

**T.C. İSTANBUL KÜLTÜR UNIVERSITY
INSTITUTE OF SCIENCE**

**ONE EYE MOVIE WATCHING EXPERIENCE AN EXPERIMENT
FOR ENHANCING ATTENTION IN PRESENTATION PROCESS**

**MASTER THESIS by
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**Department: Architecture
Programme: Urban Planning**

Supervisor: Prof. Dr. Koray GÖKAN

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ABSTRACT

One-Eye Movie Watching Experience; An Experiment For Enhancing Attention In Presentation Process, was prepared by the student of İstanbul Kültür University Institute of Science Engineering-Architecture Department City Planning Program as a Post Graduate thesis.

Since human life started to pass in earth, people need a place to live. That was the beginning of architecture. A definition of architecture can be said, including the design of the total built environment, from the macro level of how a building integrates with its surrounding man-made landscape, to the micro level of architectural or construction details and sometimes, furniture. Wider still, architecture is the activity of designing any kind of system. It means that architecture is created by people for people.

After years passes by, humanity starts to use and see architecture as an art. On that years architecture, as a new art, is started to combine other artistic branches with people. On those days almost nothing had been invented yet. People needs in art branches forced them to create artistic arts such as cinema. By this, the new and fascinating combination had born which can be called *cinema and architecture*.

However architecture is not just an artistic branch. Firstly, it is generated because of people needs than it becomes an art. But the cinema is invented because of needing in art. After creation of architecture, human and architecture have become inseparable issues. This is why if any subject involves human life, has to be involve architecture. This is cause of the combination of *cinema and architecture*.

By the technology is developed very rapidly, architecture is start to use cinema instead of using architecture in cinema. Latterly, cinema and its' components are using by architectural and engineering sector for their representing techniques. By those needs

virtual world gained too much importance with three-dimensional drawings, renderings, animations etc.

Virtual world is unlimited issue in this sector, which means there is a lot of way for using virtual worlds' maintains. Following experiment is, basically, about cinema and architecture. Purpose of this research is, understanding and facilitating use of virtual worlds in architecture which combines cinema at the same time.

KEYWORDS

Cinematography, one eye movie, attention enhancement, CAD, virtual reality

ÖZET

Tek gözlü film seyretme deneyimi; sunum sürecinde dikkati artırma deneyi çalışması, İstanbul Kültür Üniversitesi Fen Bilimleri Enstitüsü Mimarlık Bölümü Şehircilik programı kapsamında yüksek lisans tezi olarak gerçekleştirilmiştir.

Dünya üzerinde yaşam başladığından beri, insanlar barınmak için mekâna ihtiyaç duymuşlardır. Mimarlığın başlangıcı buna dayanır. Mimarlık için, tüm çevre elemanlarının en yüksek seviyeden en düşük seviyeye kadar tasarım sürecini ve bunun uygulamasını içinde barındırır demek doğru olur. Hatta mimarlık sistem tasarımıdır. Mimarlık insanların insanlar için yarattığı bir olgudur.

Yıllar geçtikçe insanlık mimarlığı sanat dalı olarak görmeye, kullanmaya ve yararlanmaya başlamıştır. O yıllarda yeni sanat olarak kabul edilen mimarlık, diğer sanat dalları ile bağlarını kuvvetlendirmeye de başlamıştır. Bu kuvvetlenme sinemanın da doğumuna sebep olmuştur. Bu yeni oluşum mimarlık ve sinemanın büyüleyici birleşimini doğurmuştur.

Fakat mimarlık sadece bir sanat dalı değildir. Her şeyden önce mimarlık insanların ihtiyaçlarına karşılık verebilmesi amacı ile doğmuştur ve gelişim göstermesiyle birlikte sanat dalı olarak kabul görmeye başlamıştır. Fakat sinema insanlığın zorunlu ihtiyaçlarından olmayan, sanatsal ihtiyaçları sebebi ile doğmuştur.

Teknolojinin hızla gelişmesi ile sinemanın mimarlığı kullanmasından, mimarlığın sinemayı bir alt başlık olarak kullanması söz konusu olmuştur. Son dönemde sinema mimarlık ve mühendislik dallarında sunum teknikleri olarak sıklıkla kullanılmaktadır.

