and its governance belongs to Zhang and

Dafoe (2019) where they provide preliminary insights on US public opinion regarding AI. Their report suggests that there's mixed support in US society for the development of AI with majority of people underlining governance issues to be critical, and demographic attributes are effective in shaping attitude towards AI, primarily education and annual income significantly driving support for embracing algorithmic systems and acknowledging their benefits to the society.

Another study focused on media analysis by Brennen, Scott and et al. (2018) tackled media representation of AI vertically in UK newspapers analyzing artificial intelligence in six UK-based mainstream news outlets. Results points out that AI discourse is led by the industry / companies rather than academia or government while AI is portrayed as "a relevant and competent solution to a range of public problems", along with public debates around the concerning effects of AI. Another finding is the politicization of AI; Right-leaning media highlight economics, geopolitics, national security and investment whereas left highlights issues of ethics, discrimination, algorithmic bias, and privacy.

In their study, Suerdem, Yildiz et al (2018) analyzed semantic shifts in the meaning of AI in major UK newspapers using word embeddings to produce semantic similarities between AI and other words to create a time-series analysis. Results showed that through the years, the sense of AI changed from "more speculative to more concrete" while AI is separating its language from the generic science, beginning to establish its own vocabulary.

Most academic studies on representation of AI are focused on local and western media, accentuating critical chronological journalistic treatment to AI with classical text analysis. However, current academic research has no input on how AI is represented in different countries and methodological choices are generally towards classical or manual media analysis. Limited number of studies on the media representation of AI majorly leans on the content analysis, yet in a limited contextual grounding through time series analyzing media in a single context of a country or a specific publication. However, media framing is closely related with

context and analyzing media in different countries can accentuate different media framings, suggesting different anchoring or objectifications. This is the starting point of thesis to underline such cross-country media frames and an attempt to understand cognitive mapping of AI by country context, revealing patterns, nuances or overlapping similarities.

CHAPTER 2

METHOD OF THE STUDY

2.1 A Social Sciences Inquiry of AI: Methodology and Methods

Exploring representations of Artificial Intelligence (AI) requires crossing epistemological and methodological borders, conceptualizing, contrasting, challenging, respecting and at times even ignoring borders as the fluidity, umbrella-like nature and complexity of the term, akin to other contemporary research questions today's social scientists are expected to engage (Stember,1991)

AI is originally a techno-science concept, carving a certain *episteme* in the social structure making it too pervasive to be treated in distinct disciplinary boundaries. Just as an example, although many bearing secular views, engineering jargon of the some of the creators of "AI", their self-positioning and even ideological quests have become associated with religion and attracted attention from theology studies. From digital prophets to technology evangelists, many professional titles in technology industry and linguistic elements of technology bear direct religious elements and new minority religion groups arise powered by technology (Singler,2016). Recently, a former Google engineer has founded "Way of the Future, a religious group to create a deity based on artificial intelligence for the betterment of society" (Solon, 2017)

A boundary object is concrete or abstract cohesions of meaning acting as interfaces which enable different, seemingly segregated social worlds to communicate (Bowker and Star, 1999). Stemming from the local units of sorting and categorization, Bowker and Star (ibid) coined the term "boundary infrastructures" defined as "any working infrastructure serving multiple communities of practice simultaneously." As argued by Giddens (2013) with respect to *Expert Systems*, "The medium of an information system is not just wires and plugs, bits and bytes, but also conventions of representation" (ibid, p.292). When these conventions become performative in society, represented in media discursively, they become

units of construction for certain modes of understanding, they become passively-active as "boundary infrastructures".

A methodological shift will also be needed to serve above-mentioned epistemological challenges. Gibbons (1994) underlines that the way knowledge is produced has undergone radical changes across the spans of scientific disciplines and this has the power to "replace or radically reform established institutions, disciplines, practices, & policies". Wickson et al. (2006) defines transdisciplinary (TD) methodology as going across borders and its ramifications in methodology is vast. A TD approach calls for a methodology involving an interpenetration or integration of different disciplinary methodologies, termed as "pluralistic methodology". This process, according to Wickson (ibid) "characterizes TD research by the process of having multiple research approaches critiquing and deconstructing one another to develop an evolved methodology"

In contrast to an evolved methodology in the practices of a vertical discipline, methodology caring about the fluidity of borders continue to 'evolve' along the research in an iterative relationship. This has significant implications for how TD research is performed in practice. One aspect is the collaboration across scientific disciplines. For an understanding of AI from social sciences perspective, both the research question and methodological tools work closely with computer science domain and this relationship is quite organic starting from the epistemology to arrive at multiple transdisciplinary methods. An example is the practical research of exploring the media representations of AI using text mining powered by Natural Language Processing algorithms. According to Boydstun, Amber E., et al. (2013), grasping media frames as a general phenomenon requires textual analysis at scale that is an arduous task if done solely by annotating the documents.

As AI is a pervasive concept represented in various forms ranging from a process to a technological object or even as an ideology or religion, capturing how the meaning is constructed by discourse analysis requires processing of diverse and vast amounts of media documents which are almost impossible to complete manually. However, using algorithms like LDA (Latent Dirichlet allocation)

running on an open source platform like Knime (Berthold,2007) or R Studio (RStudio Team,2015), topic probabilities and frequencies in media documents can be calculated, providing an explicit representation of the media corpus without or prior to manually analyzing it.

After this quantitative mode of inquiry, as machines only provide algorithmic representations of the document which are signs yet to be grounded on a meaning, further method work is in a completely different disciplinary nest: Reading representative documents calculated and produced by the machine for overall conceptual understanding and engaging them with qualitative methods for further digging.

To conceptually ground explored topics in this thesis, an interpretive reading of only selected texts is conducted. These texts were algorithmically marked as most statistically representative of AI-related topics in the corpus. During these readings, a qualitative coding is implemented in an iterative manner where new keywords noted, they are re-plugged into the text analysis algorithm to further get assistance from the corpus regarding where new relevance is possible from the topic similarities detected around this newly-discovered keyword. This fluidity of epistemological approach, during any step of the qualitative inquiry, researcher sometimes paused and referred back to text-mining process based on the utterance of a specific keyword for which the computer algorithm provided other related topics in the corpus. This also triggered another circular, methodologically transdisciplinary attempt for qualitative explorations.

This continuous cycle of capturing the signs and grounding the meaning by switching between quantitative methods of text mining and qualitative modes of inquiry is a practical example of how cross boundary methodology can be actively engaged in studying the representation of AI, being this study's rather distinctive approach to methodology.

2.2 Methods Used in Study

As briefly outlined above, this thesis involves a two-layer approach to answer its research problems, Topic Detection and Exploration of Text-mining Topics by grounding text-mined symbols. Topic detection used text-mining methods to find patterns of how AI is textually represented, and which topics are salient in the AI discourse. After this phase, text-mining topics were explored by manually reading most representative documents and taking these textual inputs to identify and validate machine-read topics within and across country settings.

2.2.1 Topic Detection

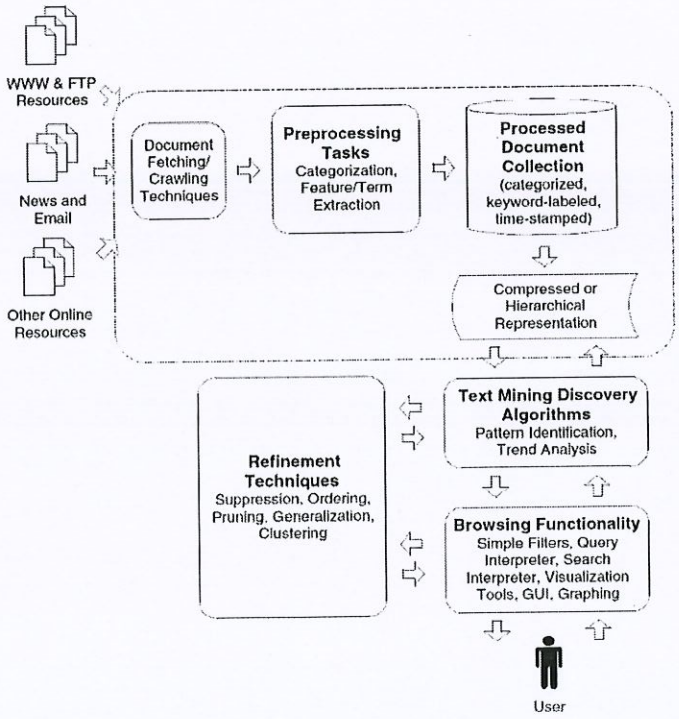
Mass media is a vast repository in terms of producing a multiple ground for making meaning on most issues including science and technology. It plays a major role during the dissemination of such symbols in modern societies and cultivation of collective thought. Gerbner (1969) defines "the creation of both the consciousness and the social structure called public is the result of the "public-making" activity" of media. Classical content analysis of such a valuable environment referred as "Agenda Setters" by Gerbner (ibid, p.140) might provide social scientists an opportunity to explore how the concept of AI is making itself as a collective thought and action.

Like any other media topic, concept of AI is represented in many different contexts with different related keywords, textual patterns and regularities. AI can be considered as rather a unique issue in terms of its scientific origin yet in the way how this scientific concept has created simultaneously a discourse and a pervasiveness in our daily practices, uncommon to other popularized science concepts (e.g. the case of genetic engineering, quite popularized yet almost nothing quite practically and pervasively lived in society). This dual nature of AI can be extremely relevant to address from social sciences perspective by juxtaposing these concrete daily practices vis-à-vis -sometimes- dualistic conceptions / representations in the media. Capturing these by content analysis presents an

opportunity to capture the entire textual spectrum of the related AI concepts, with the potential of revealing social media frames in tandem.

Today's mass media bear far more diversity in nature and has tremendously increased in volume due to digitalization which is almost impossible to tackle by classical manual content analysis. Computer assisted text-mining methods were used to overcome this hurdle. Text mining is a recent realm of computer science using natural language processing, data mining, machine learning, information retrieval and knowledge management practices. Text mining techniques are used to extract useful information from unstructured textual data by identifying and exploring patterns in relevant text repositories. (Feldman & Sanger, 2007). See Figure 3 for a process summary of a generic text-mining method. It mainly involves the preprocessing of document collections (text categorization, information extraction, term extraction), the storage of the intermediate representations, the techniques to analyze these intermediate representations (such as distribution analysis, clustering, trend analysis, and association rules), and visualization of the results.

Figure 3. Architecture for generic text mining system (Feldman & Sanger, 2007)



Concept of building a corpus is critical in text mining. `Texts' are often assumed to be a series of coherent sentences and paragraphs, while a corpus is a subset of an electronic text library (ETL) which is a "collection of electronic texts in standardized format with certain conventions relating to content etc., but without rigorous selection constraints" (Atkins 1992). Corpus is built in line with specific design criteria for a specific purpose, hence corpus design is instrumental in terms of addressing research objectives and capturing nuances of the cultural indicator in question.

Definition of the corpus population requires specification of the boundaries and specification of the strata / categories (Biber, 1993). In this study, corpus included major English language media outlets in United States, UK, Germany, China and Turkey between the dates 1983 and 2018. Please refer to Table 2 for the details of media covered in each country. News are selected based on the keyword of "AI" in these flagship newspapers reflecting dominant public opinion in English. Hürriyet corpus was in Turkish with the same selection criteria in addition to its continuity and high circulation in this language. Countries except Turkey are empirically known to create majority of the discourse by mostly authentic news-curation. An addition to the corpus was Turkey with a major Turkish language newspaper Hurriyet, with the intention of probing whether Turkey differs significantly from the prevalent AI discourse in other countries in order to understand if and how country specific media representation mechanisms operationalize on a global issue like AI. Hurriyet was chosen as the only data source for Turkey as it was the only mass, with largest circulation, ideologically not skewed, electronically available news outlet. New developments in AI are covered originally in these English-language news resources and mostly they are later translated to local Turkish resources, so discourse making capacity of these institutions are paramount, followed and further populated by local news in Turkey.

Table 2: Corpora used in text mining

Country	Media Covered	Total Number of Articles Covered
United States	The New York Times Washington Post Blogs Wall Street Journal Abstracts Los Angeles Times The New York Post The Washington Post	815
UK	The Times Sunday Telegraph The Guardian The Daily Telegraph Independent Daily Mirror The Mirror	747
China	China Daily South China Morning Post South China Morning Post.com	725
Turkey	Hürriyet	550

Corpus Analysis is defined as a methodology "for pursuing in-depth investigations of linguistic concepts as grounded in the context of authentic and communicative situations" (Thanaki, 2017). Steps of pre-processing and topic modelling have been followed for corpus analysis in this study. To construct the corpus, Lexis Academic database (http://www.lexisnexis.co.uk/en-uk/home.page) is used by searching the keyword "Artificial Intelligence" mentioned in the news between the years 1983

and March of 2018. Lexis Nexis provided 2,985 news articles with duplications from United States, United Kingdom and China in total and they are electronically retrieved and deduplicated to be processed for further analysis. Turkish Newspaper Hürriyet was scraped from publicly available internet pages using NLTK (Loper and Steven, 2002), in addition to custom-written codes and statistical natural language processing public library packages in R and Python.

2.2.1.1 Pre-processing of Corpus

During pre-processing of corpus, raw text files were handled by a series of text operations beginning with lower-case conversion. Sentence tokenization is applied to corpus to identify the boundary of the sentences and then each token has become a unit of linguistic analysis by various NLP techniques. Most prominent of these techniques which were also crucial in this study's text pre-processing are Stemming, Lemmatization, POS Tagging and Stop-word Removal.

Stemming is a basic text normalization process of converting each word of the sentence to its root form by deleting or replacing suffixes. It is widely used in NLP studies yet this rather indiscriminate cutting off might not be successful in cases where there are multiple meanings in the roots of a suffixed word where stemming might miss the contextual accuracy (e.g. the word "activates" might typically be stemmed to "act" while the true root denotes activation from the root of "activate")

Lemmatization is the process of finding the normalized form of a word that identifies the correct intended part-of-speech (POS) and the meaning of words that are present in sentences. Finding lemmas is more robust than stemming words and it uses vocabulary and morphological analysis.

Stop-word removal is the process of getting rid of repeating words with no meaningful contribution to the text, reducing the amount of unnecessary data to be processed with no added value.

Different packages on R and Python used for stemming, lemmatization and stop word removal of the AI corpus used in this study. As Turkish corpus had methodological differences in the analysis, it has been processed and analyzed in

parallel to the English-language corpus. For Turkish newspaper Hürriyet, as most of the R and Phyton codes are not available in Turkish language, manual corrections are made, automated pre-processing is iterated after these corrections. A custom stop-word was built for Turkish on top of NLTK using a combination publicly available and open-source Turkish stop-words libraries.

2.2.2.2 Corpus Analysis Through Topic Modelling

After pre-processing, corpus becomes ready to be analyzed for advanced analysis techniques like topic modeling to understand the semantic dimensions of the text.

The term topic modelling refers to a number of generative probabilistic models and the most widely quoted one is the Latent Dirichlet Allocation (LDA) developed by Blei et al. (2003)

According to Ramage, Daniel and et al (2009), present demand from social sciences studies for topic modeling techniques is strong and growing as the scale and scope textual datasets are growing. Social scientists need better tools to help make sense of that data and understanding topics across sizable texts are almost impossible without automated tools.

Over recent years, topic modelling techniques and especially LDA (Blei DM et al, 2003; Griffiths and Steyvers, 2004) have seen growing use for various applications in social sciences.

Essentially, Topic modelling is an unsupervised learning model to identify the set of underlying topics in terms of word distributions. Topics are determined for sets of documents and each document's affinities to these topics are calculated. It is a recent and emerging research approach to use topic modelling supporting qualitative and quantitative study of large-scale text data. (Nikolenko et al., 2017)

Recent research uses topic modelling as statistical analysis for varying objectives from detecting words that may identify media bias (Fortuna et al., 2009) or ideological discourse (Lin WH et al., 1993). Certain caution and deliberation is needed when topic modelling is used to understand social phenomena (Ramage,

Daniel, et al., 2009). Pitfalls to avoid during topic modelling for social science studies can be summarized as i) Characterizing the topic with poor representation of terms, ii) difficulty of naming without vertical expertise on the specific topic in the absence of the field practitioners involved and iii) the contextual nuances of words which might be overlooked during analysis without ad-hoc and iterative supervision of the results. In order to avoid these obstacles, this study used topic modelling in tandem with utilizing the hands-on area-specific expertise and the involvement of the researcher with the AI industry.

2.2.2.3 LDA as a Topic Modelling Analysis

To explore topics in this corpus, LDA as a Natural Language Processing method is used on the open source KNIME Analytics Platform (Knime, 2017). KNIME Analytics is an open source platform integrating data access, transformation, analysis and mining tools with a graphical user interface and workflow-based structure.

First presented as a graphical model for topic discovery by Blei et al (2003), LDA is a generative statistical topic model. which assumes that each document is characterized by particular set of topics, mathematically explaining the similarity of some parts of the data. If observations are words collected into news documents, LDA suggests that each news document containing AI-related news can be represented as random mixtures over latent topics, where each topic is characterized by a distribution over words and that each word is attributable to one of the document's topics. Distributions of document-topic and topic-word learned by LDA represent a satisfactory suggestion of topics for documents and what can be the most descriptive words for each topic (Blei et. al., ibid).

LDA assumes that each document contains a number of topics as hidden variables represented by a fixed number of words (or the observable variables) and there might be varying proportions of topics in each document. These two assumptions of LDA work in the algorithm, based on word frequencies and probability of occurrence, attempts to differentiate the hidden variables / topics, from the

observable variables / words. The results show the probability of words as topics become collections of them with high probability of co-occurrence. Word/group associations present a number of semantic similarities (Jaworska, Sylvia, and et al., 2016) thus some scholars suggest other terms for LDA outputs like semantic frames (Rychlý, 2014) or thematic patterns (Goldstone and Underwood, 2014). Such academic mileage on the use of LDA is yet to be scarcely practiced in the domain of AI and social sciences interaction, laying the ground for the quantitative method of this study.

2.2.2.4 Cognitive Mapping

Cognitive mapping is a tool of representing meaning in qualitative data offering great potentials to assist researchers to make judgments about relationships between a set of concepts to visually represent the conceptions of an individual or a group about an issue (Axelrod, 1976). It is used for eliciting diversity and dimensionality in the large textual corpus to extract subgroups differences leading to different mental structures covered in news.

Frame mapping is a specific application of cognitive mapping in the context of media analysis (Miller & Riechert, 2001). According to Entman (1993) consistency in the presence or absence of specific keywords across corpus is a way of finding media frames. Multidimensional scaling (MDS) is a set of statistical techniques used for reducing the complexity of perceptual data to obtain quantitative estimates of distances among a group of real or mental "objects". These estimates are then used to visually represent pattern of relations between these objects as in a geographical map. These "Objects" can range from products, people, political persuasion, or any kind of psychological or conceptual stimuli (Kruskal and Wish, 1978). Torgerson who coined the term first used it as a psychometric technique for understanding people's judgments of the distance between a set of stimuli. According to Bazeley (2004), mixed methods can help to structure the idiographic textual expressions by providing a generalizing approach with the support of statistical techniques. Automatic pattern detection techniques such as MDS can reduce the complexity in this structuring process by revealing the patterns

connecting the singular data pieces to the whole. MDS deals with information visualization used for reducing the dimensionality in complex conceptual data, visualizing data is an important element of understanding by making holistic visual associations. MDS as a pattern detecting technique strengthens the capturing of relationships between concepts based on co-occurrences of keywords or other similarities (Miller & Riechert, 2001)..

A criticism and watch out in the literature against MDS use in the context of media analysis is its possible inability of cross-context usage of words resulting in disambiguation of the meaning. (Shapiro & Markoff, 1997). Literature suggests further qualitative coding through interpretative research (Brier et. al. 2016). Concept mapping approach tackles these reliability and validity issues by augmenting qualitative coding with multivariate statistical methods, suggesting an iterative construction of meanings by integrating the interpretation of the researcher to the analytical process.

MDS was used along with LDA topic modelling technique in this study as literature also suggests (Brier et. Al, 2016) to address the problem of dealing with large corpora. Primary patterns detected by machine are further grounded by the researcher's reflexive involvement to this specific domain. This technique enabled the representation of a large volume of texts as a summary of topics varying with probabilities, also deemed to be an explicit representation of the corpus (Steyvers & Griffiths (2007). LDA algorithm summarized the corpus by extracting a set of topics at a manageable quantity and each document exhibiting those topics with different proportions. Since LDA created map of words to vector of probabilities of latent topics according to their occurrence in similar contexts these detected topics helped analysis to recognize the contextual information along with summarizing large unstructured textual data.

Documents with highest scores for each topic are selected for interpreting and labelling the topic through in-depth reading for assuring contextual sustainability and text quality. After labeling, topic scores in each document are used to calculate topic by topic proximity matrices for each country.

2.2.2 Symbol Grounding: Exploration of Text-mining Topics

Text mining cannot infer the context of a text, which requires social and cultural elements giving rise to that text. As a solo method it cannot provide an easy solution to ground the meaning out of media representation topic keywords generated by a mathematical formula. Text mining reflects mathematical results, but it is the researcher's responsibility to fully understand and make meaning of the words in the light of reflexive thinking and following the hermeneutic circle (Gadamer, 2008), switching up and down between machine-read media representation topics and their meaning inscribed in text. Thus, second layer of the methodology included interpretive coding of machine results. Researcher is grounded in a profession heavily involved with both the production and consumption of algorithmic systems hence providing an ontological proximity to symbol grounding.

Hermeneutic circle (Gadamer, 2008) is one of the fundamental concepts of hermeneutics and its basic notion is that circle is of the whole and the parts, which can only be understood by continuously referring to the parts and the whole back and forth, because "we can only understand the parts of a text, or any body of meaning, out of a general idea of its whole, yet we can only gain this understanding of the whole by understanding its parts." (Lawn, 2016). Underlying insight of the circle and the urge to close it is to accept the axiology of "no such thing as an understanding without presuppositions" (Lawn, ibid). Here in this context of deriving symbol-based meaning of AI through text mining, hermeneutic circle grounds the meaning by keeping the partial message coherent across the scattered texts.

This process is also an attempt of qualitative understanding of the interaction between science, technology and diverse publics with the aim of finding a more thorough picture of how certain groups, especially the technology users/knowledge workers choose among different kinds of meanings of AI offered to them, with possible political, ideological and cultural systems involved. It is a mapmaking effort to understand concepts uttered quantitatively to provide a pattern or a point of socio-cultural differentiation with reference to the researcher's existing set of

knowledge, experiences and beliefs, creating certain modes of understandings visa-vis the machine-captured media representations.