Sanal gereklik sınırı olmayan bir olgudur bu da sanal gerekliĐin her konuda kullanılabilirdiĐini gstermektedir. Bu deney mimarlık ve sinema temelinde yrtlmştr. alıřmanın amacı, sanal dnyanın mimarlık ve sinema ikilemi ierisinde anlaşılabilirliĐinin arttırılması ve kullanılabilirliĐinin arttırılmasıdır.

ANAHTAR KELİMELELER

Sinematografi, tek gzly film deneyimi, ilgi artırımı, bilgisayar destekli tasarım, sanal gereklik

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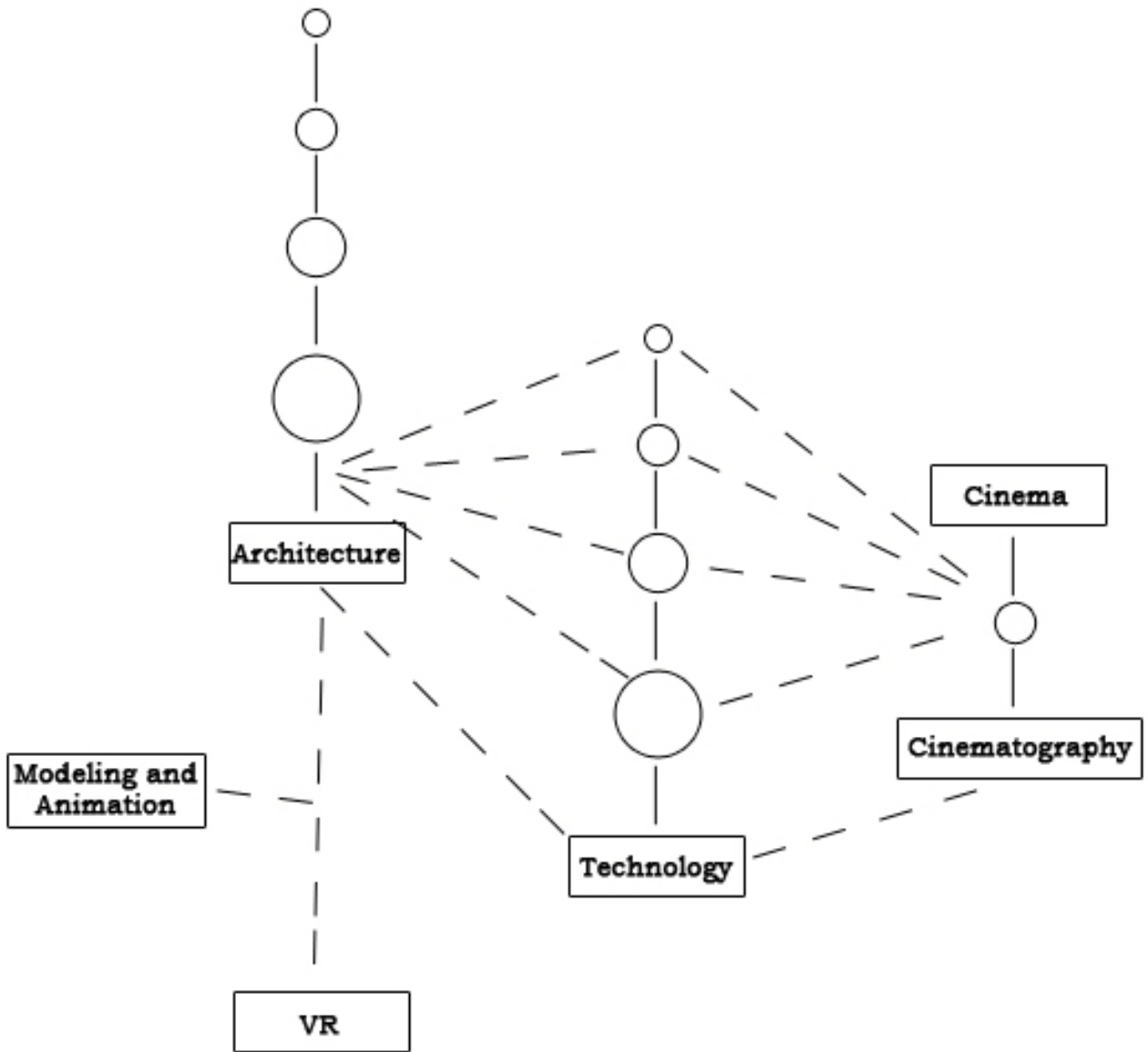


Figure 1.1: An overview on development of virtual reality and cinematography

Chapter 1. DEFINITION

This research basically is formed in the cause of a new cinematographic experiment used in architecture. The main subject of creating new viewing experiment is enhancing the attention of the spectator and facilitating and understanding of three-dimensional virtual worlds. It is obvious that, people often have problems in comprehending and navigating virtual three-dimensional worlds and they fail to recognize meaningful aspects of three-dimensional models (He, Salesin, & Cohen, 1996).