2.3.3 Researcher's Relationship with Algorithmic Systems

According to Wagner et al. (1999), social groups and individuals belonging them understand social phenomena uniquely which constitute a social identity for them. This common understanding of their lifeworld and objects (in the sense of social phenomena) constituting it is the common ground for not only communication but also for the shared actions. Lifeworlds are tackled in academia from various perspectives as a "medium of reference" (Fairtlough, 1991) or a "shared resource" (Habermas, 1984). Researcher being a knowledge worker himself nested in a global digital agency based in Istanbul Turkey (Project House - http://www.ph.com.tr/) yet working closely with UK, US and other global offices constituted the basis for reflexive grounding and interpretation of text mining results. Project House is a typical Knowledge worker environment creating technology- based communication projects in digital media, utilizing algorithmic systems and almost all of the workforce are knowledge workers involved with artificial intelligent systems in a varying and wide range from developing hard-core AI technology to using it as a fundamental part of the work produced. As a key worker and manager in this organization utilizing and managing a team creating algorithmic systems for over 20 years, this involvement and immersion with intensive field interactions also enabled grounding the topics, without falling for the pitfalls of pure-machine-based learnings.

Topics identified in the first method of the study were used as non-rigid coding frames to start navigating in-depth reading of representative news. Interpretive reading of the news triggered iterations of exploring more topics and news documents connoting certain keywords readily available in the corpus processed, producing inputs for next interpretive readings. Research findings were completed with these readings as country by country and cross-country representative elements, anchors and objectifications were identified.

CHAPTER 3

Analysis Of Findings

According to Social Representations Theory, primacy of certain symbols enables community with common codes to digest and this in turn results in the construction of realities (Moscovici, 2000). Any techno-science concept including AI comes with unfamiliar words and concepts as part of science communication. O*bjectification* as a socio-cultural process helps the community to turn the abstract concepts into concrete ones. Members of the community makes sense of phenomena by grounding them to into existing vocabularies, a process described earlier called *anchoring*. These indicators are critical to capture how media cultivates the meaning of a certain concept with certain frequency distributions within a corpus. Such distributions suggest the existence of a "common public knowledge and assumptions about the nature of existence in that domain of knowledge" (Gerbner, 1969). In text-mining, examining frequencies for single critical keywords, n-grams, collocations and concordances of critical keywords are used to explore how they make sense in the context.

As elaborated in Chapter 3 under methods, this thesis study used coherence measures as a decision criterion and ended up on maximum of 10 topics for each country's topic modelling. Further elaboration of selected representational text resulted in consolidation of topics in certain countries as similar topics are eliminated as their marginal contribution to meaning was not supported by manual reading. Each country-specific data is exhibited and findings regarding how different media cultivate AI through topical dimensions is elaborated here.

3.1. Academic Frameworks for Analysis

Topics found by text-analysis were treated under two academic frameworks:

i) Overall analysis of social representation of AI with units and functions of representations according to Bauer and Gaskell (19999). Functions serving the representation defined as Mythical, Ideological, Identity-enabler, Resistance-enabler, Attitudinal and Scripting of intentional activity are applied on the machine

generated data to explore how these parameters map functions of social representation of AI topics in media.

ii) Classifications of media frames of AI using the identification according to Boydstun, Amber E., et al. (2013) where they delineate a cross-issues unified coding approach for content analysis, as outlined in the Chapter 2.

3.2 Wholistic Analysis of English Corpus Findings

We have grouped English-language corpus of US, UK and China as a unit of analysis using exactly the same linguistic models and text pre-processing tools. As Turkish language corpus differentiated both in its linguistic nature and in terms of the methods and tools required to process, it has been treated as a separate unit of analysis for machine-based text understanding part of the study. For grounding the meaning of representative documents, a global analysis of comparing topic dimensions is made across global data. Table 3 outlines machine-based topic abbreviations and their explanations.

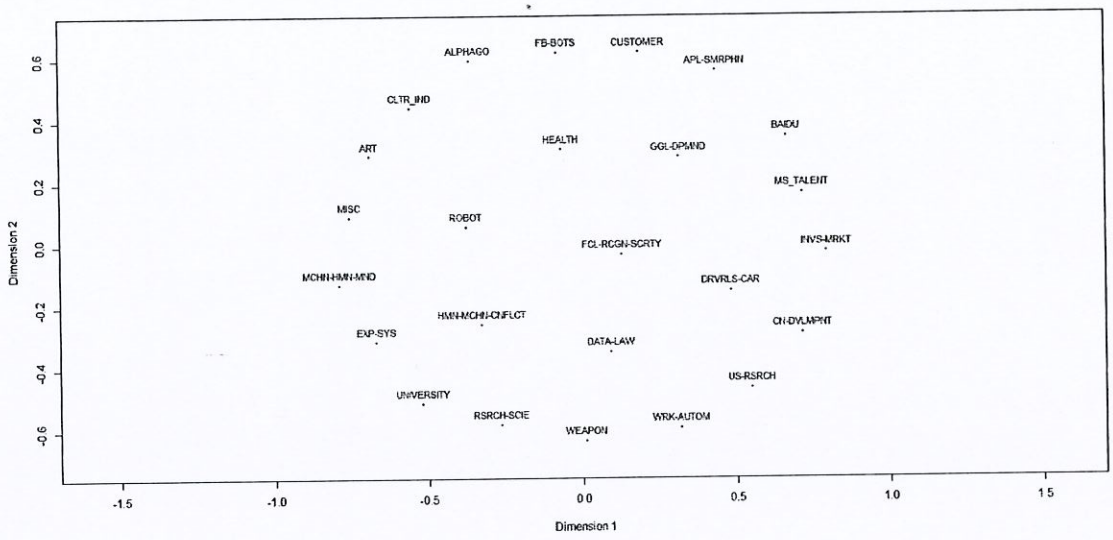
Table 3: Topics detected by text-mining

Text Mining Abbreviations	Explanation
AlphaGo	Computers vs humans in games like chess, AlphaGo, etc.
APL-SMRPHN	Apple and other smartphone related news
ART	AI's involvement in art (paintings, poetry, etc.)
BAIDU	Chinese search firm Baidu-related news
CLTR_IND	Culture Industry; AI in content and entertainment industry in the form of movies, video games and books
CN-DVLMPNT	News related with AI and development of China as a country
DATA-LAW	Law-related news regarding the use of algorithmic systems in legal.
DRVRLS-CAR	News related with driverless cars

EXP-SYS	News related with expert systems in the broadest sense of the definition; including social media platforms.
FB Bots	Topics related with Facebook, messenger bots, brands using them client interactions
FCL-RCGN-SCRTY	News related with security uses of AI, especially using facial recognition and other technologies.
GGL-DPMND	Google Deepmind in news
HEALTH	Health related news covering algorithmic systems and computers in health industry
HMN-MCHN-CNFLCT	News portraying human-machine relationship as antagonistic
INVS-MRKT	News regarding the use of AI in Investment and financial markets
MCHN-HMN-MND	News related with algorithmic systems in the effort of having human-mind like capabilities
MS-TALENT	News around Microsoft and AI-capable talent in software industry
Robot	News related with robots and their involvement in social and economic life
RSRCH-SCIE	Research and scientific development news related with AI
UNIVERSITY	News on universities and their institutional involvement with AI
US-RSRCH	News quoting US-based research on algorithmic systems
WEAPON	News on AI in weaponry and related war technologies
WRK-AUTOM	News on AI's and automation's involvement in work and labor

Using cmdscale() package in R as part of MDS analysis explained in Chapter 2.2.2.4, output was the representation of topics in 2-dimensional space in English corpus across countries as exhibited in Figure 4.

Figure 4: Topic Dimensions in English language Corpus using MDS



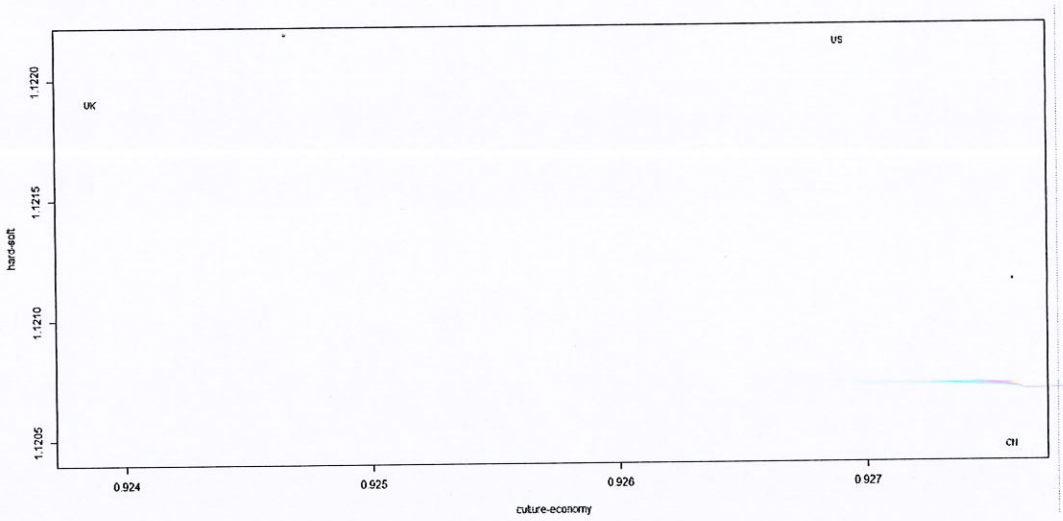
Qualitative grounding of all topics across these dimensions revealed that the horizontal dimension (D1) has topics heavily representing varying degree of humanity's macro-relationship with AI, e.g. from existential and socio-economic issues such as human-machine conflict, machine ability to emulate human mind, fundamental research, material benefits or threats of robots to human economic life, AI in culture, the controversies around AI's mimicry potential of humane values and attributes etc.

On the other hand, vertical axis in Figure 4 exhibited topics with a varying degree of benefits of techno-science, e.g. a news topic at the upper quadrant corner would be Facebook Messenger based customer service bots utilizing "AI" or an Algorithm capable of creating poetry. However, news topics at the bottom of vertical axis revealed a representation of AI skewed towards the topics typically as nation-wide defense and weaponry or AI being an economic development leverage for a country.

Figure 5 shows 2-dimensional distribution of country topics. Results indicates that China is positioned in the mere economic benefits part of the topics, close to United states yet dissimilar to both UK and US in terms of its embrace-it-all and noncritical

approach to AI as a hard-leverage for nation-wide macro development efforts. Compared to China, representation of AI in US news media is also portrayed as a leverage for economy and innovation with slightly more emphasis on the research and practical uses of AI while AI as a product critically discussed as well, compared to Chinese heavy skew towards emphasis on leverage of algorithmic systems for nation's economic development and identity. AI in UK News Media positioned differently from other countries emphasizing and critically discussing topics like how AI can or cannot be closer to humanity in the sense of soft-skills like art, poetry and possible social, cultural and economic consequences of the increasing convergence between the soft-skills of algorithmic systems and humanity.

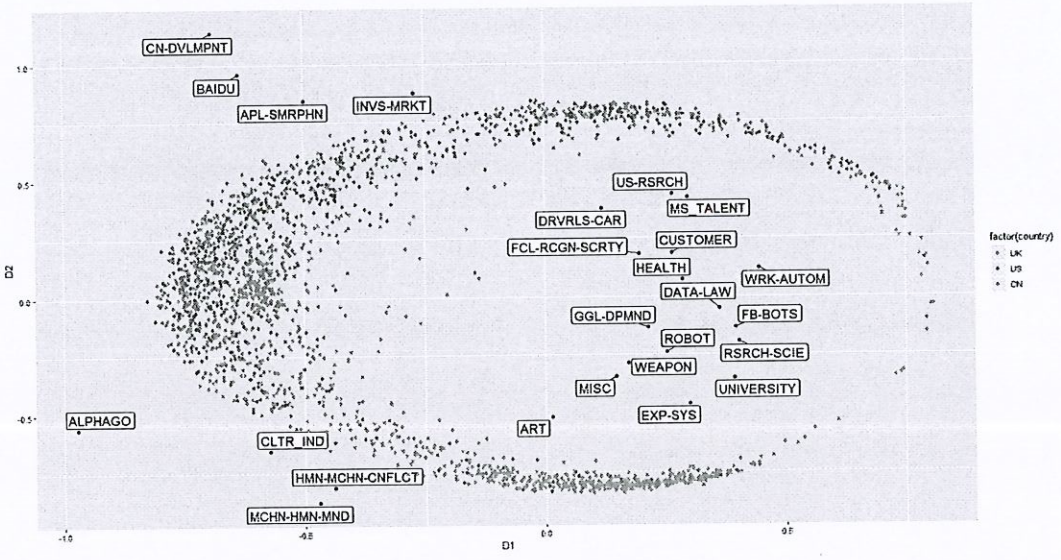
Figure 5. 2-Dimensional Distribution of Country Topics



Confirming the above analysis, unfolding MDS analysis in Figure 6 also represent the news from each country. We can observe from the figure that some news from China (Blue) do specifically mention market-investment (INVS-MRKT), hi-tech brands (BAIDU, APL-SMRPHN) and China's development (CN-DVLPMNT). US news (Green) are also concerned about R&D (US-RSRCH), workforce requirements of hi-tech companies such as Microsoft (MS-TALENT), use of AI in customer services (CUSTOMER). The news about driverless cars (DRVRLS-CAR) and using facial recognition for security purposes (FCL-RCGN-SCRTY) are salient both in Chinese and US newspapers. UK news (Red) are more concerned

about human-machine conflict, comparing human mind to machine intelligence, AI in culture & art and expert systems. Topics like use of AI in health, regulation of data, research by companies like Google and Facebook, research by scientific institutions like universities, work automation, robots and AI in weapon technology occur in news in globally with different nuances in countries.

Figure 6. Unfolding MDS, Topics by English-speaking Countries



3.3 Identifying Frames in English Corpus According to Boydstun, Amber E., et al. (2013)

When most descriptive news suggested by text-mining about each topic has been manually analyzed according to their similarity score to the topic, following frames have been identified in the English language corpus, based on frame codebook of Boydstun, Amber E., et al. (2013). A summary of all topics and their media frame categories can be found in Table 4.

Economic frames are defined as "costs, benefits, or monetary/financial implications of the issue to an individual, family, community or to the economy as a whole" (ibid). Most product-based representations of AI falls into this category, especially the topics AlphaGo, APL-SMRPHN, BAIDU, DRVRLS-CAR, FB Bots, MS-TALENT leaning towards the economic benefits at micro-economic/individual

level whereas CN-DVLMPNT, GGL-DPMND, INVS-MRKT, RSRCH-SCIE are more toward societal economic impacts.

Capacity and resource frames are defined as the lack of or availability of physical, geographical, spatial, human, and financial resources, or the capacity of existing systems and resources to implement or carry out policy goals. Especially WRK-AUTO, HEALTH, MS-TALENT, CN-DVLMPNT topics are primarily framed under this category. WRK-AUTO is usually used together with Robot topic as robots are the primary objectification of AI in the narrative of scarcity of jobs and humanity's losses against machinery in the workplace. "Robot Army", or "Robot Invasion" are particular anchorings for this framing.

Morality Frames enclose any perspective or policy objective or interpretation, duty, honor, righteousness or any other sense of ethics or social responsibility. Majority of the DRVRLS-CAR discussions entail references to morality of accountability for driverless cars especially in the case of an accident where no legal and ethical judgement is mature in society. DATA-LAW is also another topic where involvement of AI in decision making process with bias in AI models criticized from the righteousness and transparency perspectives.

Fairness and Equality with which laws and resources are applied or distributed among individuals or groups is primarily framing the topics of WRK-AUTOM and DATA-LAW, especially within the perspective of rights or interests of humanity under assumptions of AI-dominant workplaces and judicial conditions respectively. Another topic under this framing is HMN-MCHN-CNFLCT which primarily discusses how humanity is/will be challenged by the presence and advance of algorithmic systems and unfair advantage of machinery versus the fragile and limited nature of humanity.

Constitutionality and jurisprudence frames are involved with the degree or constraint of the freedoms granted to individuals, government, and corporations via judicial system, especially regarding the government's right to regulate and its boundaries with individual freedoms and rights. This frame seems to be active in

the topic of FCL-RCGN-SCRTY where the ubiquitous nature of surveillance is challenged in some of the news articles. DATA-LAW is another topic framed by this perspective on the possibility of the effects of AI on the judicial process hindering the rights of certain groups and minorities.

Policy prescription and evaluation frames the topics of DRVRLS-CAR and FCL-RCGN-SCRTY where certain policies needs to be developed for addressing a rather novel and newly-identified problem which falls out of the traditional law and economic systems and processes, making current practices and approaches rather obsolete E.g. If a driverless car makes a fatal crash with humanitarian consequences, how is the accountability assessed among the plethora of the stakeholders from hundreds of coding third parties to insurance companies, among which human drivers' agency is trying to be located.

Law and order, crime and justice frame is active in DATA-LAW topic as this framing is particularly related with law practice and its implications, including sentences and punishment, actively and directly shaping discourses of how sentencing process supported by algorithmic models where guilty/no guilty decisions are influenced under a possible bias inherent in machine learning models. Critiques circle around socio-cultural bias injected into models depicting economically disadvantages social groups as more inclined to crime and punishing certain minority groups without valid judicial causality. Discussions center around bias in AI training models that can hurt less-represented segments of society who are more prone to be challenged by judicial decisions supported by AI.

Security and defense frames shape news with security and protection both at individual and societal levels. FCL-RCGN-SCRTY has a dichotomic coverage in news as reinforcement of security and privacy are at the opposite ends of the discourse. Opinions in favor of the practices of FCL-RCGN-SCRTY embraces the view that as more connected and smart cameras are diffused into societal life, neighborhoods and communities will be more secure places. On the other hand, privacy concerned news debate over the ownership, use and possible misuse of biometric facial data violating the privacy of the individuals and lack of consent

and privacy in daily life penetrated by AI-supported camera systems. Another topic shaped at the macro-level security frame is WEAPON. Algorithmic systems in weaponry are presented in news as innovative, tactical advantages generally aligned with national priorities. Drone aided military attacks, possibility of autonomous machines or their operators making mistakes and the changing dimensions of war are among the topics shaped under this framing.

Health and safety frames are active in all health-related issues including prevention, diagnosis and treatment of diseases, with a direct topical dimension arising in this study as HEALTH. Generally news related with topics under health framing treats algorithmic systems as enablers of health systems for both patients and healthcare professionals, improving diagnosis of cancer or robots giving aid during surgery etc., portraying the ultimate positive effects of AI for humanity.

Quality of life frames have a spectrum of topical territory on issues like individual wealth, happiness, social structures, quality of nation-wide living standards, etc. It's also one of the critical framing devices cultivating AI as an artefact in the society by anthropomorphizing algorithmic systems and making them directly related with various qualities of life, depicting AI as personal assistants, portraying robots as life-friends with emotions and capable of cultural expressions or AI-enabled smartphones to be ultimate necessity for creating professional quality photography. Topics of APL-SMRPHN, FB Bots, Robot and HEALTH are all forming a quality of life discourse according to this framing model.

Cultural identity frames shape social norms, trends, values and customs constituting culture(s), from a macro / politics perspective. Most of objectified AI, devices and artefacts represented as AI or cultural outputs like art and poetry portrayed as developed by AI contribute to constitution of culture by this framework's definition. Here the topics of APL-SMRPHN, Robot, ART and CLTR_IND are directly affected by this framing. Objects narrated through an AI capability with their potential of creating consumption culture and identity have also been treated under this framing in this study.

Public opinion frames involve with general social attitudes shaping public and political opinion. Involvement of AI in societal attitudes is present in these macro-level topics of WRK-AUTOM, DRVRLS-CAR, WEAPON, DATA-LAW, FCL-RCGN-SCRTY, HEALTH and CN-DVLMPNT. News bearing these topics have the possibility of impacting public opinion due to their potential of visible / perceivable societal impacts as in the case of WRK-AUTOM where communities are affected by lay-offs and these are attributed to the presence of machines and algorithmic systems in work environments, creating a dystopian AI discourse. From a utopian perspective, a health system supported and even led by AI is portrayed superior than human health practitioners and for the ultimate interests of humans.

Political frames are related with direct considerations of politics (in the sense of voting, partisan issues, lobbying etc.) surrounding an issue. This framing has been recently active in the topic of EXP-SYS during the discussions of voter perception and behavior, Cambridge Analytica scandal being a recent example. Capacity of AI systems manipulating public perception with direct effects on voting behavior and their importance in democratic societies as an external factor is under this framing.

External regulation and reputation frames specifically shape discourse on the relations between nations and states. As it will be elaborated during the analysis of US news corpus, there's a direct reference, competition and comparison between US and China to each other's development progress in AI and CN-DVLMPNT topics, shaped by this framing across English language corpus.

Any remaining frame is denoted as "*Other Frames*" in the policy codebook that do not fit into the above categories (Boydstun, Amber E., et al., 2013). Although related with different frames, MCHN-HMN-MND topic can also be categorized under "others" frame due to its philosophical nature positioning it beyond the above-mentioned frames. MCHN-HMN-MND topic appears in the news arguing for a comparison of inherent human attributes (like writing poetry, falling love or getting angry) to algorithmic systems, working towards to cultivation of AI as an anthropomorphic phenomenon and as a myth.

Table 4. Summary of Frames Shaping AI Topics

Economic frames	AlphaGo, APL-SMRPHN, BAIDU, DRVRLS-CAR, FB Bots, MS-TALENT CN-DVLMPNT, GGL-DPMND, INVS-MRKT, RSRCH-SCIE
Capacity and resources frames	WRK-AUTO, HEALTH, MS-TALENT, CN-DVLMPNT
Morality frames	DRVRLS-CAR, DATA-LAW
Fairness and equality frames	WRK-AUTOM, DATA-LAW, HMN-MCHN-CNFLCT
Constitutionality and jurisprudence frames:	FCL-RCGN-SCRTY, DATA-LAW
Policy prescription and evaluation	DRVRLS-CAR, FCL-RCGN-SCRTY
Law and order, crime and justice frames	DATA-LAW
Security and defense frames	WEAPON, FCL-RCGN-SCRTY
Health and safety frames	HEALTH
Quality of life frames	APL-SMRPHN, FB Bots, Robot, HEALTH
Cultural identity frames	APL-SMRPHN, Robot, ART, CLTR_IND
Public opinion frames	WRK-AUTOM, DRVRLS-CAR, WEAPON, DATA-LAW, FCL-RCGN-SCRTY, HEALTH, CN-DVLMPNT, WRK-AUTOM
Political frames:	EXP-SYS

External regulation and reputation frames	CN-DVLMPNT
Other frames	MCHN-HMN-MND

3.4 Analysis of Social Representation Functions of AI in English Corpus According to Bauer & Gaskell (1999)

After analyzing overall framing of AI in English corpus, Functions of the social representation of AI will be explored in this part of the study as these functional elements are primarily the ones operationalized in news. A summary table for representational functions of AI in English language corpus is provided in Table 5.