There are a lot of different type output tools for representing the three-dimensional virtual worlds to the spectators. At the same time there are several ways of representation of virtual worlds, such as movie, images etc. One of these methods is an art called cinema.

Cinema is started to be accepted as new art in whole world in these days. By technology development new movie-making methods appeared, like an animation method. Day by day these technological methods getting more developed and latterly movie can be made by just with this method. There is no more need for real places, real dialogs even real actors for making movie in this method. And from now on two type of cinema exists. First method uses traditional ways for making movies, scene shooting, written dialogs. And the other one is the cinema which backed with computer hardware and software or the cinema which uses the method of digital systems.

There are several researches about facilitating understanding of three-dimensional virtual worlds which for developing the three-dimensional world systems to got better quality results for users and spectators. While cinema is used by

architecture and engineering sector for publishing results, a lot of issues generated. One of these issues is artificial intelligence generation which be formed by decision support systems. These systems basically help to users or spectators about decision making. For example, decision support program uses a model of a building or city which demonstrates the way for user that he/she has to follow.

Following, purpose of this research is creating a new viewing experience which will enhance the attention and facilitates understanding of virtual worlds by using cinematographic techniques. This research is going to use cinematographic techniques and several virtual reality tools and equipments.

Within this experimental project a movie will be created. Movie is going to made by computer programs, such as Autodesk's 3D Studio Max, as an animation. It is a short movie about Istiklal Street which is very famous street, placed in Beyoğlu district in Istanbul, Turkey (see Figure 1.2). Also Beyoğlu district is placed in old part of Istanbul; therefore it has a historical and organic tissue.

About selected area

Istiklal Street can be accepted as heart of Beyoğlu. Street connects Galata tower and Taksim square to each other. Presumably Taksim square is one of the most crowded places in whole Istanbul. And the Galata tower is a historical monument stayed from Ottoman's. Lately it has a usage as a restaurant.

Istiklal Street is known by its feature that lives 24 hours. A lot of shops can be found on this street. It has historical places such as churches, synagogues also libraries, art galleries, old book stores, pubs, restaurants, discos, theatres, cinemas etc.

Istiklal Street is the place that almost all tourists choose to see. However in the cause of crowdedness and easy to get lost, it is necessary to go there with a guide or with a good map.



Figure 1.2: Geographical position of Istiklal street [taken from Google Earth, 2009]

About the movie

An animation movie will be prepared about Istiklal Street. With this maximum four minutes animation a sightseeing tour will be demonstrated. Also it is a prototype with one tour. City model without texture on it has textured twelve building(s) and/or place(s) will be the base of the animation. So, the demonstration of the walking route between them will be shown by movie.

It is planning to settle up computer screens, such as kiosks at various points in Istiklal Street. Thus people –tourists- has a chance to select which place(s) or building(s) they want to see or what kind of activity they want to do. Afterward movie will start and demonstrate the route for them. Also, this experimental project can be starting point of tourist information project.

About the experiment

Main subject, this experimental project based on is enhancing the attention and facilitates understanding of virtual worlds. Therefore new watching experience will be generated.

While making movie new watching experience, namely one-eye movie watching experience will be generated by changing technical data. One eye movie watching is, basically, forces the spectator for watching movie as a one eyed person. Creation of one eye movie is simple. It is regular movie but in the middle of the screen there will be a line represents nose contour. By this line one of the separated screen part will be black. Therefore spectators, viewers will watch the movie with a very different experience. This is the issue makes movie more memorable.