3.4.1 Attitudinal

Attitudinal Functions in the representation of AI are active in various topical dimensions. In topics like AlphaGo, ART, GGL-DPMND and Robot, major underlying characteristic theme is the attitude formation centering around the capabilities of algorithmic systems visa-vis humans. An ultimate assumption of commensurability that the algorithmic systems are up to or better than humanity and comparable in most of what has been known as human-specific attributes (like creating poetry, art etc.) is embedded in this function.

In the topic DATA-LAW, attitudinal representation function is a quite dystopian one with the fallibility claims on algorithmic systems in place for judicial matters, court decision support systems etc. For the topic DRVRLS-CAR, most of the news function with the attitude that algorithmic systems drive much better than humans, only to be challenged by one-off and rare events of catastrophic failures of these systems. During the face of these events, news not only challenge the assumption of superior skills of AI, but there's also a stance in news to accept that humans are the faulty creatures behind the faulty machinery, representing algorithmic systems superior if and when human intervention is minimal. For EXP-SYS topic, especially the attitude-formation around wide-range digital platforms like Facebook are

carved in news with their potential threats to society and privacy, leading to Resistance-enabler positions in the events of US 2016 elections where algorithms were accused of meddling with election results through manipulated opinion-formations.

Intersection of Health and AI topics have an attitudinal function of representing algorithmic systems as not only ultimate helpers to health practitioners but also portray them as potential replacement for humans in treatment and care-giving. An attitude of machine-trust and AI-based innovation in health is a center of representation for AI in health-related news, where diminishing roles of human factor in health is rarely critiqued.

MS-TALENT topic is functionalized in attitudinal representation as how high-tech industries, also as in the case of technologies bearing algorithmic systems create need for talent, and the opportunities created by AI in talent space, carving an all-positive representational element for AI news.

INVS-MRKT topic centers around the attitude formation of how AI transforms the processes of investment and also the assumption that it will always beat traditional human based systems by being faster and smarter. This attitudinal dimension in especially finance industry regarding the power of AI to make anything non-algorithmic obsolete is recurrent in the news, eventually positioning AI and human in a dichotomy.

RSRCH-SCIE, UNIVERSITY, US-RSRCH are topics centered around the role of research and universities in the development of AI. Although nuanced in different country-based corpora, an attitudinal approach is functioned in representation that a generic source of advancement in AI's R&D originating from laboratories is mostly situated in University campuses, while the rest of the innovation is in the private industry. As private and academic institutions collaborate together, government institutions are barely active in this attitudinal representation with the exception of Chinese news-media.

There's a strong attitudinal formation of opinion in WEAPON topic that AI will make weaponry smarter like it does anything else and most of the social representation involve smart weaponry as both an innovative element and strong advantage for national security (as in Chinese new media) or for technological advancement agenda (as in the rest of the corpus) along with humanitarian risks of autonomous weapons.

Dominant representational function in WRK-AUTOM topic is that humans will have considerable disadvantages versus machinery in the work place, either by job losses or major and traumatic displacement of skillsets required due to the dynamics of algorithmic systems and automation.

3.4.2 Mythical

Relations between computer systems and classical myths are obvious in the industrial jargon (Fernández-Cano et al, 2014). Mythical functions in representations are active where AI functions are visible actions in the intersection of society and culture, especially in the culture industry. Two topical examples are GGL-DPMND and AlphaGo. AlphaGo is represented as the culmination of years of AI study being skilled enough to compete and beat humans in Go game, which is, according to the dominant narrative in all country media news, culturally considered to be a tacit learning of 2500 of years of human intuition. This level of capacity and results of the matches between Go masters and AlphaGo where human Go master lost the tournament conjures up the Frankenstein myth of human-built scientific excellence, beating humans. Mythical representation is very active in numerous topics including Robot (where there's also direct reference to Frankenstein myth), ART and CLTR_IND where algorithmic systems are portrayed as bearing the ultimate human attributes of creating art, poetry or able to have and express emotions with normative judgements.

From a perspective of mythical functioning of AI representation, HMN-MCHN-CNFLCT and MCHN-HMN-MND can be considered as two topics meta-framing other topics as these are higher-level mythical functions, diffusing to other mythical

connotations of AI. All Frankenstein myths are ultimately represented by HMN-MCHN-CNFLCT. AlphaGo and GGL-DPMND topics are ultimately the by-products due to the mythical function in the representation of MCHN-HMN-MND topic, underlining the commensurability of human soft skills and AI.

3.4.3 Scripting of Intentional Activity

Private industry is a critical player in terms of technologizing AI research and commodifying products and services based on algorithmic systems. All topics related to marketing and PR communication of AI-related brands are functionalizing the representation of scripting this intentional activity. These are APL-SMRPHN, BAIDU, FB Bots, GGL-DPMND, INVS-MRKT, MS-TALENT. News on these topics range from Apple cell-phones to Facebook conversational agents or investment banks claiming to provide superior service to their clients by adopting algorithmic systems. We believe this function contributes heavily into the embodied nature of algorithms and reduces AI to consumption objects, suppressing the salience and indirect social effects of algorithms.

3.4.4 Identity Enabler

Latest research shows that value derived from technology enabled consumption is part of the contemporary consumer's identity projects (Festila and Müller, 2017), valid in both ownership-based consumption and in the cases of alternative consumption models like access-based consumption (p. 62, ibid). Identity enabler representational function is behind the topics of APL-SMRPHN where topic illustrates several identity projects of consumers both in the form of objects (phones) and subscription-based services (e.g. iOS or Android applications), bounding groups of users together under the consumption act particularly manifesting itself via algorithmic features of the phone. In addition to individual level, group level identity-formation through the functionalization of AI in news is salient especially in the cases of nationalization of AI in China.

3.4.5 Ideological

AI's ideologically functioning representation emerged especially in topics of CN-DVLMPNT and WEAPON. China's macro-level stance towards AI is ideologically crafted and elaborated further in discussions of the study. Topical dimension of WEAPON is also under the functional representation of ideology as AI in weaponry is a national agenda with a show of force and determination, mostly active across English language corpus, yet especially underlined in China based news. This manifestation of ideological functioning is further elaborated in Chapter 5.

3.4.6 Resistance-enabler

Contestations occur especially in the practical dimensions of AI in society visibly creating supporters or rebellions to certain emerging daily life practices or experiences. Two vivid examples of resistance-enabler functional representation are in the topics of EXP-SYS and FCL-RCGN-SCRT. Social media platforms running on algorithmic systems create discussions around multiple topics including privacy, limiting agency for users or cultivating political agenda. Most of these discussions are functioning elements of resistance-enabler representation, particularly for the lack and abuse of privacy and hidden/opaque consent levels of these platforms. Watchdog groups, consumer protection agencies or intellectuals criticize platforms and sometimes alternative social media initiates are born out of this resistance-enabler function, covered by news media. Another topic affected by this representation function is FCL-RCGN-SCRT. Pervasiveness of AI-enabled security cameras capable of face recognition, matching this data other digitally available personal identifiers for a complete identity-recognition of citizens and its disposal to government authorities as a normal practice of life are illustrative in the case of resistance enabler representation in news.

Table 5. Summary of Representational Functions of AI in English Corpus

Topic	Explanation	Representational Function(s)
AlphaGo	Computers vs humans in games like chess, AlphaGo, etc.	Attitudinal, Mythical
APL-SMRPHN	Apple and other smartphone related news	Scripting of Intentional activity, Identity-enabler
ART	AI's involvement in art (paintings, poetry, etc.)	Attitudinal, Mythical
BAIDU	Chinese search firm Baidu-related news	Scripting of Intentional activity
CLTR_IND	Culture Industry; AI in content and entertainment industry in the form of movies, video games and books	Mythical
CN-DVLMPNT	News related with AI and development of China as a country	Ideological
DATA-LAW	Law-related news regarding the use of algorithmic systems in legal.	Attitudinal
DRVRLS-CAR	News related with driverless cars	Attitudinal
EXP-SYS	News related with expert systems	Attitudinal, Resistance-enabler
FB Bots	Topics related with Facebook, messenger bots, brands using them client interactions	Scripting of Intentional activity, attitudinal

FCL-RCGN-SCRTY	News related with security uses of AI, especially using facial recognition and other technologies.	Resistance-enabler, Ideological
GGL-DPMND	Google Deepmind in news	Attitudinal, Scripting of Intentional activity, Mythical
HEALTH	Health related news covering algorithmic systems and computers in health industry	Attitudinal
HMN-MCHN-CNFLCT	News portraying human-machine relationship as antagonistic	Mythical, Resistance enabler
INVS-MRKT	News regarding the use of AI in Investment and financial markets	Attitudinal, Scripting of intentional activity
MCHN-HMN-MND	News related with algorithmic systems in the effort of having human-mind like capabilities	Mythical
MS-TALENT	News around Microsoft and AI-capable talent in software industry	Attitudinal, Scripting of Intentional Activity
Robot	News related with robots and their involvement in social-economic life	Attitudinal, Mythical
RSRCH-SCIE	Research and scientific development news related with AI	Attitudinal

UNIVERSITY	News on universities and their institutional involvement with AI	Attitudinal
US-RSRCH	News quoting US-based research on algorithmic systems	Attitudinal
WEAPON	News on AI in weaponry and related war technologies	Attitudinal, Ideological
WRK-AUTOM	News on AI's and automation's involvement in work and labor	Attitudinal

3.5 Bi-gram Analysis by Countries

Bigrams or N-grams are word forms or sets of text co-occurring together in a text document. This co-occurrence is contextual and not random, meaning-extraction through analyzing bigrams is interesting and possible by embedding them in a country context. Bi-grams are analyzed as the most occurring two-word strings in each country and certain bi-grams are eliminated from language or corpus specific usages as stop-swords, removing their effect from analysis, like in the case of "Artificial Intelligence". It is a bi-gram with no additional meaning extraction in this case as AI is the very filtering mechanism of corpus building in the study.

US News corpus bi-grams suggest that majority of the results confirm objectification of AI in names referring to certain places, people and institutions with mostly economic framing. "Silicon Valley", "San Francisco", "Carnegie Melon", "Elon Musk" are examples of top bigrams. A strong economic framing is infused into most of the US news, which can be considered as the global meta-framing of AI as well, since it is common in all countries. In UK corpus, except for addition of "Stephen Hawkins" as a British figure, many US economic named entities are repeated, including the terms "Chief Executive Officer" or "Silicon Valley". However, there's a certain nuance regarding UK corpus underlining

philosophical discussions apparent in bi-grams of "human race" and "existential threat". It is also interesting that "Autonomous weapons" as bi-grams occur more frequently. US and UK Corpus bi-grams and their co-occurrence levels are provided in Table 6 and Table 7 respectively.

Persistence of economic framing is quite prevalent in China as well, "billion yuan" and "chief executive" being the top bi-grams. A strong presence is the addition of "Chinese" for most of the bi-grams representing AI. News differentiate companies in China as "Chinese companies" underlining their origin with a nationalistic tone. In addition to local institutions and names of places like "Zheijang Province", "Silicon Valley" bi-gram is also common, confirming the global representational influence of US in all corpora.

When Turkish bi-grams are analyzed, there's no differentiation in terms of dominance of economic framing. "Yönetim Kurulu/Board of Directors", "Genel Müdür / Managing Director" bi-grams are all persistent in the AI-related news due to the frequency of the companies utilizing AI in their product and service strategies. Interesting bi-grams locally emerging from Turkey are "Siber Güvenlik" and "Dünya Çapında". Siber Güvenlik bi-gram underlines the prevalence of security concerns and opportunities provided by AI, mostly represented under national agenda of creating technology which is not foreign. "Dünya Çapında" is a bi-gram mostly used in news announcing local Turkish entrepreneurs or researchers creating an AI related success, with an inclination of comparing it to the standards of the world outside Turkey as an attempt of being world-class. A between-the-lines national framing for creating, utilizing and localizing (like in the topical dimension *Human-like Robots,* as detailed in Turkish corpus) AI as a local entity is persistent in Turkish representation. Turkey Corpus bi-grams and their co-occurrence levels are provided in Table 8.

Table 6: US Corpus Bi-grams

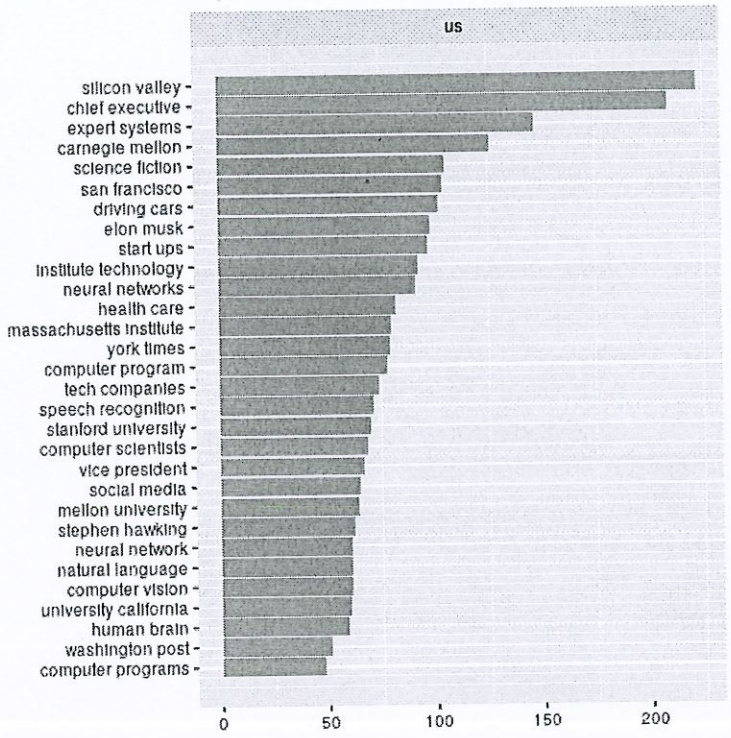


Table 7: UK Corpus Bi-grams

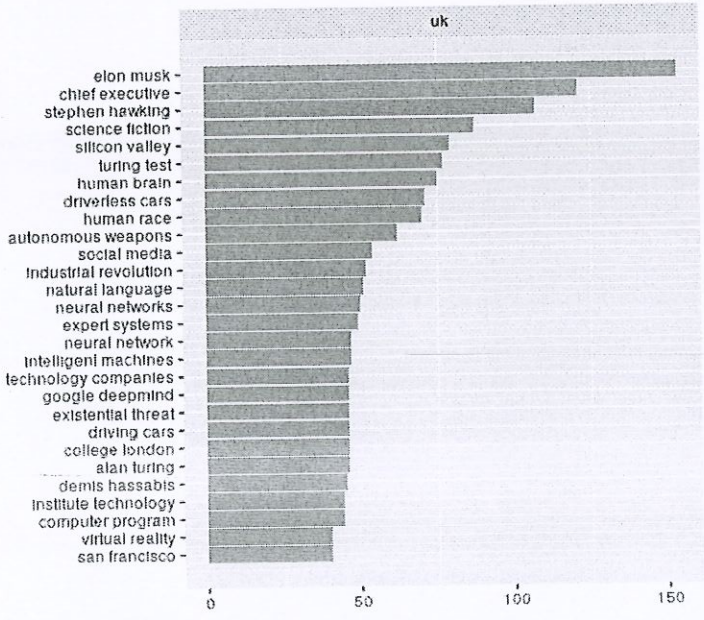
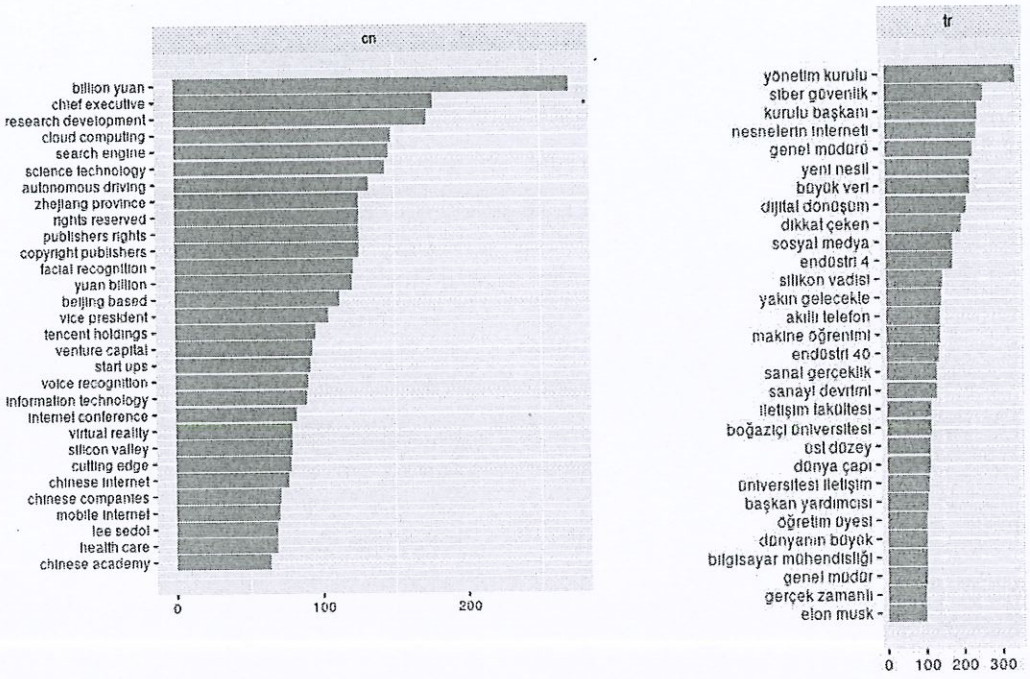


Table 8: Bi-grams for China & Turkey Corpora



3.6. Analysis of AI in UK News Media

For the UK News Media resources analyzed, coherence value observed to be declining after topic number exceeded 8 and distribution of number of words in the corpus was skewed towards news containing less than 500 words, as shown in Figure 7 and Figure 8. Representative news excerpts for UK news corpus topics can be seen in Appendix 1.

Figure 7.Number of Topics vs Coherence Value in UK News Media

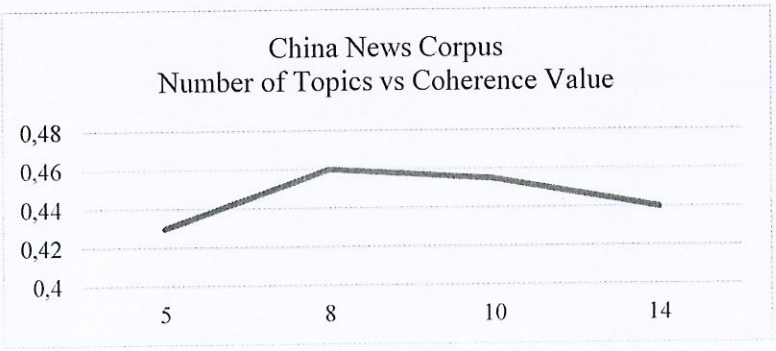
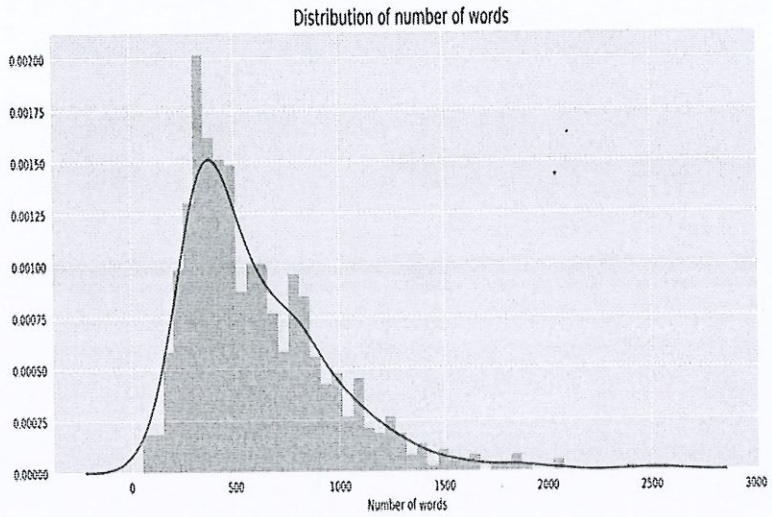


Figure 8. Distribution of Number of Words / UK News Media



UK News media differentiated itself in the grounding of the machine-read topical results as certain topics were unique to this country. These are coded as Health-related discourse of AI, Existential threats / questions around AI and the over-emphasis on the workplace concerns resulting from AI. Table 9 summarizes all framing and functional representations detected in each topic in UK. In Table 10, all UK topics and their frequencies are summarized.

Table 9: Framing and functional representations in UK Corpus

UK News Topic	**Framing**	**Functional Representation**
Doctor in the House	Health and safety	Attitudinal
Existential threats	Morality	Mythical, Resistance-enabler
Branded AI	Economic, Quality of Life	Scripting of Intentional Activity, Identity-enabler
Let's Play!	Cultural Identity, Morality	Attitudinal, Scripting of Intentional activity, Mythical

AI the Mechanical Turk	Economic	Attitudinal
Soft Skills of AI	Quality of Life, Morality	Attitudinal, Mythical
Branded AI_Apps	Economic	Scripting of Intentional Activity
Show me the money	Economic	Attitudinal
Machines in the workplace	Economic, Capacity and resources, Morality	Attitudinal

China corpus topical dimensions along with representative keywords are explained below in detail.

UK News Topic 1: Doctor in the House

Frame: Health & Safety

Functional Representation: Attitudinal

UK Data revealed a particular focus on health-related issues due to AI's involvement in the particular scientific area of health research and practice. AI is considered to be a game-changing technology in health with its impact on chronical disease patients. Numerous quotes refer to AI paving its way into the decision support systems in medical institutions. While rest of topics in UK media is quite critical on discussions of AI, this is one particular topic where AI is represented as the magic healer promising a better future for humanity, portrayed utopian in all representative documents suggested by text mining to be manually analyzed.

UK News Topic 2: Existential Threats

Frame: Morality

Functional Representation: Mythical, Resistance-enabler

Is the end of humanity coming? AI is a threat for the smart machines who will evidently end human part of life as we know it? As the typical dystopian look at

humanity's future becomes involved in the AI rhetoric, one of AI's representations in media is positioned towards the smarter the more dangerous discourse. Science becomes a threat, experts ditto with their capacity to create powerful Frankensteins, this time much smarter. UK news media were the primary place this topical dimension is problematized compared to other corpora.

***UK News Topic 3*: Branded AI**

Frame: Economic, Quality of Life

Functional Representation: Scripting of Intentional Activity, Identity-enabler

Marketing communication of certain corporate brands in the realm of AI is creating many aspects of AI to be highly associated with specific brands and creating topical clusters around those brands with their respective positionings. Here in this topical cluster it is observed that Google has a stand-alone dominance in the representation of AI via its popular start-up companies like Deepmind.

***UK News Topic 4*: Let's Play!**

Frame: Cultural Identity, Morality

Functional Representation: Attitudinal, Scripting of Intentional activity, Mythical

This topical element is rooted in a discourse set by IBM corporation when it first started human vs machine games by positioning its AI based computer called Deep Blue against world chess champion Kasparov. It was later followed by Google's DeepMind beating the world-famous Go Player which fortified this human-machine knock-down as one of the media foci.

***UK News Topic 5*: AI The Mechanical Turk**

Frame: Economic

Functional Representation: Attitudinal

In this topical dimension, AI is represented as the killer of the mundane, repetitive tasks by automating them. Named in this study after the "Mechanical Turk"

(Standage, 2002) the chess playing machine and later adopted as a brand name by the online retailer Amazon.com for their online task tool using manual human work, this symbolism portrays AI as the helper of humanity in the sense that it takes care of the trivial, ordinary tasks and routine things-to-do through automation.

UK News Topic 6: Soft Skills of AI

Frame: Quality of Life, Morality

Functional Representation: Attitudinal, Mythical

Across countries, AI is frequently quoted together with humanistic topics like literature, art, music, etc. Often the discourse is challenging whether and how AI is capable of handling what is truly humane. UK Media is covering it as a quest for the humanity to benchmark machines over what humans are best of, judging machines by contrasting the skills known as unique to humans.

UK News Topic 7: Branded AI_Apps

Frame: Economic

Functional Representation: Scripting of Intentional Activity

Another version of BrandedAI, under this topic "Google Home device" and "applications by Apple" denoted frequently with the keyword AI, representing the primacy of Facebook and Apple brands in technology news. It is relevant to note that although this pattern is across geographies and almost all identified brands are deemed to be global across corpora, certain brands appear more dominantly in particular geographies (e.g. Amazon and IBM Watson dominantly represented with AI in particularly US while Alibaba is in China, yet all of them exist in both country media corpora).

UK News Topic 8: Show me the money

Frame: Economic

Functional Representation: Attitudinal

AI and Financial topics are closely positioned and common in media news as AI is positioned as the enabler of smarter investments, faster transactions of liberal market economy. Although bearing machine superiority to humans, contrary to other dystopian quotes and similar to Health issues in corpus, this topical dimension underlines AI as being at the service of humanity on financial matters.

UK News Topic 9: Machines in the workplace

Frame: Economic, Capacity and resources, Morality

Functional Representation: Attitudinal

There's an accumulation of media news on the discussion of whether or how machines will replace human workers, its repercussions in the society with the increasing use of robotic automation, discussions over whether the loss of jobs vs. new genres of jobs created etc.

Table 10. UK News Topics Keyword Frequencies

Topic Name	Representative Keywords with frequency
Doctor in the house	[('information', 0.05284474445515911), ('problem', 0.04609450337512054), ('software', 0.03702989392478303), ('rule', 0.026808100289296047), ('application', 0.026422372227579555), ('patient', 0.02237222757955641), ('researcher', 0.021407907425265188), ('expert', 0.020829315332690453), ('doctor', 0.019479267116682738), ('work', 0.019286403085824494)]),
Existential threats	[('human', 0.06307361843389962), ('ai', 0.03182972075766452), ('humanity', 0.0306580745948057), ('end', 0.030267525873852764), ('intelligence', 0.02792423354813513), ('threat', 0.02772895918765866), ('life', 0.026166764303846905), ('development', 0.020308533489552822), ('scientist', 0.019527436047646944), ('expert', 0.019332161687170474)])

Branded AI	[('company', 0.17861129716454566), ('image', 0.03884795713328868), ('google', 0.029917392275061398), ('london', 0.025228845724492074), ('project', 0.02500558160303639), ('picture', 0.02344273275284662), ('team', 0.02254967626702389), ('deepmind', 0.022326412145568207), ('deal', 0.020093770931011386), ('power', 0.020093770931011386)])
Let's Play!	[('computer', 0.11022682053322722), ('game', 0.1054516514126542), ('program', 0.06307202546756864), ('player', 0.03501790688420215), ('chess', 0.016912057302029448), ('deepmind', 0.016713091922005572), ('play', 0.01532033426183844), ('software', 0.014723438121766812), ('alphago', 0.014524472741742936), ('match', 0.014126541981695185)])
AI the Mechanical Turk	[('machine', 0.1354688021354688), ('computer', 0.11745078411745079), ('brain', 0.05922589255922589), ('intelligence', 0.047547547547547545), ('human', 0.031865198531865195), ('idea', 0.0313646980313647), ('mind', 0.021021021021021023), ('task', 0.01951951951951952), ('concept', 0.01618284951618285), ('word', 0.01618284951618285)]),
	[('question', 0.06828680457923278), ('day', 0.0389636473187387), ('child', 0.03474593291825668), ('answer', 0.029323157260494077), ('thing', 0.028318939546093592), ('test', 0.027716408917453302), ('programme', 0.02410122514561157), ('man', 0.022695320345450895), ('lot', 0.0222936332596907), ('week', 0.01948182365936935)])
Soft Skills of AI	[('life', 0.03446316985419428), ('film', 0.031622798712365084), ('story', 0.031622798712365084), ('thing', 0.02783563718992615), ('book', 0.027078204885438363), ('art', 0.017042226850975194),

	('sense', 0.0166635106987313), ('emotion', 0.01628479454648741), ('work', 0.01628479454648741), ('music', 0.01609543647036546)])
Branded AI_Apps	[('user', 0.05041690905565251), ('Facebook', 0.046732596470816366), ('apple', 0.041884816753926704), ('app', 0.03315881326352531), ('device', 0.027535388791933294), ('internet', 0.02501454333915067), ('video', 0.024820632150475083), ('tool', 0.02268760907504363), ('service', 0.020942408376963352), ('home', 0.01977894124490983)])
Show me the Money	[('business', 0.05332302936630603), ('customer', 0.037480680061823805), ('cent', 0.03690108191653787), ('company', 0.03593508500772798), ('bank', 0.029752704791344668), ('service', 0.02743431221020093), ('market', 0.026468315301391036), ('investment', 0.02627511591962906), ('product', 0.023377125193199382), ('fund', 0.02009273570324575)]),
Machines in the workplace	[('robot', 0.19301250214077753), ('job', 0.09556430895701319), ('car', 0.043843123822572355), ('robotic', 0.03562253810584004), ('automation', 0.03082719643774619), ('machine', 0.02928583661585888), ('worker', 0.025346805959924643), ('human', 0.0220928241137181), ('work', 0.020551464291830794), ('society', 0.018496317862647715)])]

3.7 Analysis of AI in Chinese News Media

Coherence value for topics detected in China-based mainstream news sources published in English language decreased after the optimum topic number of 9 as shown in Figure 9. Majority of the news ranging between 500 and 600 words in total, length of news articles in China corpus is slightly higher than US and UK corpus. Representative news excerpts for China news corpus topics can be seen in Appendix 2.

Figure 9. Number of Topics vs Coherence Value in China News Media

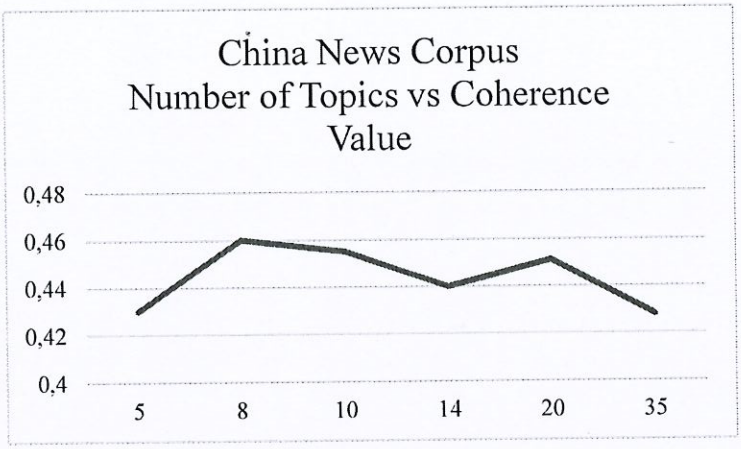
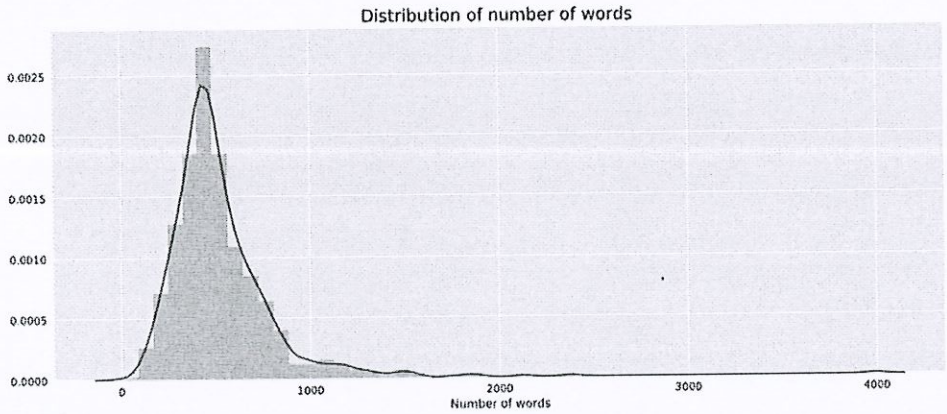


Figure 10. Distribution of Number of Words / China News Media



AI news in China exhibited an inherent representation of AI as a leverage of national development quest. Analysis shows that China embraces AI as an all-nation effort to leveraging economic growth with the assumption that the level of AI advancement in US is better, thus all efforts of mainland China is being portrayed mostly as a "race against" whatever has to be beaten.

Topic of University-Institute relations, heavy connotations of branded AI for both local and global technology brands and machine vs human play dimensions were similar to US news corpus. Table 11 summarizes all framing and functional representations detected in each topic in China. Following is a topic-by-topic explanation of China corpus along with topic frequencies observed by the LDA

modelling algorithm. All topics and their keyword frequencies are summarized in Table 12.

Table 11. Framing and functional representations in China Corpus

China News Topic	Framing	Functional Representation
University-Institute of AI	Economic, Other	Attitudinal
Chinese Branded AI	Economic, Quality of Life, Cultural Identity	Scripting of Intentional Activity, Identity-enabler
Quest of AI / China R&D	Economic	Attitudinal
Machine – Human Mind	Cultural Identity, Morality	Attitudinal, Scripting of Intentional activity
Applied Science of AI	Economic	Attitudinal
Application of Algorithms	Quality of Life	Attitudinal, Scripting of Intentional activity
Machines in the workplace	Economic, Capacity and resources, Morality	Attitudinal
Baidu the search giant	Economic	Scripting of Intentional activity
Show me the money	Economic	Attitudinal
Let's Play!	Cultural Identity, Morality	Attitudinal, Scripting of Intentional activity, Mythical

China News Topic 1: University-Institute of AI

Frame: Attitudinal

Functional Representation: Attitudinal

One of the dimensions that Chinese media portrays AI is its relationship with educational institutions creating projects and products related with algorithmic systems. AI related news in media are important representation areas of scientific issues as the fundamental developments about AI topic is originated from either universities or collaborations between various types of institutions.

China News Topic 2: Chinese Branded AI

Frame: Economic, Quality of Life

Functional Representation: Scripting of Intentional Activity, Identity-enabler, Cultural Identity

Akin to UK and US counterparts, branded AI is a recurrent and global AI related news topic as Chinese national brands especially Baidu and Alibaba appear frequently with the flag carriers of AI domain. However, this does not mean that the US brands of AI relevance are not present in China corpus, as there's a global dimension for this topic across all countries.

China News Topic 3: Quest of AI / China R&D

Frame: Economic

Functional Representation: Attitudinal

Chinese news mention AI mostly as an all-out effort to grow and as an industrial leverage especially nested in particular industry-specific mentions. Portrayed in a nationalistic tone of moving forward, AI is a leverage for bright horizons which will arise from country-wide development efforts. This is underlined as a race where China should be strong in order not to be taken by other countries but primarily US.

China News Topic 4: Machine – Human Mind

Frame: Cultural Identity, Morality

Functional Representation: Attitudinal, Scripting of Intentional activity

Contrasting Human capabilities to the available skillsets provided by algorithmic systems, this representation is basically a discussion of how much and whether machines are up to the level of humans in terms of human-like capabilities akin to "soft skills of AI" dimension in UK data set, yet the Chinese approach is less normative and not much interested in the philosophical dimensions of the phenomenon, tending towards pragmatic use of AI in an economic agenda of a nation's development.

China News Topic 5: Applied Science of AI

Frame: Economic

Functional Representation: Attitudinal

China has a typical media representation of AI in the sense that the technology is created in the specific milieus of research labs in collaboration with industry. Technological advancements of AI praised by the news is mentioned by their origins of institutional R&D efforts.

China News Topic 6: Application of Algorithms

Frame: Quality of Life

Functional Representation: Attitudinal, Scripting of Intentional activity

From image recognition to traffic cameras, daily-life applications of AI embedded in Chinese society manifests itself in this topical dimension as Chinese media represents technological advancements derived from algorithmic systems and carved into daily life.

China News Topic 7: Machines in the workplace

Frame: Economic, Capacity and resources, Morality

Functional Representation: Attitudinal

As a salient topic across countries, Chinese press has its fair share of discussions whether robots will replace workers in factories or whom AI will replace in the offices.

China News Topic 8: Baidu the search giant

Frame: Economic

Functional Representation: Scripting of Intentional

Similar to the dominance of Google in AI news in US and UK, China has its counterpart with Baidu being extensively represented with its financial power as a company, also being a driving force of China's AI ambitions and a flag carrier in the so-called AI race.

China News Topic 9: Show me the money

Frame: Economic

Functional Representation: Attitudinal

Mostly originated from Beijing and Shanghai, financial and economic news related with AI is represented in Chinese media as startups and investments, where they are portrayed as pinnacles of advancement in Chinese capital markets.

China News Topic 10: Let's Play

Frame: Cultural Identity, Morality

Functional Representation: Scripting of Intentional activity, Mythical

As another cross-country representation area, machine vs human gaming takes an additional spin in Chinese media with the Go match between AlphaGo and Go Master Lee Sedol. It also gains a symbolism of eastern vs western dualism in the setting of human vs machine game-play where human player represented a master of the eastern game while AlphaGo was the machine rival originated from Google.

Table 12. China News Topics Keyword Frequencies

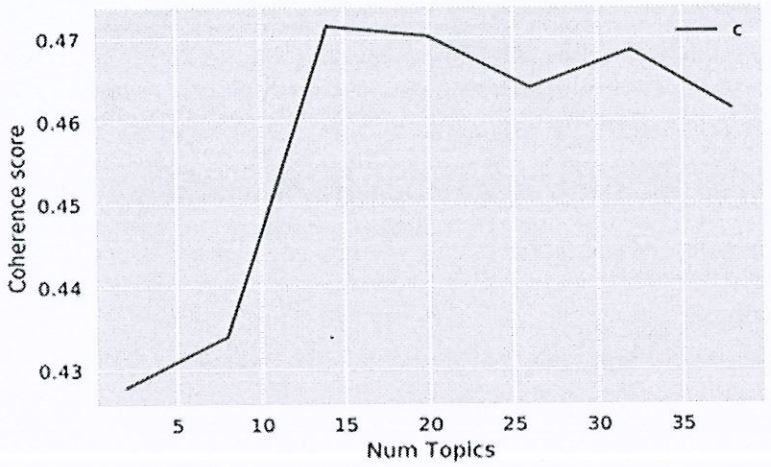
Quest of AI / China R&D	[('china', 0:06818857380655133), ('industry', 0.038582723975982405), ('internet', 0.0328755722014149), ('development', 0.030973188276559063), ('innovation', 0.030259794304738127), ('technology', 0.02871410736579276), ('sector', 0.018250995779085667), ('global', 0.015635217882408892), ('country', 0.015278520896498424), ('big_data', 0.012068248023304202)]),
Machine – Human Mind	[('robot', 0.08156503904709315), ('china', 0.030527727380295022), ('medical', 0.018221976808393152), ('chinese', 0.01774867870947385), ('robotic', 0.017354263627041098), ('education', 0.014987773132444584), ('student', 0.014435592017038732), ('science', 0.013410112802713576), ('beijing', 0.011122505324603613)]),
Applied Science of AI	[('product', 0.02928071292170592), ('user', 0.02673456397199236), ('device', 0.020369191597708464), ('smart', 0.019255251432208784), ('market', 0.017902609802673455), ('smartphone', 0.0174252068746021), ('voice', 0.016549968173138127), ('chinese', 0.015595162316995544), ('company', 0.01281031190324634), ('consumer', 0.0128103119032463)])]
Application of Algorithms	[('datum', 0.045450946234856286), ('information', 0.0224087417847816), ('application', 0.02034998812257502), ('system', 0.015599018132868793), ('security', 0.013936178636471614), ('communication', 0.0092643914799), ('chip', 0.00894766014728007), ('software', 0.00878929448095653), ('video', 0.008155831815662365), ('public', 0.007839100483015282)]),
Machines in the workplace	[('human', 0.035360780375842775), ('job', 0.024960550853536077), ('machine', 0.022665327786544256), ('computer', 0.01742935016496916), ('intelligence', 0.0119781953808637),

	('future', 0.011404389614115622), ('good', 0.011332663893272128), ('year', 0.010543680963993688), ('work', 0.009109166547123798), ('scientist', 0.009109166547123798)]),
Baidu the search giant	[('company', 0.0685779662157615), ('baidu', 0.028602193956524666), ('internet', 0.02651591627969581), ('business', 0.022747156605424323), ('car', 0.021603068847163336), ('giant', 0.016219126455346927), ('platform', 0.015411535096574466), ('baidus', 0.015344235816676762), ('search', 0.01413284877851807), ('chinese', 0.014065549498620366)]),
Show me the money	[('company', 0.03257084329122568), ('service', 0.031614885626493686), ('china', 0.027654489586889725), ('investment', 0.02437692045066575), ('market', 0.019733697507681804), ('business', 0.01911915329463981), ('percent', 0.01891430522362581), ('customer', 0.016319562990781838), ('industry', 0.01618299761010584), ('financial', 0.01563673608740184)]),
Let's Play!	[('human', 0.03933691756272401), ('game', 0.03575268817204301), ('alphago', 0.027867383512544804), ('chinese', 0.023118279569892472), ('player', 0.019982078853046596), ('good', 0.019086021505376343), ('match', 0.014336917562724014), ('china', 0.013709677419354839), ('computer', 0.013261648745519713), ('move', 0.012992831541218637)]),

3.8 Analysis of AI in US News Media

Coherence value observed during topic detection in US News Media resources declined after topic number exceeded 14 as shown in Figure 11. Representative news excerpts for UK news corpus topics can be seen in Appendix 3.

Figure 11. Number of Topics vs Coherence Value in US News Media



After human-eye reading of most representative news across these 14 topics, similar topics on "Branded AI" and "Academic AI" are consolidated and total number of topics analyzed qualitatively reduced to 9. Distribution of number of words in the corpus was centered between 600 to 700 words with the exception of a news segment in the corpus with less than 150 words, as shown in Figure 12.

Figure 12. Distribution of Number of Words / US News Media

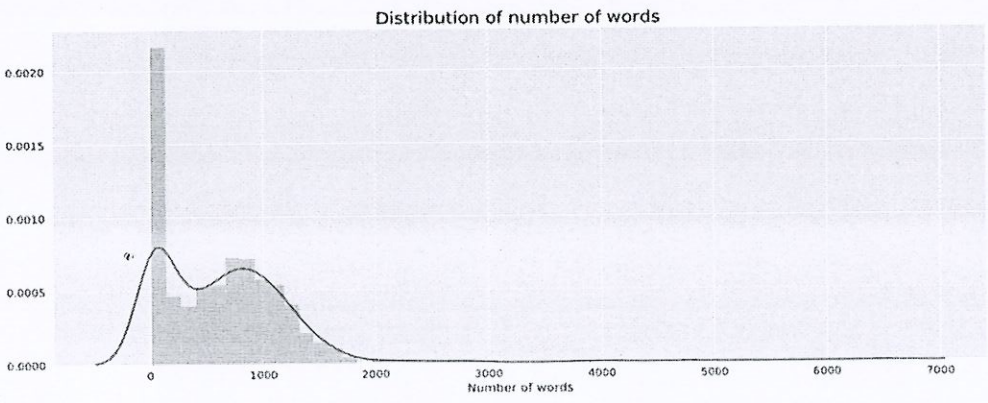


Table 13 summarizes all framing and functional representations detected for each topic in US. Table 14 summarizes US topics with their frequencies in corpus. Certain representations of AI in US News Media were idiosyncratic to this country, especially a country-level curiosity on how advanced China is in AI technology and the hardware-related developments in the realm of AI, as explained further below.

Table 13. Framing and functional representations in US Corpus

US News Topic	**Framing**	**Functional Representation**
Humanity with Robots	Quality of Life	Attitudinal
Scientific AI	Economic	Attitudinal
Chinese Connection	External regulation and reputation	Attitudinal, ideological
US branded AI	Economic, Quality of Life, Cultural Identity,	Scripting of Intentional Activity, Identity-enabler
Let's Play!	Cultural Identity, Morality	Attitudinal, Scripting of Intentional activity, Mythical
Consciousness / Thinking Machines	Cultural Identity, Morality	Attitudinal, Scripting of Intentional activity, Mythical
Academic AI	Economic	Attitudinal
AI as remedy	Quality of Life	Attitudinal
Hardware of AI	Economic, Quality of Life	Attitudinal

US News Topic 1: Humanity vs Robots

Frame: Quality of life

Functional Representation: Attitudinal

This US-specific topic underlines the relationship of AI and robots with the involvement of particular names like Elon Musk. Their discourse heavily involves whether robots are a threat to humanity or how robots are becoming a part of our everyday lives with certain consequences.

US News Topic 2: Scientific AI

Frame: Economic

Functional Representation: Attitudinal

News in this topic depict a close relationship between private and academic institutions in the realm of algorithmic systems development in US as scientific papers and new terms are injected and get used in the news media originating from such institutions, often blended into each other as private industry is working closely with academic institutions.

US News Topic 3: Chinese Connection

Frame: External regulation and reputation

Functional Representation: Attitudinal, ideological

This topic arises as media representation of AI in US quotes China more than the Chinese media quote US. There's a direct reference to China as a country in US media especially showing itself in comparisons of how China advances in AI with a competitive tone.