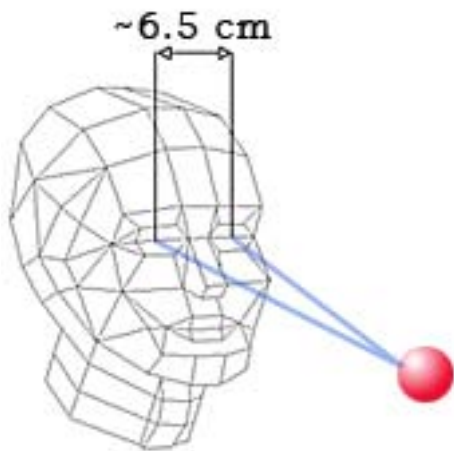


Figure 1.3: Approximate distance between the eyes

Besides being a new experience for viewers, main objective that wanted to be told collects more attention by decreased angle of view. Human eyes have an almost 6.5 centimeter distance between each other. This distance causes to see target point with different angles than each other. By this we got ability to perceive depth. One eye is meets the deficit of the other eye by sending data to brain. Thus depth occurs when images from two different angles are interpreted by the brain (Seeing in 3D, 1998).

Therefore it can be said that shutting down one eye will decrease depth ability of viewers. This is the other issue makes movie more memorable.

1.1. Problem Description

Within this experimental project there are several problems detected which are caused by generation of this hypothesis. Following part discusses the problems which are constituent of this hypothesis.

Starting point of this hypothesis can be said 'is the movie making method, using advanced computer technology, as cinema?'

In late 1880's cinema is officially born as animating images with tools (see Chapter 3, Figure 5 & Figure 6 & Figure 7). After years passes first camera invented for recording movements and it got developed very rapidly. Lately with the technology it is possible to make movies without stages even without real actors. However the traditional cinema uses real places, actors, dialogs. By this information, animation movies, basically the movies completely or mostly made by technological equipments, can be enrolled a branch of cinema. Not cinema itself. Thus for that question, a negative answer can be accepted.

"People often have problems in comprehending and navigating virtual three-dimensional worlds and they fails to recognize meaningful aspects of three-dimensional models" (He, Salesin, & Cohen, 1996).

There are two problems detected in usage of virtual world. Essentially this experimental project searches the solution for the problem, how to facilitate understanding of virtual reality and enhance the attention of users.

For the solution of these problems, the suggestion of this hypothesis is *new watching experience* which will be generated by this experimental research project.

New watching experience

The fact, people –spectators / users- can see almost two hundred degree angle in their view by two eyes. While watching movie, users see the director's thirty or forty five –it depends on the type of lens of the camera- degree cropped image in his/her two hundred degree vision (see Figure 1.4).