US News Topic 4:US-Branded AI

Frame: Economic, Quality of Life, Cultural Identity

Functional Representation: Scripting of Intentional Activity, Identity-enabler

As a cross-country representational element, commercial brands do also emerge in news topics and US-centric brands are the salient named entities recognized during

the topic detection. Especially Apple, Amazon and Google with references to their applications, products and services are quoted heavily. These brands were also the ones exported from US to other countries in all AI-related news. Non-US brands in US Media is less common and typical national filters are applied when media quote brands in US while all country corpora quote US-brands heavily, e.g. this is the second most frequent topic in China. Contrary to general country-level quotations, in the domain of commercial entities, non-US media quote and benchmark more US brands than the US media does for non-US brands.

US News Topic 5: Let's Play!

Frame: Cultural Identity, Morality

Functional Representation: Attitudinal, Scripting of Intentional activity, Mythical

This topic is salient through underlining human-machine competitiveness fixing the machine vs humanity concept with the landmark phenomenon of IBM Watson computer winning over the chess master Kasparov. The case of AlphaGo winning over Go Master See Ledol is also quoted with primarily anchoring this relatively new event back to the Watson-Kasparov phenomenon. Game of Go is a clear objectification of AI in news media in all countries including US.

US News Topic 6: Consciousness / Thinking Machines

Frame: Cultural Identity, Morality

Functional Representation: Attitudinal, Scripting of Intentional activity, Mythical

US Media discourse analysis reveals a salient topic with a constant concept of possibility of thinking machines capable of developing consciousness, with fictional or nonfictional literature playing with this idea and quoted in the news. Such philosophical considerations were also found to be salient and dominant in UK corpus.

US News Topic 7: Academic AI

Frame: Economic

Functional Representation: Attitudinal

Under a different representation than techno-scientific quotes of AI in news, US Media has also an aspect of news quoting pure academic resources and their contributions / discussions in algorithmic systems. Certain institutions do also appear under this representational topic, yet the focus is not exactly on the private sector, but the academy supporting private industry with research turning into innovations in collaboration.

US News Topic 8: AI as Remedy

Frame: Quality of life

Functional Representation: Attitudinal

In this topic-set, AI and the relevant efforts to attain an AI skillset is mostly associated with solving problems caused by humans which range widely from corporate efficiency to urban living. Contrary and in addition to Human vs Machine annotations of AI, this topical representation suggests a Human augmented and assisted with AI depiction in US Media.

US News Topic 9: Hardware of AI

Frame: Economic, Quality of Life

Functional Representation: Attitudinal

News related to the core developmental aspect of AI, the capacity and power of machinery in which algorithmic systems operate constitute a topical dimension in US media. Especially news related with hardware, microchips denoting computing powers, quantum computing etc. are under this topic's representation.

Table 14: US News Topics Keyword Frequencies

Topic Name	Representative Keywords with frequency

Humanity vs Robots	[('robot', 0.16883720930232557), ('human', 0.07813953488372093), ('robotic', 0.03906976744186046), ('musk', 0.027906976744186046), ('humanity', 0.025116279069767444), ('planet', 0.022790697674418603), ('space', 0.022558139534883722), ('scientist', 0.02116279069767442), ('race', 0.020930232558139535), ('challenge', 0.016511627906976745)])
Scientific AI	[('question', 0.07186303221446272), ('word', 0.04865960801982429), ('answer', 0.04280243298040099), ('research', 0.03491777427348502), ('information', 0.03198918675377337), ('language', 0.030186979049335434), ('science', 0.026807839603514304), ('paper', 0.025456183825185854), ('term', 0.023428700157693175), ('field', 0.02297814823158369)]),
Chinese Connection	[('china', 0.062433183664742355), ('government', 0.04682488774855677), ('united_state', 0.044686765020312165), ('research', 0.042334830019243104), ('company', 0.038913833654051745), ('country', 0.0327132777421424), ('development', 0.022236476373743853), ('center', 0.021595039555270472), ('state', 0.019029292281376953), ('effort', 0.01796023091725465)])
US Branded AI	[('apple', 0.05185972369819341), ('service', 0.051222104144527096), ('google', 0.04250797024442083), ('software', 0.03676939426142402), ('device', 0.035706695005313496), ('app', 0.03485653560042508), ('product', 0.030818278427205102), ('consumer', 0.030393198724760893), ('company', 0.026992561105207227), ('amazon', 0.023379383634431455)])
Let's Play	[('game', 0.0993514915693904), ('watson', 0.07574578469520103), ('player', 0.049805447470817124), ('computer', 0.04824902723735409), ('program', 0.03164721141374838),

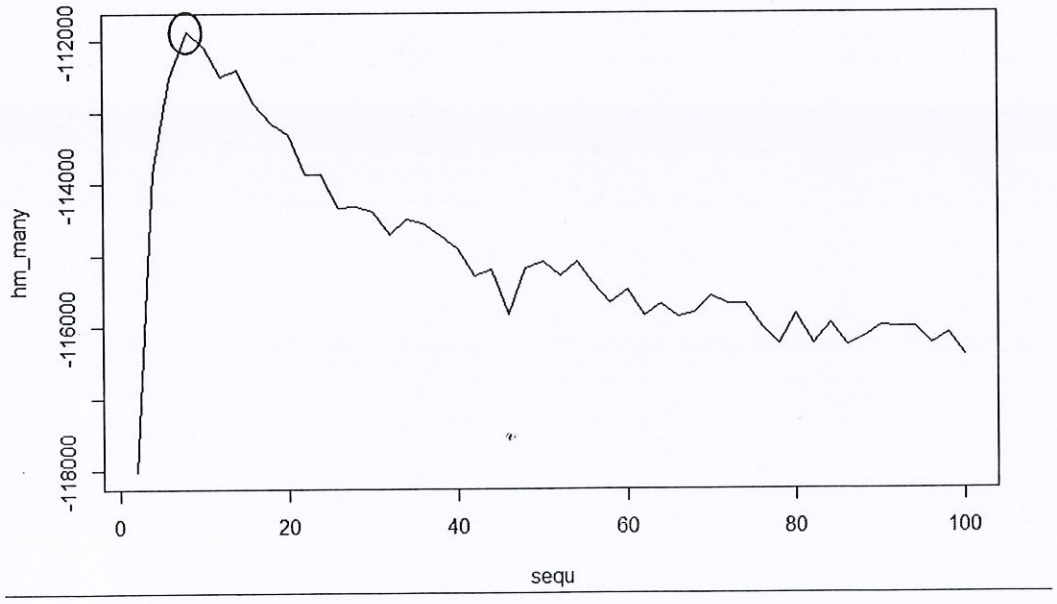
	('human', 0.029053177691309988), ('chess', 0.024383916990920882), ('alphago', 0.023865110246433202), ('match', 0.01867704280155642), ('deepmind', 0.01841763942931258)])
Consciousness / Thinking Machines	'book', 0.052619743647402746), ('life', 0.05194513154935912), ('machine', 0.04677310546435799), ('child', 0.034854958398920624), ('idea', 0.0332808635034855), ('man', 0.02945806161457162), ('person', 0.023161682032831123), ('history', 0.02023836294130875), ('thinking', 0.015516078255003373), ('consciousness',0.015291207555655498)])
Academic AI	[('university', 0.09202195018995357), ('science', 0.07154917686787673), ('professor', 0.06015196285352469), ('student', 0.045588856057408186), ('project', 0.04221190375685943), ('field', 0.03419164204305614), ('research', 0.03334740396791895), ('stanford', 0.03334740396791895), ('work', 0.027015618404390037), ('carnegie_mellon', 0.02406078514140987)]
AI as Remedy	[('machine', 0.0934409687184662), ('intelligence', 0.07325933400605449), ('thing', 0.0651866801210898), ('human', 0.03915237134207871), ('point', 0.035923309788092835), ('problem', 0.02341069626639758), ('behavior', 0.02179616548940464), ('case', 0.020988900100908172), ('hand', 0.02058526740665994), ('lot', 0.017961654894046417)]

Hardware of AI	[('computer', 0.13397972675187308), ('brain', 0.06676950198325253), ('machine', 0.05509034817100044), ('chip', 0.04869986778316439), ('mind', 0.029528426619656236), ('power', 0.024019391802556193), ('computing', 0.023137946231820184), ('idea', 0.019391802556192154), (quantum, 0.01851035698545615), ('work', 0.01740855002203614)])

3.9 Analysis of AI in Turkish Online Newspaper Hurriyet.com.tr

News scraping from Turkish News Media Hurriyet.com.tr containing keywords "Yapay Zeka" resulted in 550 unique news. After pre-processing they are plugged into LDA topic modelling with a coherence value decreasing between 10-20 topics and after this limit coherence measure becomes negative as can be seen in Figure 13. Representative news excerpts for UK news corpus topics can be seen in Appendix 4.

Figure 13. ***Number of Topics vs Coherence Value in Hurriyet.com.tr***



As most of the built-in functions of text-processing library are fully functional only in English language, pre-processing and especially stop-word removal was performed by manually building custom stop-word lists until iterations of processed text produced meaningful results. After manual analysis of 25 topics and representative documents, topics representing AI in Turkish news was consolidated to 9.

Topics representing AI in Turkish news were mostly parallel to the ones detected in English language corpus while weights of certain topics differed. Along with similar named-entities observed in Turkish language corpus originated from the English corpus, Turkish language news produced local nuances in terms of topics and representational functions, as local-news related entities like "Teknoloji Festivali" were present in the results.

AI gains multiple representations in response to the different opportunities and challenges it poses to the ideological and historical projects of different milieus and Turkish AI is mostly propagated by national / country development motive, infused to most of the topical dimensions.

Table 15 summarizes all framing and functional representations detected in each topic in Turkish news corpus.

Table 15: Framing and functional representations in Turkey Corpus

Turkey News Topic	**Framing**	**Functional Representation**
Show me the money	Economic	Attitudinal
Local AI & Development	Economic	Attitudinal, ideological
Consumers' AI	Quality of Life	Scripting of Intentional Activity, Identity-enabler
Medical AI	Health and Safety	Attitudinal
Education and AI	Economic	Attitudinal

Weapons & Security / AI at war	Security and Defense	Attitudinal, Ideological
AI in Movies	Cultural Identity	Mythical
Human-like Robots	Economic	Attitudinal, Mythical
Autonomous Vehicles / Driverless Cars	Economic, Quality of Life	Attitudinal

Following is an explanation of machine-detected topics in Turkish corpus, later manually read by selecting the corresponding and most representative news suggested by topic detection algorithm.

Turkish News Topic 1: Show me the money

Frame: Economic

Functional Representation: Attitudinal

One of the most salient topics (representing 11,8% of all tokens in Turkish text) related with "Yapay Zeka" in Hürriyet corpus was marking the relationship between liberal economy and algorithmic systems. Either as a smart money maker or enabler of faster and better liberal market economy promising more financial gains for tall market stakeholders, this utopian positioning of AI is at the same time the most salient one portrayed in Turkish media, standing out from other countries where the topic is also present, but its frequency and weight is behind that of Turkish corpus.

Turkish News Topic 2: Local AI and Development

Frame: Economic

Functional Representation: Attitudinal, Ideological

Similar to China's Quest of AI, this topic is illustrative in the sense that how AI is represented as an enabler of macro and national efforts of country-wide development objectified in the efforts of AI start-up entrepreneurs, industrial representatives or scientists, all being part of a national move to go forward.

Turkish News Topic 3: Consumers' AI

Frame: Quality of life

Functional Representation: Scripting of Intentional activity, Identity-enabler

Embodied representations of AI in Hürriyet was 8,7% of all tokens generated from Turkish corpus. We coined this term as Consumers' AI as it stood for fetishized objects of technology and digital life imposed by ready-made products inherently driven by algorithmic systems.

This topic is an example of the embodied AI in terms of technological gadgets where consumption-related news in media is entangled with the framing of "yapay zeka/AI".

Turkish News Topic 4: Medical AI

Frame: Health and Safety

Functional Representation: Attitudinal

With 11,3% of all tokens, this topic depicts AI as a healer in the Turkish new corpus, similar to that of English-language news corpora. AI is depicted as a critical part of advancement in medical sciences with scientific institutions quoted in most of the news. AI's role in in saving human life from critical diseases and also its capacity and speed being better than human doctors are also discussed. Majority of the representative news under this topic are translated form English news sources to Turkish newspaper Hürriyet.

Turkish News Topic 5: Education and AI

Frame: Quality of Life, Economic

Functional Representation: Attitudinal

Educational institutions and their activities regarding science and technology constitute a salient topic in Turkish AI-related representations as events, academic success stories behind new technological discoveries especially from Turkish

institutions including high-school robotic championships and university researchers are typical examples of this topic category.

Turkish News Topic 6: Weapons & Security / AI at war

Frame: Security and Defense

Functional Representation: Attitudinal, Ideological

Use of algorithmic systems in military, security and defense areas especially in the context of national defense was another salient topic in Turkish news corpus. Majority of the representative news were quoting Turkish national efforts by using algorithmic systems against cyber-war threats in addition to global news stories.

Turkish News Topic 7: AI in Movies

Frame: Cultural Identity

Functional Representation: Mythical

As observed in every country, movies related with AI and technology were significant sources of AI-related news with either utopian or dystopian plots generating a specific topic dimension in this study. News under this topical domain mentioned frequently about AI as a movie genre – "Yapay Zeka filmleri", articulating the mostly dystopian rhetoric of movie scenarios.

Turkish News Topic 8: Human-like Robots

Frame: Quality of Life, Economic

Functional Representation: Attitudinal, Mythical

Robots are heavily quoted in all country corpora including Turkish as they are objectified representations of algorithmic systems. Objectified with human-like characteristics, Robots in Turkish news appeared next to different keywords ranging from "humanoid", "university" and "sex", as Table 16 details representative keywords for Turkish corpus topics. Commonality of all representations were comparison of robots vs humans, either as conflicting parties struggling against each other's existence or as robots being a helping hand for health

or economic benefits or catering human beings in different areas. Although mention of sex robots was not specific to Turkish corpus, its frequency made it in the top 3 keywords representative of this topic.

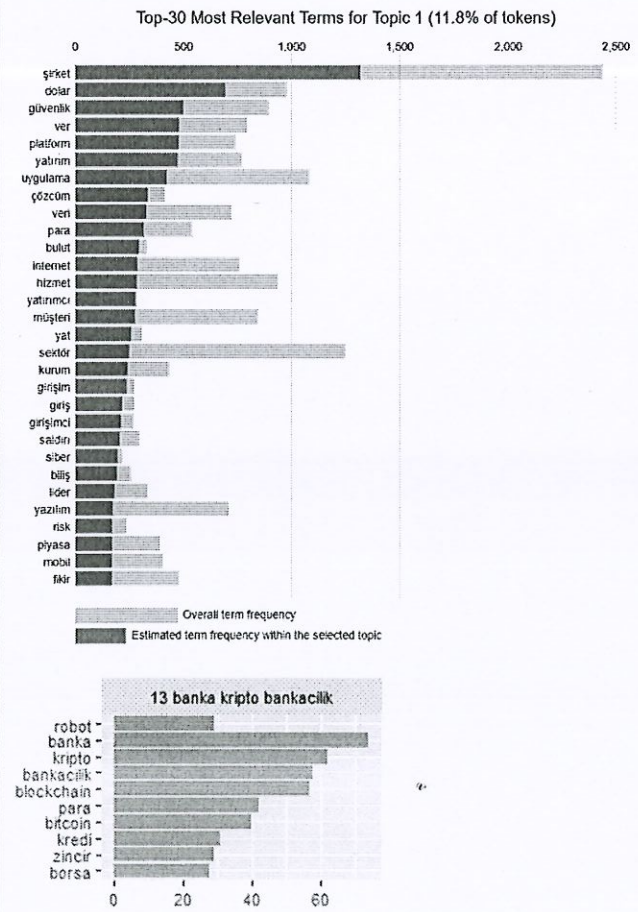
Turkish News Topic 9: Autonomous Vehicles / Driverless Cars

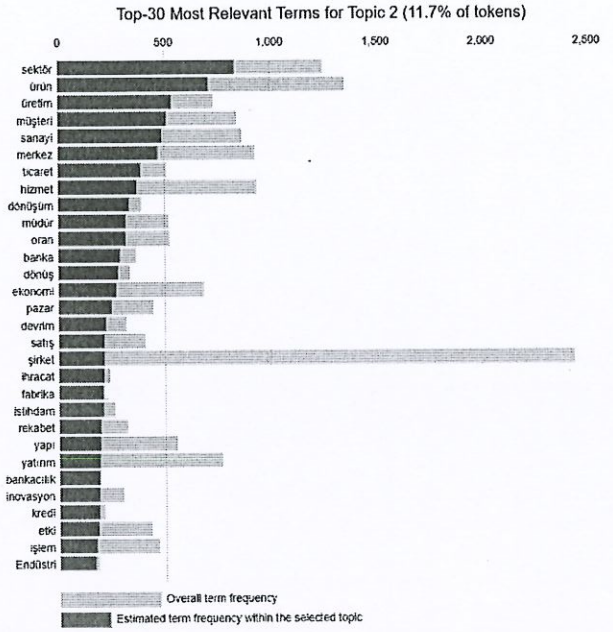
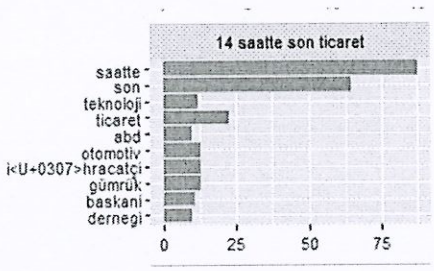
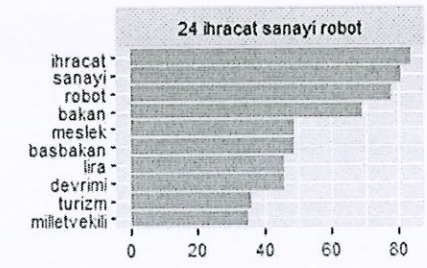
Frame: Quality of Life, Economic

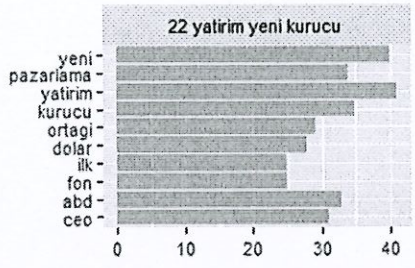
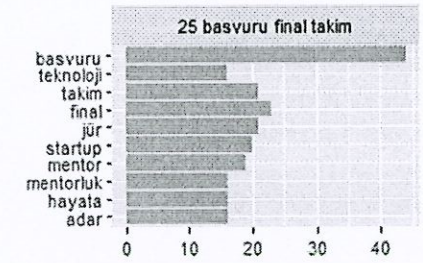
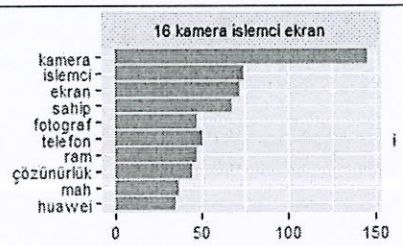
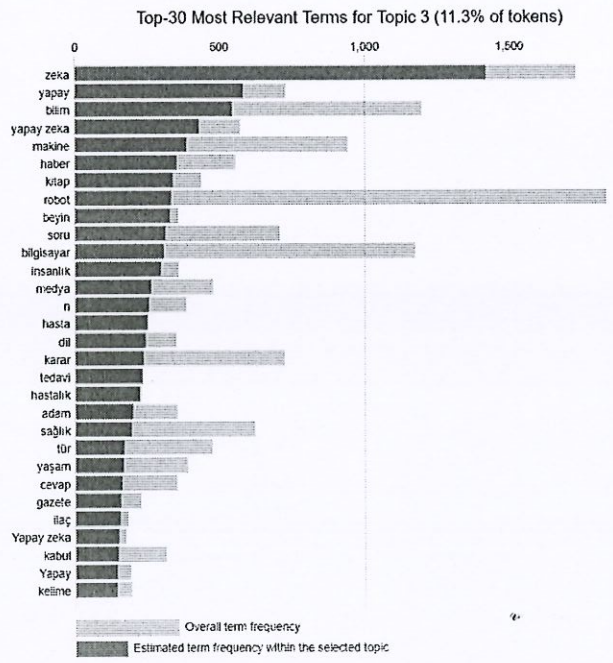
Functional Representation: Attitudinal

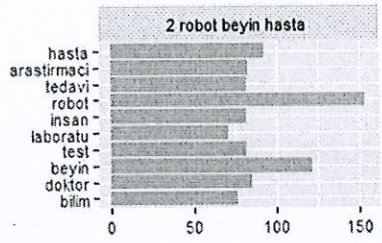
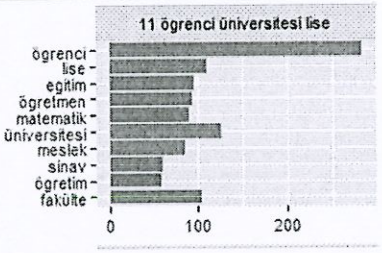
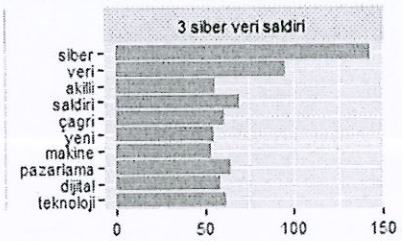
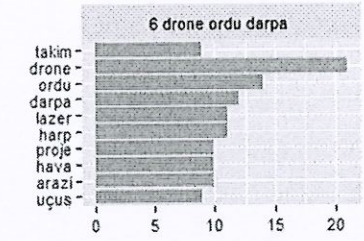
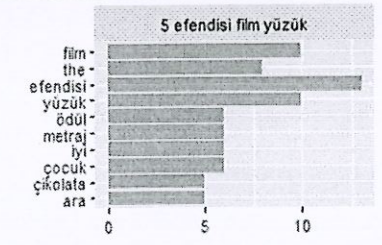
Driverless Cars is one of the objectifications of AI in media representing AI across multi-lingual corpora and Turkish news mostly import foreign news translations in addition to local efforts on building autonomous vehicles.