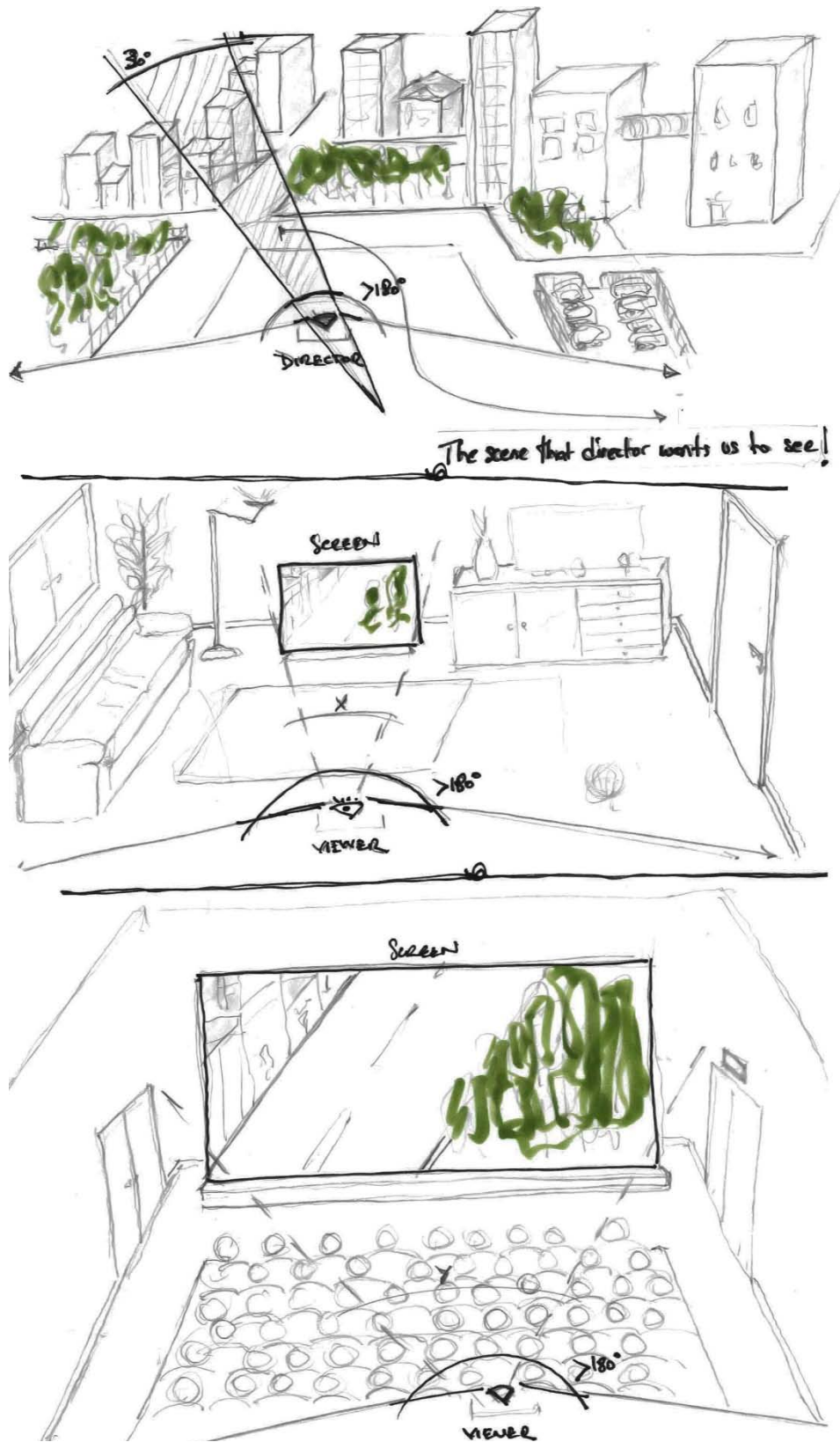


Figure 1.4: A sketch on how watching angles changes depending on place where users see director's angle of view

“...we try to simplify the complex stimuli presented to us by the environment...” (Feldman, 1992).

“...ironically psychologists have found that the process of simplifying the world requires an impressive amount of perceptual effort...” (Feldman, 1992).

Although there are a lot of place possibilities to see movie. Depending on where viewer sees, he/she sees the movie in particular part of his/her two hundred degree vision. Herein, efforts have been spent to make the watching experience more effective are detected such as making the room darker, using bigger screens, using qualified sound systems etc. These efforts are for enhancing the understanding.

If this aspect of movie presentation is true, seeing movie in complete vision would be more effective experience for the viewer. This can be come true only by using external tools like VR-Cave¹ or HMD's² etc.

As we noticed there is two type of view in this discipline. One of them is, as we know, cinematographic view which contains various fragments, diverse dimensions of angles, diverse points of views and sides. And the other one is architectural point of view which be formed by spectator's view.

New watching experience will use two view type in the same movie. Principle aim on this project is to create dissimilar influence on viewers.

Within this experiment it is planning to separate the screen into two parts when creating the one eye experience. By separating screen into two parts, one part of the screen will be black which demonstrates the human nose as an obstacle. In normal screen main target of the scene is standing in the half of the screen however in the one