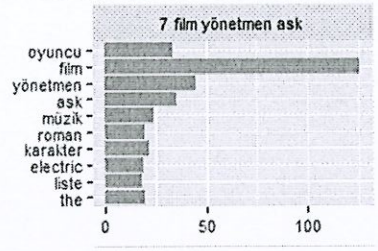
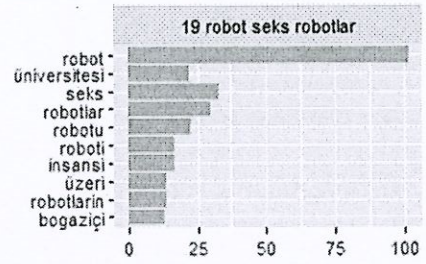
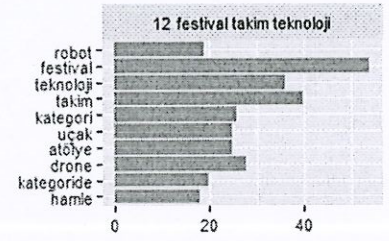
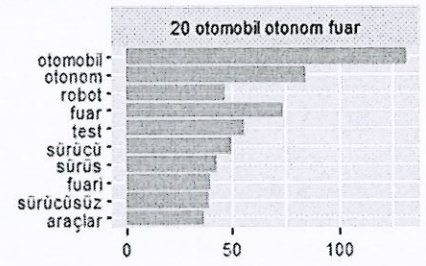
TABLE 16. Turkey News Topics Keyword Frequencies

Topic Name	*Representative Keywords with frequency*
Show me the Money! / *Making money*	

Local AI for Development *AI & Economy: Turkish Export Business / R&D / Investments*	  

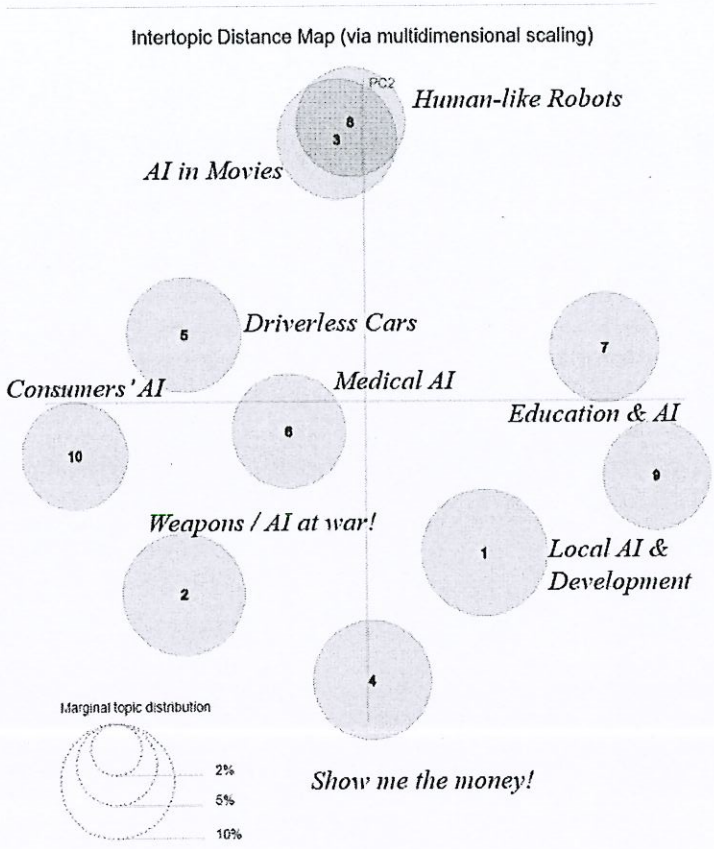
	 
Consumers' AI	
Medical AI	

	
Education and AI	
Weapons & Security / AI at war	 
AI in Movies	

	
Human-like Robots	 
Driverless Cars	

Based on the LDAvis package method developed by Sievert & Shirley (2014), an intertopic distance map was created via MDS, plotting LDA results as shown in Figure 14. This visualization provides a global view of the Turkish news corpus topics and by visualizing their relative positionings, it creates an opportunity to analyze how they differ from each other.

Figure 14. Intertopic Distance Map of Turkey News Corpus



Intertopic distance map confirmed the categorization of framing and functional representation coding: Topics like *Humanity & AI*, *AI in the movies* and *Human-like Robots* (robots heavily portrayed with ultimate human characteristics) huddled together and distanced themselves from the pure financial and security related frames (*Weapons*, *Show me the money*). *Consumers' AI* was also positioned near AI powered consumer technologies including financial technologies and technologies like Driverless Cars that are easier to be portrayed in the lived practices of the consumers. Topic of *Consumers' AI* also seemed to be distinctively separated from macro-level topics like *Education and AI* and *Local AI and Development*.

CHAPTER 4

DISCUSSION

4.1 Discussion of Analyses

Economic framing is the most dominant framing in AI news. Although with nuances, across all countries this economic framing manifested itself as private industry and branding of consumer objects running on algorithmic systems like robots, personal assistants, smart phones or accentuating other economic impacts like job creation and loss. After reduction of number of topics by categorizing them for the sake of simplifying the representational elements, 6 fundamental representation area of AI in English language media was determined. Table 17 summarizes these major representation areas and their corresponding topics.

Table 17: Fundamental Representation Areas of AI

Consumer representation	AlphaGo-SMRPHN, BAIDU, FB Bots, DRVRLS-CAR, INVS-MRKT, Robot
Academic representation	RSRCH-SCIE, UNIVERSITY, US-RSRCH
Soft-Skills representation	ART, CLTR_IND, GGL-DPMND, MCHN-HMN-MND, Robot
Macro (economic and political) representations	CN-DVLMPNT, MS-TALENT, Robot, WRK-AUTOM
Social and Ethics Representation	DATA-LAW, DRVRLS-CAR, FCL-RCGN-SCRTY, EXP-SYS, HMN-MCHN-CNFLCT, WEAPON
Health Representation	HEALTH

Consumer representation depicts AI as the artefacts of consumption, with technological advantages and also controversies of our relationships with them. This area of representation is an opening door for consumer culture theory studies as embodied AI created plethora of consumption experiences and attributes, as

these objects are never objects but an extended identity and gateways to different identity projects with certain dynamics (Belk, 2013). Consumer representation of AI also has a mechanism of veiling the systemic aspect and indirect effects of algorithms by reducing them to a firm, monolithic, objectified phenomena, which is typical across all the country corpora analyzed.

Academic representation of AI can be considered as the origin of the scientific concept later diffused into larger society groups as the issues like climate change or biotechnology discussed in the public understanding of science literature (Moloney, Gail, et al, 2014; Christidou, Vasilia, Kostas Dimopoulos, and Vasilis Koulaidis, 2004; Wolfgang, and Kronberger. 2001 to name a few of many academic discussions). AI stands between academic and private institutions in the production and experimentation of technology as news about private company owned research institutions are more prevalent in the discourse.

Soft Skills of AI is another representation area where algorithms are portrayed with humanistic talents and attributes including artistic and emotional capacity. This representational area has a potential of creating new communication myths around AI as public needs to make meaning out of this novel phenomenon that a machinery is up to the most humanistic values and talents.

As AI is embedded in economically framed discussions, many topics also bear political issues in the cases where it is seen as a driver of a national economy, with nationalistic ideological framing in action. As Carvalho (2007) asserts that "discursive (re)construction of scientific claims in the media is strongly entangled with ideological standpoints. Understood here as a set of ideas and values that legitimate a program of action vis-à-vis a given social and political order, ideology works as a powerful selection device in deciding what is scientific news, i.e. what the relevant "facts" are, and who are the authorized "agents of definition" of science matters". In such cases, techno-scientific concepts also represent the mood in international relations as this has been the case of cold-war era space race between US and Union of Soviet Socialist Republics (Ringas, expected in 2020) where technological capability represented a critical nationalistic pride and

becomes the major element of an international competition. In this case, "the unique socio-economic setting of the Space Race and how the need for space superiority led to the unprecedented investment, development and breakthroughs in space technologies" (ibid), resulted in a purely scientific topic to be represented as a macro level political issue. Analysis of China and US corpus reveals a dimension of rivalry clearly manifested in the AI news. The relationship of a country with AI is always depicted as "AI Race" or "Battle" to win which is a macro-level objectification of AI. Under this framing, leveraging technology is operationalized as a relevant political power in the meaning-making of AI. Hence AI is proposed here as a nationalization element in the case of China and US on the basis of ideological functions of representation, much like suggested by the research that certain science communication issues like global warming and climate change are operationalized as a result of ideological functions. (Maeseele & Yves, 2017; Olausson, 2010)

A similar case here is relevant for Turkey as well. Results showed that Turkish corpus did not differentiate structurally from topical set of English corpora except for certain nuances in local normative values. Majority of the topics in Turkish news were infused with attitudinal and ideological representational functions under the effect of a nationalistic pride operationalizing AI news. Once again, a techno-science topic is utilized in a nation-wide identity project. Turkey and China were similar in their approach to this identity project as their use of "Turkish AI" or "Chinese AI" dominated the naming of a technology. US and China portrayed a dualistic representation in the sense of an AI development race while Turkey portrayed a nationalization of technology effort. From a Moscovician perspective, this is a typical objectification of AI by fixing the term in the domain of economic development, denoting it as a leverage / catalyzer in a national "development move". With a touch of nationalistic pride emphasized where possible, news articles tend to portray Turkey's efforts amid the highly dominant global players in this area. Human reading of representative news in this topical domain revealed that they vary in terms of origin (ranging from government to private and Turkish university initiatives) with a common nationalistic approach to create "milli /

national" technology. Another dystopian dimension of AI is being cultivated in Turkish media in this very topical dimension is that either the country catches up with AI or it will face the dangers of being a follower / prey to the foreign powers.

It could be important to underline a certain unmarkedness inherent in the linguistic dominance of US across the world news. Limited appearance of ideological framing should be carefully noted as this might be deceptive. As Silicon Valley signifies AI, what is nationalistic about US goes unmarked being represented as a global AI discourse while China and Turkey cases emerge as marked signifiers of National AI or Yerli/Milli Yapay Zeka. As US national ideology becomes a global standard, an unmarked signifier with a dominance, the rest can be marked as an ideological framing suppressing the probable dominant ideological framing and representations of AI.

Societal tensions around AI are manifested as global representations, tensions especially regarding job-losses due to AI, new job creation, and unprecedented requirements from work-force in terms of new skillsets required to run an economy increasingly powered by algorithmic systems are prevalent in all corpora analyzed.

Only representation going beyond the anthropomorphism and embodiment of algorithms is present in social and ethics dimension, where non-objectified state of AI has been represented with concrete impacts on the society around the topics of DATA-LAW, DRVRLS-CAR, WEAPON and FCL-RCGN-SCRTY. On these topical dimensions, media is closer to discuss pragmatically that a piece of code can send innocent people into prison, a self-guided missile running on AI can autonomously decide to kill civilians and there's a lack of accountability when self-driving cars are involved with accidents or when facial recognition cameras run and detect wrong person of interests by algorithmic predictions.

Representation of AI in Health is critical to underline as the most of discourse here is utopian, confirming preceding work of Ethan & Horvitz (2017) and making this finding valid for the media out of US as well. With the exception of a few topics around universities and scientific research, manual reading of documents

representing each topical dimension revealed that all AI topics and their representations skew towards dystopian futures awaiting humanity. Only Health representation of AI is portrayed as totally utopian without significant dystopian connotations, with no episodal negative cases in media so far regarding the involvement of AI in health-related issues. This dual representation of the AI both as utopian and dystopian at the same time suggests what SRT coins as "*cognitive polyphasia*" (Moscovici, 1976) where everyday agenda of AI is characterized by opposite rationalities and forms of thinking present at the same time.

Most prevalent anchoring mechanism of AI is the naming. According to Moscovici, naming is to locate a concept in "*the identity matrix of our culture*" (Moscovici, 2000). For consumer representations of AI, anchoring of naming revolves around the theme "smart" while macro-level representations the words "battle" or "quest" becomes apparent. Hegemonic representation of AI is present in its supremacy over humanity in terms of cognitive skills.

There's also an emotional anchoring especially of fear in most of the dystopian representations, represented by topics like Robot, WRK-AUTOM, HMN-MCHN-CNFLCT and WEAPON where communicative mechanism is to associate AI as a threat to humanity. As an example of representation by antimonies in SRT, AI's portrayal emerges as *hope* instead of fear when it comes to the topic HEALTH as detailed above. Markova defines dialogicality as a sense making process based on capacity of thinking in polarities and antinomies (Markova, 2003). AI has an anchoring in antimonies as the process of collective meaning-making through attitudinal social representation functions underlines algorithmic systems as a leverage for both fear and hope simultaneously.

Primary objectification mechanism of AI is in the topic robot as it depicts the concrete phase of algorithmic systems across country media corpora. Moscovici (2000) underlines that perception replaces what is conceived with the help of objectification and here an ultimately abstract phenomenon like algorithm is materialized as a concrete reality like robot. Especially in US and UK, episodal

cases like DeepMind beating Go Player Lee Sedol or Kasparov-IBM chess battle creates other name objectifications.

Another mechanism of objectification for AI is personification. Personification of a concept ties a phenomenon to specific people, mostly well-known and public figures representing that phenomenon on their concrete behaviors, discourses or experiences they radiate. Their power of popularization is paramount as in the cases of photographs of Al Gore personified climate change and international resolutions towards it (O'Neill, Saffron J., et al., 2013; Smith and Helene, 2009). In the case of AI, Elon Musk was the global personification across all corpora. US and UK personifications were mostly similar as China produced different personifications like Lee Sedol (human Go player against AlphaGo) and Jack Ma (founder of Alibaba.com).

4.2 Conclusion

Regardless of country setting, representation of AI centered mostly around an economic framing with attitudinal functions of representation. Veiled by embodied consumption objects, systemic nature of algorithmic systems are overrid by monolithic media representations, cultivating economically framed attitudinal functions. While literature underlines that media framing of techno-science is economically, culturally and politically grounded (Felt, 2000), framings and representation functions resulted different priorizations and more importantly masking of ideology in framing with limited ideological representations detected in media (Table 5). According to Barthes (1957), a myth is a naturalization of what is culturally taken for granted, as socially constructed phenomena are represented unquestioningly with assumptions, historical roots and power dynamics within a particular culture. This reification in representation of AI is further supported by framings and functional representations excluding /suppressing ideological dimensions, naturalizing AI as primarily an economic phenomenon.

As the origin of AI, academic representations are salient with increasing dominance of private industry research labs making AI a boundary topic between private and academic institutions. As dominant framing is economic, academy appears to be

less represented in media frames, potentially limiting the diversity of communication of AI developments which might spur from academia hence promoting a further emphasis on the economic framing of AI.

Commensurability of machines versus humans is a mythification point as representation of AI has potential of creating new myths while novel developments from both private and academic spheres meet with public. Literature suggests that many linguistic elements of technology, especially in the realm of computer sciences bear direct metaphysical elements (Davis 2015; Dery 1996; Singler 2017; Kelly 1999) and they "embody and drive important myths about our time" (Mosco,2005). As an empirical example for the diversity of conceptual relevance of algorithmic systems, although many bearing secular views, engineering jargon of the some of the creators of "AI", their self-positioning and even ideological quests have become associated with religion and attracted attention from theology studies. From digital prophets to technology evangelists, most of the professional titles in technology industry and linguistic elements of technology bear direct religious elements and new minority religion groups arise powered by technology (Singler,2016). Recently, a former Google engineer has even founded "Way of the Future, a religious group to create a deity based on artificial intelligence for the betterment of society" (Solon, 2017). As also findings of this thesis study confirms, there's a rich spectrum of conceptual relevance in the representation of algorithmic systems. In line with this diversity, framing by media necessitates further objectified and anchored news content for facilitation of meaning-making across a wide spectrum of signs.

Overall, representation of AI has a folding agenda, masked by economic frames which limit both ideological functions of its representation and meaning-making processes of indirect social effects of AI with the exception of a few topical dimensions discussed above. While Mesthene (1970) says "technology is nothing if not liberating", according to Ellul (1964), technology as a force with autonomy and with its uncontrollable nature has a dehumanizing effect on the society. The term "technique" (Ellul, ibid) is differentiated from technology with it pervasive

mentality and structuration across social, political, and economic dimensions of life, with intrinsic logic and necessities, replacing nature as well. Technology is then described as a consequence of a primary dependence on technique, with a certain teleology of organizing everything at the maximum efficiency and productivity. From a perspective of "Technique", this thesis underlines from a social representation perspective that the way AI is cultivated by media representation also contributes to masking of indirect influences and ramifications of technology. "Technique" in its Ellulian meaning, is not represented in AI, despite the social, economic and political aspects of AI is much more than a technology as it is currently and dominantly framed in media, resulting in a pseudo-liberating cultivation and subtle illusions giving rise to dystopian antitheses arising at the same time. Findings of this thesis confirm the significantly minor presence of ideological aspects of AI as the masking of "technique" at the expense of technology.

As a methodological conclusion, this thesis attempted to explore how crossing epistemological and methodological borders might be conceptualized on the specific case of identifying representations of Artificial Intelligence (AI) as an effort of rethinking methodology in communications. It used quantitative text mining tools to identify topical dimensions of AI-related news, creating a cognitive map and then manually tackling machine-identified topics across countries, utilizing different methodological approaches enroute. Gibbons (1994) underlines that the way knowledge is produced has undergone radical changes across the spans of scientific disciplines and this has the power to "replace or radically reform established institutions, disciplines, practices, & policies". Russel et al. (2006) defines transdisciplinary (TD) methodology as going across borders and its ramifications in methodology is vast. A TD approach calls for a methodology involving an interpenetration or integration of different disciplinary methodologies, termed as "pluralistic methodology". This process, according to Wickson (ibid) "characterizes TD research by the process of having multiple research approaches critiquing and deconstructing one another to develop an evolved methodology". In contrast to an evolved methodology in the practices of a vertical discipline,

methodology caring about the fluidity of borders continue to 'evolve' along the research in an iterative relationship. This has significant implications for how TD research is performed. One aspect is the collaboration, not only across scientific disciplines but also involving stakeholders actively in the definitions of problems during the research. For the study of algorithmic systems from a social science perspective, both the research question and methodological tools can work closely with computer science domain and this relationship is quite organic starting from the epistemology to arrive at transdisciplinary methods. An example is this thesis where practical research of exploring the media representations of AI as a social sciences topic using text mining powered by Natural Language Processing algorithms conducted by an involved stake-holder in the industry.

Interactions between the findings of the study and the epistemology of studying AI is another concluding point in this thesis. Using a continuous hermeneutic cycle of capturing the machine-read signs and grounding their meaning by switching between induction and deduction between quantitative methods of text mining and qualitative modes of inquiry in an "abductive manner" (Suerdem, 2018) is a vivid example of how cross boundary methodology facilitates results, with all the implications and requirements of involvement from the field as machine-involvement is a producer of large sign systems with no symbolic meanings.

4.3 Limitations and Further Research Potential

Following limitations have been identified in this study along with further research opportunities:

AI frames are too dynamic to be fixed. Rather than a retrospective study, a dynamic dashboard of monitoring topics on a dynamic base of changing keywords can give representational studies a more balanced and diverse view of localities and nuances along with global representations within niche groups/milieus rather than countries as a unit of analysis. A relevant example of this dynamism is the topic *Hardware of AI* in US Corpus. Once an economic frame, empirical observation shows the more frequent appearance of keyword "quantum supremacy" as of October 2019,

which was beyond the data collection point of this study. The injection of the word supremacy has turned this keyword from a representational element of economic into a policy and security and defense frame as any nation having quantum supremacy will have an advantage in not only economic, but more vitally in political and military areas. The word supremacy is a recent anchoring to quantum computing, denoting the presence of power in technology that possibly evolve to another keyword in the coming years. A continuous longitudinal research is needed to tackle which topical dimensions are persistent and leading to dominant frames while which ones are temporal and leading to other representations.

As no diffusion study is probed under this study, there's possibly an uncaptured diversity of milieus with nuanced representations of AI. Although assuming Social Representations are constituted with collective cognitions captured by media news, there's a possible academic mileage to explore diverse groups within a society / group with different operationalizations of AI representation possibly resulting in varied cognitive thinking and communicative mechanisms. As an example, a developer in technology company knowing all technical background might criticize the news that national Turkish AI is being developed while there is limited national infrastructure regarding AI. Hence a national representation might collapse in this certain group or even lead the way to a *polemic representation* (Moscovici, 1988). Including different milieus with qualitative methods and probing the diffusion / cultivation of machine-detected topics might be a future research plot to fully understand phenomena on social representation of AI. A qualitative inquiry will explore how these defined media frames and representation functions diffuse in more varied groups to better illustrate how this diffusion process operates or stalls at what parameters in detail.

Another limitation and a further research potential is the *frame detection*. Policy codebook by Boydstun, Amber E., et al. (2013) used in this study originates from the ontology and epistemology of political science of USA, particularly bearing references for elections and micro policy issues of the country, limiting its usefulness for a study of this nature. There might be a research opportunity further

towards creating a codebook of AI frames in media by attempting to compile a detailed AI frame codebook as diversity of topics in AI representation can fuel a unique frame detection codebook for AI itself with sufficient collection of news media corpus and their text-mining.

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Appendix 1: UK News Sample Excerpts

UK News Topic	News Sample Excerpts
Doctor in the House	The Times December 13, 2017 Artificial intelligence rivals doctors in spotting spread of breast cancer Artificial intelligence is just as good at spotting the spread of breast cancer as specialists, a study suggests. Advanced algorithms were as accurate as an experienced pathologist in selecting metastatic tissue samples and did even better than specialists rushing against the clock, the study, the first of its kind, found….. The best programmes were as good at spotting metastases as a pathologist who took 30 hours to interpret 129 slides, much longer than would be normal in a hospital. They did better than 11 pathologists given a minute on each slide, researchers report in the Journal of the American Medical Association. This is the first study, they claim, "that shows that interpretation of pathology images can be performed by deep-learning algorithms at an accuracy level that rivals human performance"
Existential threats	The Times December 3, 2014 Hawking: artificial intelligence could kill off mankind

	Artificial intelligence is a threat to human existence, Stephen Hawking, one of Britain's best known scientists, has warned. "The development of full artificial intelligence could spell the end of the human race," he said in an interview yesterday. His warning came in response to a question about a revamp of the technology he uses to communicate, which incorporates a basic form of AI. The theoretical physicist, who has the motor neurone disease amyotrophic lateral sclerosis, or ALS, was using a new system developed by Intel to speak. Machine learning experts from the British company SwiftKey were also involved in its creation. Their technology, already employed as a smartphone keyboard app, learns patterns that the physicist tends to use and suggests which words he might want to use next. Professor Hawking told the BBC that "smart" algorithms designed for specific tasks were proving useful, but that he feared the consequences of creating "general" artificial intelligence, which could potentially surpass human abilities on a broad range of tasks.
Branded AI	The Times February 27, 2017 O2 unveils artificial intelligence link for customers

	Telefnica, the Spanish owner of O2, has launched an artificial intelligence platform enabling customers to use their voice to ask questions about their account as well as tailor content and data to their own needs and interests. The digital personal assistant service, which has been developed with Microsoft, is one of the more advanced efforts to apply artificial intelligence technology to ordinary consumers, according to Jos Mara lvarez-Pallete, the chairman of Telefnica. "Cognitive intelligence will allow us to understand consumers better so they can relate to us in a more natural and easy way," he said at the Mobile World Congress in Barcelona. In 2008, three Cambridge graduates created a virtual keyboard app called SwiftKey, which uses artificial intelligence to predict the next word you will write on a phone or tablet. The friends - Jon Reynolds, Ben Medlock and Chris Hill-Scott, who sold his stake in the start-up for a bicycle - created a program that is now used on 300 million smartphones. The technology, which learns users' typing habits, even helps power British physicist Stephen Hawking's speech system, doubling the rate at which he talks and reducing the errors he makes while typing. Last month, Microsoft announced it had bought SwiftKey for $250m (176m). The technology will ultimately be integrated into Microsoft's own products to make them smarter and more intuitive.

	While this is a moment of celebration for UK entrepreneurs and investors, SwiftKey is not the first British artificial intelligence company that has caught the attention of a Silicon Valley monolith. Apple, Amazon, Google and Microsoft have all been drawn to Britain's disproportionately large pool of talented artificial intelligence entrepreneurs.
Let's Play!	Guardian March 17, 2016 AlphaGo beats Lee Sedol in third consecutive Go game; Google's DeepMind computer program wins $1m in victory marking significant development in artificial intelligence Lee Sedol, who is the world's second best player of the strategy game, lost three games in a row in Seoul this week, with the latest AlphaGo victory on Saturday handing Google the best-of-five match. "I've never played a game where I felt this amount of pressure, and I wasn't able to overcome this pressure," Lee said at a post-game press conference. Go has simple rules, but is highly intuitive and complex in practice. Mastering it has been an exceptionally difficult task for even the world's best IT designers. "We came here to challenge Lee, to learn from him and see what AG was capable of," said Demis Hassabis, co-founder of Google's artificial intelligence business, DeepMind, which created the program.

	"AlphaGo controlled the momentum over more than four hours of gameplay, with Lee struggling to maintain territory against the program's creative approach. Google DeepMind taught AlphaGo to recognise the optimal move in thousands of possible scenarios." AlphaGo's dominance amounts to a significant, and much faster than previously expected, advance in artificial intelligence. Google co-founder Sergey Brin, who was in Seoul to watch the third match, described Go as a beautiful game and said he was excited the company had been able to "instil that kind of beauty in our computers". Michael Redmond, one of the match's commentators and a professional Go player, said some people initially doubted AlphaGo's abilities. "After three matches and three straight victories, we are convinced," he said.
AI the Mechanical Turk	Independent October 7, 1996 Lost? Send in the hounds; Finding what you're looking for on the Web is about to get easier. Have you ever spent hours trying to find something on the Internet without really knowing where to look? If not, count yourself in a lucky minority. For the Net's vastness - the incredible, ever-expanding amount of information it contains - makes it both a thing of wonder and a source of irritation to those who use it. There are numerous "search engines" to help you find your way around, but all too often they are slow to

	respond to a query and when they finally do you are presented with long lists of irrelevant items. But a revolutionary solution, drawing on research into neural networks and artificial intelligence, is now at hand. Known as an "intelligent agent", it is an ingenious piece of software that does all the searching for you and, unlike conventional search engines, can distinguish between different meanings of the same word. Those who are promoting agents say this is just the beginning. They are already talking of agents that will negotiate deals for you, pay bills and arrange home entertainment such as music or movies. The concept of employing artificial intelligence for searching the Net and other computer networks has been around for some time. Several companies, including Microsoft, have been putting a lot of effort into producing a viable application. "It has been the Holy Grail for software developers", says David Tabizel, a consultant to Durlacher Multimedia, who has watched the development of agents.
Soft Skills of AI	Guardian May 6, 2016 Does an AI need to make love to Rembrandt's girlfriend to make art?; Is a picture made by an artificial intelligence 'art' if there's no emotion involved? And what happens if you train a neural net to make music using only the Friends theme tune? Jonathan Jones is unhappy about artificial intelligence. It might be hard to tell from a casual glance at the art critic's recent column, "The digital Rembrandt: a new

	way to mock art, made by fools," but if you look carefully the subtle clues are there. His use of the adjectives "horrible, tasteless, insensitive and soulless" in a single sentence, for example. The source of Jones's ire is a new piece of software that puts... I'm so sorry... the 'art' into 'artificial intelligence'. By analyzing a subset of Rembrandt paintings that featured 'bearded white men in their 40s looking to the right', its algorithms were able to extract the key features that defined the Dutchman's style. Trained on over 160,000 fragments of the Rembrandts, the AI would soon learn enough to produce its very own masterpiece. Or failing that, the Friends theme tune. Of course an artificial intelligence is the worst possible enemy of a critic, because it has no ego and literally does not give a crap what you think. An arts critic trying to deal with an AI is like an old school mechanic trying to replace the battery in an iPhone - lost, possessing all the wrong tools and ultimately irrelevant. I'm not surprised Jones is angry. If I were in his shoes, a computer painting a Rembrandt would bring me out in hives.
Branded AI_Apps	Guardian February 15, 2010 Siri: voice-driven iPhone app If you're a hardcore Douglas Adams fan, you may remember the 1990 BBC2 documentary Hyperland. In it, he dreams of a future in which a super-clever

	program, a "software agent" played by Tom Baker, guides him through a world of information. Computers that answer questions we ask them are sci-fi fare, but moving closer to reality as smartphones become more powerful. Google mobile apps have had voice search for a couple of years, but speech-driven mobile apps are growing in sophistication. A new app called Siri promises to be a virtual personal assistant. Siri draws on artificial intelligence research from a $150m US defence programme called Calo. Rather than helping soldiers find bad guys, Siri promises to help you find an Italian restaurant near your office or a movie close by, or let you know the weather forecast for tomorrow. Want to know what romcoms are playing near you? Just ask, and the iPhone app interprets your question, finds your location from the onboard GPS and delivers a list of movies, cinemas and times. Siri uses its artificial intelligence and speech recognition from Nuance to dedecide whether to query the forecasting service WeatherBug, MovieTickets.com or the airline information site Flightstats.
Show me the money	Independent April 3, 2016 How your bank is becoming RoboCop; Could artificial intelligence make banking more personal? Felicity Hannahfinds out.

	Banking isn't what it once was. Branch managers with personal relationships and hunchbased decisions are out. And in their place are automated algorithms relying on credit checks and other customer data to make decisions on lending and customer spending. Nowhere is that more prevalent than when it comes to fraud. Ask anyone who's had their card blocked during a stag do in Tallinn or a girls' trip to Vegas. And now the effects of blanket rules that leave thousands of banking customers in the lurch is prompting a major drive to develop artificial intelligence (AI) that can effectively identify fraud and, potentially, transform consumer banking. But while AI may sound like yet another step away from the days of the trusty bank manager, proponents argue that the ability to identify unique spending behaviours and make rapid decisions could mean the future of banking is more personal, not less. Meanwhile, with "robo advice" already tipped as a development that could transform how people access products in the future, it now seems RoboCop could be coming for fraudsters. "Let's imagine you go on holiday every year to Morocco", suggests Martina King, the chief executive of Featurespace, a company born from Cambridge University research that is pioneering the use of AI to understand individual behaviour in real time and predict future actions. "Our systems can use that prior piece of information where existing bank systems can't. So we know that you usually go to Morocco, it's an expected pattern and your card wouldn't be blocked."

Machines in the workplace	Daily Mail June 28, 2017 WORKERS TO BE REPLACED IN THE ROBOT REVOLUTION MILLIONS of British workers could find themselves replaced by robots, according to a study by PwC. In a workplace revolution, computers with artificial intelligence are increasingly being used by companies in place of humans. It is a sector that could be worth 222bn to the economy by 2030, the auditor predicts, and is expected to prompt a complete rethink about how employees spend their time. Up to 30pc of workers - or about 10m people - could be affected, it was estimated. Instead of driving lorries from the vehicle's cab, for example, hauliers could allow machines to do most of the route before taking over remotely when they reach busy areas or to carry out tricky manoeuvres. Machines could also help surgeons carry out operations or read scan results in hospitals, draw up contracts for law firms, manage stock rooms for supermarkets and raise your insurance premiums based on vast amounts of number-crunching. Alastair Bathgate, chief executive of artificial intelligence software firm Blue Prism, said: We are trying to transform the future of work and to digitise the workplace.'

Appendix 2: China News Sample Excerpts

China News Topic	News Sample Excerpts
University-Institute of AI	South China Morning Post May 3, 2005 Cityu wins award for AI software An Artificial Intelligence (AI) software system jointly designed and developed by City University (CityU) and the MTR Corporation has won an innovative application award from the American Association for Artificial Intelligence. The award-winning AI Engine, which has been in daily use since July last year, is an intelligent scheduling software for the efficient allocation and management of engineering resources for existing MTR lines, the Airport Express and the future Disneyland Resort Line. Andy Chun, an associate professor at CityU's department of computer science, is the first person in China to receive the award. "I believe our AI technology can easily be applied to many different types of organisation in Hong Kong to help them streamline their operations and maximise their performance and revenue," said Dr Chun (below left)
Chinese Branded AI	Baidu, Alibaba, Tencent advance Chinas AI development goals, says Microsoft research head

	April 6, 2017 Mainland China, led by its three largest internet companies, may be narrowing the gap with the United States in undertaking advanced research and development in the growing field of artificialintelligence, according to the head of software giant Microsoft's AI organisation. "This is probably the greatest business opportunity of our time, so all of the world's major technology companies are now in the AI race," Harry Shum Heung-yeung, the executive vice-president for the artificialintelligence and research group at Microsoft, told the South China Morning Post. Baidu, Alibaba Group and Tencent Holdings - the Chinese internet triumvirate collectively known under the acronym BAT - are "leading the way in China by investing heavily in AI", he said.
Quest of AI / China R&D	China Daily December 4, 2017 Nation shines in digital China's growing openness and its digital economy's continuing impetus to social and economic development are big positives, business executives and experts said. Businesses laud leadership's backing for technology-driven progress China's growing openness and its digital economy's continuing

	impetus to social and economic development are big positives, business executives and experts said. Nathan Blecharczyk, co-founder and chairman of Airbnb China, a vacation home-rental platform, said President Xi Jinping's congratulatory message to the 4th World Internet Conference on Sunday showcased the open and supportive attitude of the country's leaders toward the digital economy as well as the increasingly pioneering role China plays in innovation. It is also a topic that Wang Huning, a member of the Standing Committee of the CPC Central Committee Political Bureau, touched upon in his address to the event. One promising initiative on this frontier is the digital Silk Road. That is, accelerating internet infrastructure to develop artificial intelligence, big data and sharing economy, said Luigi Gambardella, president of ChinaEU, a nonprofit organization promoting digital and internet cooperation. Xi is a leader who will "make China thrive in the digital age, while his speech touched on strengthening infrastructure networks and developing advanced manufacturing through the integration of the internet, big data and artificial intelligence", Gambardella said. The leaders' speeches are clear signs that Beijing has flagged digital economy as "an intrinsic source" to drive macroeconomy, said Shen Yi,

	head of the Cyberspace Governance Research Center at Fudan University. Shen said China's leadership is adding substance to the governance and future of the internet, through introduction of concrete steps, with the private sector exerting a centripetal force. Obviously, AI will boost the real economy. From healthcare to the auto industry, almost every industry will experience the upgrading and transformation brought by AI. And we will have the opportunity to witness and participate in this technological revolution. Pony Ma, chairman and CEO, Tencent Holdings Ltd
Machine – Human Mind	South China Morning Post May 27, 2017 AlphaGo vanquishes worlds top Go player, marking AIs superiority over human mind Humanity's contest with artificial intelligence, using the oldest and most complicated form of competition known to the human mind, came down convincingly in the machine's favour this week, marking the point in time when the progeny of the human race outsmarted the creator. AlphaGo, an artificial intelligence (AI) programme developed in 2014 by the DeepMind

	lab of the world's largest internet search engine Google, vanquished China's Ke Jie, the top player of the game of Go, in all three matches this week in Wuzhen in Zhejiang province. "I'm very sorry I lost," Ke said with tears in his eyes at a post-match press conference. "I wish I could have done better," he said, describing AlphaGo as "perfect, flawless, without any emotions." The game of Go, also known as weiqi ( ), is played on a 19 X 19 grid board by two players. With more permutations than the total number of estimated atoms in the visible universe, it has been the benchmark for measuring human intelligence against the artificial variety ever since IBM's Deep Blue beat the chess grand master Gary Kasparov in 1997.
Applied Science of AI	South China Morning Post September 7, 2017 Chinese University researchers build speedy new system to detect cancer using AI A medical imaging analysis system developed by Chinese University researchers could cut the time required to identify cancer cells from five minutes to just 30 seconds with the help of artificial intelligence. The system, which relies on "deep learning" - a form of artificial intelligence whereby a machine

	can improve its accuracy through use of existing data - reportedly reduces the time taken to analyse medical images for computerised tomography (CT) scans and histopathology examination, or microscopic inspection of tissues. The technology could be adopted by local hospitals within one to two years, said Professor Heng Pheng Ann from the Chinese University's department of computer science and engineering. "Hopefully the technology could be applied to cancers that are more prevalent," Heng said. The system can help doctors be more efficient in analysing medical images and reduce possibilities of inspection missed by medical personnel, said Dou Qi, a PhD student from the same department. Analysing information from about 1,000 overseas patients provided in an international data analysis challenge last year, the Hong Kong researchers, who began looking into the technology five years ago, managed to locate cancer cells from CT scan images of lung cancer patients - a way for doctors to identify the disease - in 30 seconds with an accuracy of 91 per cent.
Application of Algorithms	South China Morning Post September 29, 2016 AI to drive Baidu car dreams in mainland; Search giant sees huge commercial applications for

	technology in autonomous driving, plans to make huge investments on new growth driver Unfazed by the early initiatives of Google and Tesla, Chinese online search giant Baidu is looking to take the lead in the commercial application of artificial intelligence for autonomous driving on the mainland, the world's largest car market. "China's road conditions are, perhaps, much more complex than in other developed countries," Baidu chief financial officer Jennifer Li Xinzhe said during a Bloomberg event in Hong Kong yesterday. "Autonomous driving can bring tremendous value in the issues it can address [in China] like traffic jams, air pollution and road safety." Li reiterated Baidu's target of initially getting self-driving cars on mainland roads by 2018 and the mass production of these vehicles in 2020. "We think the automobile is the next major computing platform," said Li. She added that the company has been investing in artificial intelligence over the past four or five years, with an eye on creating a new growth engine that will help transform traditional industries like transport and financial services.

Machines in the workplace	South China Morning Post April7, 2017 Artificial intelligence could put as many as 50m Asian jobs at risk over next 15-20 years: UBS study The widespread adoption of artificial intelligence (AI) could put as many as 50 million jobs in Asia at risk over the next 15-20 years, with manufacturing-driven economies such as China taking most of the hit, according to latest research by UBS Wealth Management. It says services-driven economies such as Hong Kong, Singapore and India, however, will be less affected. "10-15 million jobs will be at risk in China as traditional business models become obsolete," said Sundeep Gantori, the lead equity analyst of the UBS research. Compared with low- and high-skilled jobs that require some level of personalisation, creativity or craftsmanship, medium-skilled occupations that involve predictable and routine tasks are expected to be more effected by AI. Overall employee productivity, however, should increase sharply in Asia with the rise of AI, providing enough opportunities for employees to upgrade their skills and focus on other creative areas.

	As such, AI should also ultimately create many millions of new jobs in Asia, resulting in net job losses that should be far less and relatively manageable, said the UBS report. Chinese tech companies, including internet heavyweights Baidu, Tencent and Alibaba Group, have been pushing harder into AI to gain a leg-up before the technology makes a more profound impact on people's lives.
Baidu the search giant	South China Morning Post November 8, 2017 Internet giants will narrow the A.I. gap with U.S.; Initiatives from Baidu, Alibaba and Tencent in artificial intelligence and government support will help to close the divide with global rivals The combined initiatives of Chinese internet powerhouses Baidu, Alibaba Group Holding and Tencent Holdings are helping the mainland chip away at the lead held by the United States in artificial intelligence (AI) innovation globally. In August, the Chinese government announced its national development plan, which included building up a highly competitive AI industry that would be worth 1 trillion yuan (HK$1.18 trillion) by 2030.

Show me the money	China Daily June 23, 2017 BOC, Tencent establish joint laboratory of financial technology Bank of China, one of the country's big four state-owned lenders, and Tencent have established a joint financial technology laboratory. BEIJING - Bank of China (BOC), one of the country's big four State-owned lenders, and Tencent have established a joint financial technology laboratory, said the lender in a statement on Thursday. The lab will work on cloud computing, big data, blockchain and artificial intelligence to promote financial innovation such as finance in the cloud. "After months of work, the two sides have made breakthroughs in the fields of cloud computing, big data and artificial intelligence applications, and set up a unified platform of financial big data," said the statement. The two companies will set up a cloud platform of financial technology, improve risk control and raise efficiency. China's service sector is expected to play a bigger role in powering the economy as increasingly affluent Chinese consumers demand more diverse and better-quality services.

Let's Play!	South China Morning Post May 24, 2017 AlphaGo 1, human 0 in first of 3 games Google's artificial intelligence program AlphaGo is one step closer to omnipotence in the ancient game of Go on Tuesday after it prevailed in the first of three matches against Ke Jie, a 19-year-old Chinese prodigy who is the world's No 1 human player. Ke Jie, the world's top human Go player, loses a game on Tuesday to the artificial intelligence program AlphaGo. XU YU / XINHUA The victory shows the big leaps AI has made in the 3,000-year-old board game, which at one time was thought to be beyond the reach of computer algorithms because of its complexity, experts said. "AlphaGo is completely different from what it was one year ago. In the past, it had shortcomings. But now it is progressing so fast that I have not found any of its weaknesses yet," Ke said at a news conference in Wuzhen, Zhejiang province, after losing a close game by half a point. The match is the latest showdown between elite human Go players and AlphaGo, which defeated

	South Korean Go master Lee Se-dol 4-1 in March 2016. Demis Hassabis, CEO of Google DeepMind, said the company has upgraded AlphaGo into a more capable version since then. Go, which originated in ancient China, is a game in which two players take turns placing black and white stones on a 19-by-19 grid of squares to try to control the most territory.

Appendix 3: US News Sample Excerpts

US News Topic	News Sample Excerpts
Humanity with Robots	The New York Times November 11, 2003 Can Robots Become Conscious? It's a three-part question. What is consciousness? Can you put it in a machine? And if you did, how could you ever know for sure? Unlike any other scientific topics, consciousness -- the first-person awareness of the world around -- is truly in the eye of the beholder. I know I am conscious. But how do I know that you are? Through logical analogy -- I am a conscious human being, and therefore you as a human being are also likely to be conscious -- I conclude I am probably not the only conscious being in a world of biological puppets. Extend the question of consciousness to other creatures, and uncertainty grows. Is a dog conscious? A turtle? A fly? An elm? A rock? "We don't have the mythical consciousness meter," said Dr. David J. Chalmers, a professor of philosophy and director of the Center for Consciousness Studies at the University of Arizona. "All we have directly to go on is behavior." So without even a rudimentary understanding of what consciousness is, the idea of instilling it into

	a machine -- or understanding how a machine might evolve consciousness -- becomes almost unfathomable. The field of artificial intelligence started out with dreams of making thinking -- and possibly conscious -- machines, but to date, its achievements have been modest. No one has yet produced a computer program that can pass the Turing test. But with the continuing gains in computing power, many believe that the original goals of artificial intelligence will be attainable within a few decades.
Scientific AI	The New York Times November 1, 2016 New Research Center to Explore Ethics of Artificial Intelligence Carnegie Mellon University plans to announce on Wednesday that it will create a research center that focuses on the ethics of artificial intelligence. The ethics center, called the K&L Gates Endowment for Ethics and Computational Technologies, is being established at a time of growing international concern about the impact of A.I. technologies. That has already led to an array of academic, governmental and private efforts to

	explore a technology that until recently was largely the stuff of science fiction.. Earlier this year, the White House held a series of workshops around the country to discuss the impact of A.I., and in October the Obama administration released a report on its possible consequences. And in September, five large technology firms -- Amazon, Facebook, Google, IBM and Microsoft -- created a partnership to help establish ethical guidelines for the design and deployment of A.I. systems.
Chinese Connection	The New York Times May 28, 2017 Is China Outsmarting America in Artificial Intelligence? Sren Schwertfeger finished his postdoctorate research on autonomous robots in Germany, and seemed set to go to Europe or the United States, where artificial intelligence was pioneered and established. Instead, he went to China. "You couldn't have started a lab like mine elsewhere," Mr. Schwertfeger said. The balance of power in technology is shifting. China, which for years watched enviously as the West invented the software and the chips powering today's digital age, has become a major player in artificial intelligence, what some think may be the most important technology of the

	future. Experts widely believe China is only a step behind the United States. China's ambitions mingle the most far-out sci-fi ideas with the needs of an authoritarian state: Philip K. Dick meets George Orwell. There are plans to use it to predict crimes, lend money, track people on the country's ubiquitous closed-circuit cameras, alleviate traffic jams, create self-guided missiles and censor the internet. Beijing is backing its artificial intelligence push with vast sums of money. Having already spent billions on research programs, China is readying a new multibillion-dollar initiative to fund moonshot projects, start-ups and academic research, all with the aim of growing China's A.I. capabilities, according to two professors who consulted with the government on the plan.
US branded AI	Washington Post May 18, 2017 Google: Artificial intelligence will help personalize its popular tools MOUNTAIN VIEW, Calif. - Google kicked off its annual developers conference Wednesday by outlining a broad vision of how it thinks artificial intelligence will shape the way we communicate, travel, work and play.

	Chief executive Sundar Pichai said that improving artificial intelligence is Google's top strategy in its continuing goal to organize the world's information. Using AI, Gmail will now suggest phrases for your replies, based on its interpretation of your conversation. Google Photos will figure out which of your snapshots are best for sharing, and it will use facial recognition to figure who should get those photos. A program called Google Lens will analyze your photos and be able to remove obstacles, such as a chain-link fence, that obscure your shot. Google Assistant will also be more proactive, now nudging you to leave earlier if the traffic to your next appointment is bad, rather than waiting for you to ask about it. The differences are subtle, but significant, said Gartner research vice president Brian Blau. "We're not going to see that many new features - maybe some new buttons and dials. But what will improve is how well these apps relate to the individual."
Let's Play!	Machine Masters Man in Complex Game of Go March 10, 2016 SEOUL, South Korea -- Computer, one. Human, zero. A Google computer program stunned one of the world's top players on Wednesday in a round of

	Go, which is believed to be the most complex board game ever created. The match -- between Google DeepMind's AlphaGo and the South Korean Go master Lee Se-dol -- was viewed as an important test of how far research into artificial intelligence has come in its quest to create machines smarter than humans. "I am very surprised because I have never thought I would lose," Mr. Lee said at a news conference in Seoul. "I didn't know that AlphaGo would play such a perfect Go." Mr. Lee acknowledged defeat after three and a half hours of play. Demis Hassabis, the founder and chief executive of Google's artificial intelligence team DeepMind, the creator of AlphaGo, called the program's victory a "historic moment."
Consciousness / Thinking Machines	New York Times May 14, 1997 Yes, Computers Can Think Last year, after Garry Kasparov's chess victory over the I.B.M. computer Deep Blue, I told the students in my Introduction to Artificial Intelligence class that it would be many years before computers could challenge the best humans. Now that I and many others have been proved wrong, a lot of people have been rushing to assure us that Deep Blue is not actually intelligent and that this victory has no bearing on the future of artificial intelligence.

	Although I agree that the computer is not very intelligent, to say that it shows no intelligence at all demonstrates a basic misunderstanding of what it does and of the goals and methods of artificial intelligence research. True, Deep Blue is very narrow. It can win a chess game, but it can't recognize, much less pick up, a chess piece. It can't even carry on a conversation about the game it just won. Since the essence of intelligence would seem to be the ability to react creatively to various situations, it's hard to credit the computer with much on that score. But many commentators are insisting that Deep Blue shows no intelligence whatsoever because it does not actually "understand" a chess position, but rather searches through millions of possible moves "blindly." The problem with this argument is the assumption that intelligent behavior can only be the result of intelligent cogitation. Saying that Deep Blue doesn't really think is like saying an airplane doesn't really fly because it doesn't flap its wings.
Academic AI	New York Times May 22, 2015 New Approach Trains Robots to Match Human Dexterity and Speed BERKELEY, Calif. -- In an engineering laboratory here, a robot has learned to screw the cap on a bottle, even figuring out the need to

	apply a subtle backward twist to find the thread before turning it the right way. This and other activities -- including putting a clothes hanger on a rod, inserting a block into a tight space and placing a hammer at the correct angle to remove a nail from a block of wood -- may seem like pedestrian actions. But they represent significant advances in robotic learning, by a group of researchers at the University of California, Berkeley, who have trained a two-armed machine to match human dexterity and speed in performing these tasks. The significance of the work is in the use of a so-called machine-learning approach that links several powerful software techniques that make it possible for the robot to learn new tasks rapidly with a relatively small amount of training. The new approach includes a powerful artificial intelligence technique known as "deep learning," which has previously been used to achieve major advances in both computer vision and speech recognition. Now the researchers have found that it can also be used to improve the actions of robots working in the physical world on tasks that require both machine vision and touch.
AI as remedy	New York Times July 18, 2006 Brainy Robots Start Stepping Into Daily Life

	Robot cars drive themselves across the desert, electronic eyes perform lifeguard duty in swimming pools and virtual enemies with humanlike behavior battle video game players. These are some fruits of the research field known as artificial intelligence, where reality is finally catching up to the science-fiction hype. A half-century after the term was coined, both scientists and engineers say they are making rapid progress in simulating the human brain, and their work is finding its way into a new wave of real-world products. The advances can also be seen in the emergence of bold new projects intended to create more ambitious machines that can improve safety and security, entertain and inform, or just handle everyday tasks. At Stanford University, for instance, computer scientists are developing a robot that can use a hammer and a screwdriver to assemble an Ikea bookcase (a project beyond the reach of many humans) as well as tidy up after a party, load a dishwasher or take out the trash.
Hardware of AI	The Washington Post December 28, 2015 A quantum leap for artificial intelligence Ever since the 1980s, researchers have been working on the development of a quantum computer that would be exponentially more

	powerful than any of the digital computers that exist today. And now Google, in collaboration with NASA, says it has a quantum computer - the D-Wave 2X - that works. Google claims the D-Wave 2X is 100 million times as fast as any of today's machines. As a result, this quantum computer could theoretically complete calculations within seconds to a problem that might take a digital computer 10,000 years to calculate. That's particularly important, given the difficult tasks that today's computers are called upon to complete and the staggering amount of data they are called upon to process. On the surface, the D-Wave 2X represents a quantum leap not just for computing but also for the field of artificial intelligence. In fact, Google refers to its work being carried out at NASA's Ames Research Center as "quantum artificial intelligence." That's because problems that are too hard or too complex for today's machines could be solved almost instantaneously in the future.

Appendix 4: Turkey News Sample Excerpts

Turkey News Topic	News Sample Excerpts
Show me the money	Hurriyet.com.tr January 03, 2000 Artık, yatırımınızı bile robotlar yönlendirecek! "ABD'de MIT laboratuvarlarının üzerinde çalıştığı yeni bir proje tamamlandığında, artık yatırımlarım kararlarınızı da bilgisayarlara bırakacaksınız. ''Investment Robot'' adlı bu projede, özel bir bilgisayar yazılımı, portföyünüzü kendi kendine dünyanın en iyi piyasalarında değerlendirecek. İlk yapılan denemelerde, Yatırım Robotu, 1998 ve 1999 ekim ayları arasındaki dönemde dolar bazında yüzde 500'e yakın kazandırdı. Robot, 1999'un önemli bölümünde yatırımını Türkiye piyasalarından yana kullandı. MIT öğrencilerinin robotunun denemesi, tüm piyasaların ve aracı kuruluşların ''on-line'' olduğu varsayılarak gerçekleştirildi. Gerçekte, tüm piyasalar on-line olmadığı için, Yatırım Robotu'nun pratikte kullanımı şimdilik mümkün değil. Ancak, MIT uzmanları, önümüzdeki 5 yıllık dönem içinde, robotun verimli kullanılabileceği kadar on-line piyasa oluşacağı görüşündeler. NASIL ÇALIŞIYOR? Yatırım Robotu'nun çalışma prensipleri şöyle: Öncelikle Yatırım Robotu adlı bu bilgisayar programına, kullanabileceği yatırım araçlarını ve piyasaları bildiriyorsunuz. Robota, ne kadarlık bir portföyle yatırım yapmak istediğiniz söylüyorsunuz.

	Robot, size yatırımlarınızla ilgili bazı seçenekler sunuyor. Bu seçenekler, ''yüksek risk ve yüksek kazanç ile düşük risk ve düşük kazanç'' mantığı ile hazırlanmış. Eğer yüksek kazanç istiyorsanız, Yatırım Robotu, daha çok gelişmekte olan borsalardan hisse senedi tercih ediyor…"

Local AI & Development	Hurriyet.com.tr August 26, 2009 İnsansı robotlar için ilk adım .. Özgür Akın, Konya'da bulunan Akınsoft Plaza'da, yönetim kurulu üyeleriyle birlikte düzenlediği basın toplantısında, 14 yıl önce genç bir ekiple yola çıktıklarında büyük hedefler belirlediklerini, bu hedeflere bir bir ulaşmanın mutluluğunu yaşadıklarını belirtti. Bugüne kadar 140'ı aşkın yazılım programıyla sektörde önemli bir noktaya geldiklerini anlatan Akın, "bugün plazamızda 50'yi aşkın kalifiye personel ile üretim yapıp 11 ülkeye ürün satıyoruz" dedi.Firma olarak yenilikçi bir bakış açısına sahip olduklarını ve sadece Türkiye'de değil dünyadaki rakip firmalarla, özgün ve yaratıcı projeler ortaya koyarak rekabet ettiklerini belirten Akın, "İstanbul'daki plazamızı da kasım ayında açıyoruz. Bu plaza, Akınsoft'un İstanbul Bölge Müdürlüğü olacak, merkez yine Konya kalacak" diye konuştu..

	Hurriyet.com.tr February 24, 2007 Giresunlu Yerli Kardeşler'in yeni oyunu Crysis'i bütün dünya bekliyor YILIN EN ÇOK MERAK EDİLEN OYUNU Avni, Cevat ve Faruk Yerli, üç kardeş olarak şirket yürütmenin çok eğlenceli olduğunu, hep sırt sırta verdikleri için başarıya ulaştıklarını söylüyor. Far Cry'ın başarısının ardından Almanya'da epey ünlenen Yerli Kardeşler şimdi yeni oyunları Crysis'le çok iddialı. Crysis, Windows'un yeni işletim sistemi Vista için hazırlanan oyunların en önemlisi olarak gösteriliyor ve tüm dünyada merakla bekleniyor.Crysis tam üç yılda hazırlandı ve 16 milyon dolara mal oldu. Bu rakam, Avrupa'da çekilen birçok sinema filminin bütçesinden daha yüksek. Önümüzdeki aylarda piyasada olacak Crysis'in dağıtımcısı oyun piyasasının devi Electronic Arts (EA). Yerli Kardeşler yeni oyunun kısa sürede dikkat çekeceğinden emin: "Önceki oyunumuzun bu kadar başarılı olacağına Ubisoft ve bizim dışımızda kimse inanmıyordu. Ama ortaya inanılmaz bir oyun çıktı. Bu sebeple Crysis'le ilgili beklentiler ve bizim hedeflerimiz çok yüksek. Grafikleriyle ve öyküsüyle zamanın en iyi aksiyon oyunu olacağından eminiz. Oyunun mutlaka Türkçe versiyonunu da çıkarmak istiyoruz."CRYSIS NASIL BİR OYUN?2019'da bir meteor Kuzey Kore'ye düşerCryEngine oyun motorunun yeni versiyonunun kullanıldığı Crysis,

	gerçeğe yakın görüntüler, gelişmiş yapay zeka ve oynanma şekli açısından pekçok yenilik sunacak
Consumers' AI	Hurriyet.com.tr July 23, 2001 "..Tuşsuz telefonCep telefonlarının hacimsel olarak küçültülebilmesindeki en önemli sorunlardan biri numara çevirmek için gereken tuşlar. Telespree, bu sorunu da ortadan kaldırdı. Bu telefon, içinde bulunan dijital ses dönüştürme (DAC) çipi ile kullanıcısının söylediği telefon numarasını çevirebiliyor. Ürünün fiyatı henüz açıklanmadı..." Hurriyet.com.tr April 26, 2015 "..Microsoft'un Cortana'yı tanıtmasının üzerinden bir yıl geçti. Cortana da, Siri gibi karışık sorulara cevap verebiliyor. Artık dijital asistanlarda bir standart haline gelen alarm kurma ya da internette arama yapma gibi birçok işlevi rahatlıkla yerine getiriyor. Windows 8.1 güncellemesiyle kullanılabilir hale gelen Cortana şimdilik Çince, İngilizce, Almanca, İtalyanca, Fransızca ve İspanyolca dillerinde. Türkçe desteği henüz yok. Ancak Siri'nin Türkçe atağı onları

	da bu konuda adım atmaya zorlayabilir.Cortana farklı sorulara ilgi çekici cevaplar da veriyor:..”
Medical AI	Hurriyet.com.tr September 3, 2018 Yapay zeka beyin hasarlarını tanımlayacak Şinhua ajansının haberine göre, çin Bilimleri Akademisinden bilim insanları ve çin Halk Kurtuluş Ordusundan doktorların 5 yıldır üzerinde çalıştıkları yapay zeka sistemi, beyin hasarı oluşan kişilerde bunun tanımlanması ve değerlendirilmesinde doktorlara yardım edecek. özellikle bilinç kaybı ve bozukluğu (DOC) yaşayan hastaların, bilinçlerini yeniden kazanmasında önemli rol oynaması beklenen sistem, beynin farklı bölümlerindeki yapıların birbiriyle iletişim kurmak için oluşturduğu ağları görüntüleyerek bu görüntüye dayalı kıymetlendirme yapıyor. Yapay zeka, bugüne kadar bilinç bozukluğu yaşayan 63 hastadan 10 binlerce görüntüyü inceledi, bilinci geri gelebilecek ve gelemeyecek hastaları yüzde 88 oranında doğru teşhis edebildi. çalışmayı yöneten Song Ming, beynin çalışması sırasında birçok bölgenin birlikte hareket ettiğini ve iletişim ağları oluştuğunu dile getirdi. Doktorların beyindeki iletişim ağlarının bilinç bozukluğu ile doğrudan bağlantısını göremediğini ve yapay zekanın bu hastalığı anlamak için yeni ipuçları sağlayabileceğini aktaran Song, yapay zekanın, tam değerlendirme yapmasını ve beyin yaralanmaları konusunda ön bilgi sağlayabilmesini umduklarını bildirdi. Song, bununla

	birlikte, yapay zeka modelinin geçerli ve güvenilir bir sistem olabilmesi için daha fazla veriye ihtiyaç duyulduğuna dikkati çekti.
Education and AI	Hurriyet May 7, 2018 Liseli gençler yapay zekayı öğrenecek İSTANBUL, (DHA)- İstanbul Medipol Üniversitesi "Teknoloji Yaz Kampı" kapsamında Türkiye'nin yedi bölgesinden çok sayıda lise öğrencisine kapılarını açtı. Teknolojiye ilgi duyan genç bilimseverler kampta yapay zekayı keşfedecek, kendi elektronik devrelerini tasarlayarak hayata geçirecek. Öğrenciler ücretsiz kampta kampüs hayatını teneffüs ederek üniversite deneyimi de yaşayacak. İstanbul Medipol Üniversitesi Mühendislik ve Doğa Bilimleri Fakültesi öncülüğünde düzenlenen 'Teknoloji Yaz Kampı' başladı. Türkiye'nin yedi bölgesinden 50 lise öğrencisine kapılarını açan İstanbul Medipol Üniversitesi kamp kapsamında genç zihinlere yapay zekadan elektroniğe, bilimden teknolojiye geniş bir perspektif kazandırmayı amaçlıyor.

	Hurriyet December 27, 2017- Yerli ve yabancı akademisyenler "Dijital Dönüşüm ve Yapay Zeka Çalıştayı"nda buluşacak İSTANBUL, (DHA)- Nişantaşı Üniversitesi tarafından 28 Aralık Perşembe günü düzenlenecek "Uluslararası Dijital Dönüşüm ve Yapay Zeka Çalıştayı" yerli ve yabacı pek çok akademisyeni ve uzmanı bir araya getirecek. Üniversitenin Maslak 1453 Neotech Kampüsünde gerçekleşecek etkinlik, San Diego State Üniversitesi, Youngstown State Üniversitesi, Gazi Üniversitesi ve Universiti Teknologi Malaysia tarafından da destekleniyor. Çalıştayda, hükümet programında da yer alan dijital dönüşümün 3 aşaması olan tüm kamu kurumlarının tek bir kurum gibi çalışmasının sağlanması, kurumların verdiği hizmet kalitesinde standartlaşma ve talep edilen kamu hizmetlerinin tek bir pakette sunulması, büyük veri, siber güvenlik, biyoinformatik, dijital oyunlar, araçlar ve teknolojiler, kuantum ve post kuantum hesaplamaları gibi konular üzerinde durulacak.

Weapons / AI at war	Hurriyet May 17, 2016 Türkiye'de Bir İlk! STM'den yapIlan açIklamaya göre, Türkiye'nin ilk Siber Füzyon Merkezi, Savunma Sanayi MüsteŞarı İsmail Demir'in katIldIğI törenle hizmete girdi. Demir, konuya iliŞkin açIklamasInda, "Dünyada sadece birkaç ülkede bulunan Siber Füzyon Merkezi ile Türkiye, siber güvenlik konusunda önemli bir güce kavuŞtu. Dünyada ülkelerin güvenliğini tehdit eden en büyük unsurlardan biri, siber saldIrIlar. Siber saldIrIlarI gerçekleŞmesinden önce analiz etmek, önüne geçebilmek kritik bir öneme sahip. Bugün bunun için büyük bir adIm atIldI" değerlendirmesinde bulundu.STM Genel Müdürü Dayut YIlmaz da yeni nesil Siber Füzyon Merkezi ile siber güvenlikte klasik yöntemlerin çok ötesine geçtiklerini belirtti.

	Hurriyet October 17, 2016 Üniversiteliden akıllı cihazlara koruma kalkanı Yapılan araştırmalara göre günümüzde 15 milyarın üzerinde cihazın internete bağlı olduğu tahmin ediliyor. Bu rakamın 2020'ye gelindiğinde elektrikle çalışan her eşyanın internete bağlanması ve 200 milyar cihaz seviyesine çıkması öngörülüyor. Tüm bu gelişmeler, "İnternete bağlı cihazlar ne kadar güvenli?" sorusunu da beraberinde getiriyor. Bu sorundan yola çıkarak Yaşar üniversitesi Bilgi ve Teknoloji Transfer Ofisi'nin desteğiyle Kuluçka Merkezi Minerva'da iki ayrı siber güvenlik projesi geliştiren Bilgisayar Mühendisliği Yüksek Lisans öğrencisi Mert Kılıç, "Nesnelerin interneti alanında yaşanan gelişmelerle artık evinizdeki buzdolabınız veya kombiniz bu saldırılara maruz kalabildiği gibi ele geçirilerek başkasına yapılan saldırılarda kullanılabiliyor. Teknolojinin bu hızlı gelişimi karşısında herhangi bir savunma sistemi henüz geliştirilmedi. Akıllı telefonunuzla açıp kapayabildiğiniz kombinizi, garaj kapınızı, güvenlik ve çocuk kameralarınızı hatta otobanda seyir halindeki arabanızı başka birinin kontrol etmesinin ne kadar korkunç sonuçlar doğurabileceğini düşündüğünüzde, yaşanabilecek tehlikelere karşı önlem almak şart" dedi.
AI in Movies	Hurriyet.com

	November 6, 2003 İşte Matrix'in tarihçesi İlk iki filmi gişe rekorları kıran şimdi de üçüncüsü gösterime giren Matrix filminin kurduğu dünyayı daha yakından tanımak ister misiniz? Bütün dünyada aynı anda gösterime giren Matrix serisinin üçüncü ve son filmi "Matrix Revolutions", şimdiden bütün gişe rekorlarını zorluyor. İlk filme damgasını vuran "Matrix Nedir?" sorusu, filmin karışık ve uzun hikayesi nedeniyle izleyiciler için "Matrix'de ne olmuştu?" sorusuna dönüştü. Associated Press ajansı, 3 filmden ve animasyon filmler Animatrix'den derlediği, Matrix'de kurgulanan dünyanın tahmini bir tarihini ve zaman çizelgesini şöyle aktardı.. Artık Zion'da yaşayan ve isyancılarla makinelere karşı savaşan Neo, Matrix'i yaratan yapay zeka programı "Mimar"la yüzleşti. Mimar, yok edilmek üzere olan Zion'da yaşayan isyancıların da Matrix'in parçası olduğunu, sistemdeki gedikleri temizlemek için daha sonra yok edildiğini anlattı. Mimar, Zion'un daha önce 5 kez yok edildiğini söyleyerek, Matrix'in düşüncelerden çok daha yaşlı olabileceğini belirtti…

AnthropoBotia	Hurriyet March 3, 2006 Robot bebek kendi kendine öğrenecek ve büyüyecek "Elinde oyuncağıyla emekleyen bebek robot şimdilik sanal dünyada yaşıyor ama önümüzdeki yılın sonbaharında Robotcub, gerçek dünyadaki oyun odasına taşınacak. Burada çevresini tanıyarak yepyeni deneyimler edinecek, yani tıpkı gerçek bebek gibi. Avrupa birliği beş yıllık Robotcub projesi için 8,5 milyon Avroluk bir yatırım yaptı. Projede Cenova Üniversitesi yönetiminde Avrupa'dan on araştırma enstitüsü, İki Amerikan ve üç Japon enstitüsü çalışıyor. Robot uzmanları ve bilişimciler dışında, yapay zeka uzmanları, nörologlar ve gelişim psikologları da robotun bir canlı gibi kendi kendine öğrenip öğrenmeyeceğini görmek istiyorlar.

	Hurriyet Hacklenen seks robotları insanları öldürebilir Sanal Dilber July 11, 1999 Büyük göğüslü, uzun bacaklı, narin hatlı Lara Croft, dijital kahramanların başında geliyor. MAX Dergisi, temmuz sayısında hayalleri süsleyen sanal kahraman Lara Croft'un önlenemez yükselişinin öyküsüne yer veriyor... Güçlü, bağımsız ve sert özelliklere sahip Lara Croft, cinselliğini ön plana çıkartmaktan hiç çekinmiyor. Günümüzde bilgisayar yardımıyla modellenip ''render''lanan (bilgisayar aleminde doku kaplamak anlamına geliyor) ve sadece bu görsel ortamda varmış gibi görünen birçok kahraman prototipiyle karşı karşıyayız..

Autonomous Vehicles / Driverless Cars	Hurriyet March 6, 2017 İşte Toyota'nın ilk sürücüsüz otomobili! - Toyota Araştırma Enstitüsü (TRI), şirketin ilk otonom yani sürücüsüz otomobilinin tanıtımını gerçekleştirdi. İşte, Prius Challenge etkinliğinde tanıtılan Lexus LS 600HL test otomobili ile sunulan Teknolojiler. Lexus LS 600HL test otomobili, yüksek çözünürlüklü harita ihtiyacını azaltmak üzere, LIDAR yani radar ve kamera dizilişi ile donatılmış durumda.
	Hurriyet January 10, 2018 Lise öğrencileri sürücüsüz maket araç tasarladı - Bursa Uludağ Üniversitesi Teknoloji Geliştirme Bölgesi'nde (ULUTEK) yürütülen Maker Çocuk Programı kapsamında eğitim alan lise öğrencileri, geliştirdikleri sürücüsüz maket araç ile Massachusetts Institute of Technology (MIT) tarafından bu yıl ilk kez Türkiye ayağı gerçekleştirilecek olan yarışmada yer alacaklar.

ETİK KURUL DEĞERLENDİRME SONUCU/RESULT OF EVALUATION BY THE ETHICS COMMITTEE

(Bu bölüm İstanbul Bilgi Üniversitesi İnsan Araştırmaları Etik Kurul tarafından doldurulacaktır /This section to be completed by the Committee on Ethics in research on Humans)

Başvuru Sahibi / Applicant: Serhat Akkılıç

Proje Başlığı / Project Title: Cultivation of Intelligent Decision Support Systems: Representations of A.I. in Media and Their Reception by Knowledge Workers

Proje No. / Project Number: 2018-30813-84

1.	Herhangi bir değişikliğe gerek yoktur / There is no need for revision	XX
2.	Ret/ Application Rejected Reddin gerekçesi / Reason for Rejection	

Değerlendirme Tarihi / Date of Evaluation: 10 Temmuz 2018

Kurul Başkanı / Committee Chair

Doç. Dr. Itır Erhart

Üye / Committee Member

Prof. Dr. Aslı Tunç

Üye / Committee Member

Prof. Dr. Hale Bolak

Üye / Committee Member

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Doç Dr. Ayhan Özgür Toy