¹ Virtual Reality -Cave Automatic Virtual Environments

² Head Mounted Display

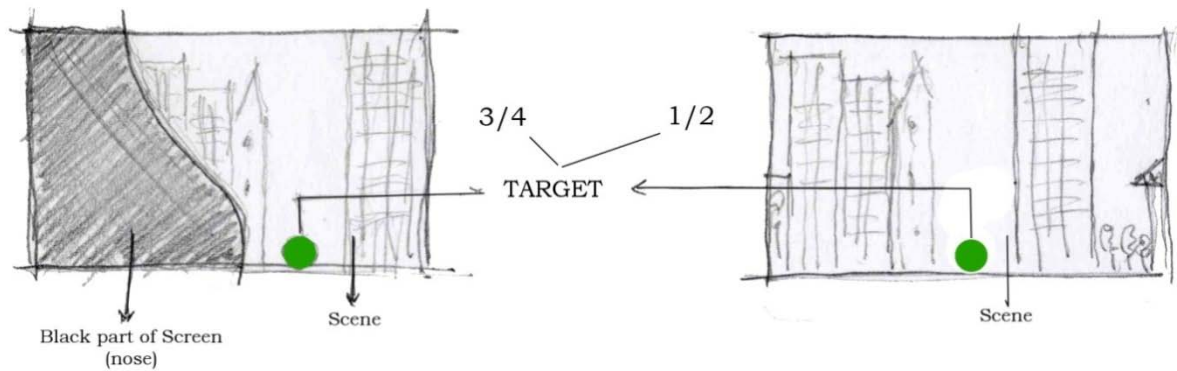


Figure 1.5: Comparison one eye movie screen and two eye movie screen

eye movie screen main target will be in the quarter part of the screen. And almost half of the screen will be black (see Figure 1.5).

At the same time one eye movie experience will give a chance to see in one-eye person's view. This is very different experience for the two-eyed people. People can see almost two hundred degree view in their life. Thus in the movie if they sees the screen in a different way, it will make the movie more effective for the users or spectators even game players (see Figure 1.7 & Figure 1.).

According to Fear, one of the Kuleshow's theories says that, for every human emotion there was a corresponding external movement. Namely, Kuleshow saw not actors, but the organs of the definitive mechanization of life (Fear, 2000).

"Motion, we claim, produces emotion and correlatively, emotion contains a movement" (Marcus & Neumann, 2007).

It can be said that the important thing is not the scene or actors. The important thing is movement (*kinesis*) which connected to the emotion that wanted to be given to the viewer. It means it is possible to tell the story by showing insignificant scenes. Namely if the scenes are giving the emotion to the viewer correctly, it is not necessary to create substantial connection between scenes.

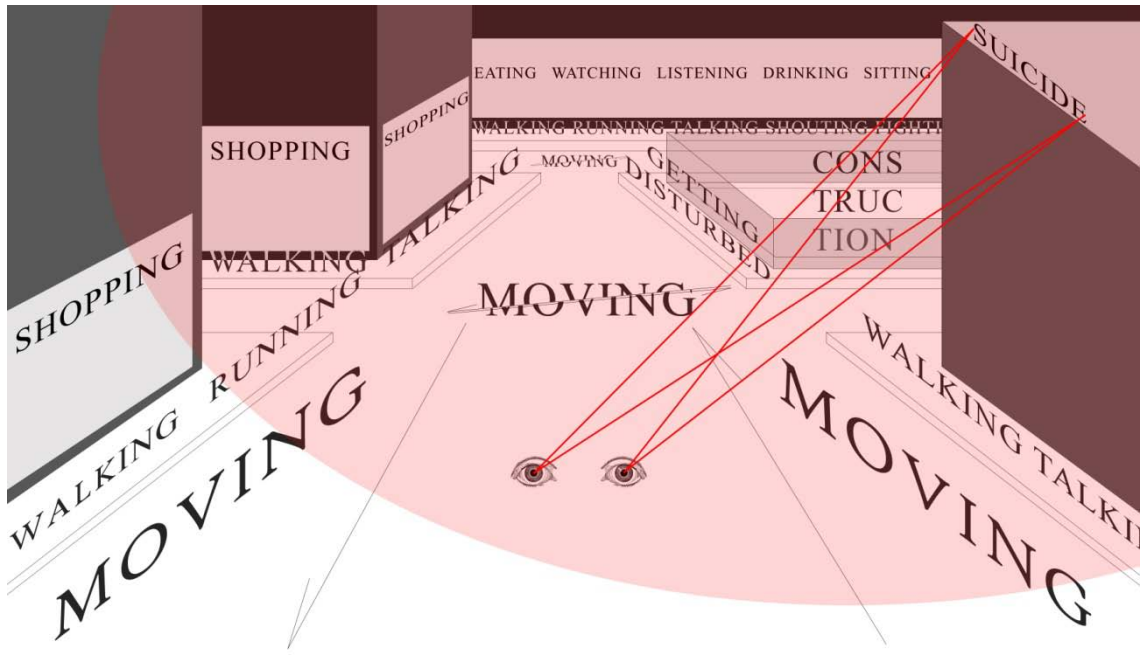


Figure 1.6: Two eye view graphic / regular movie

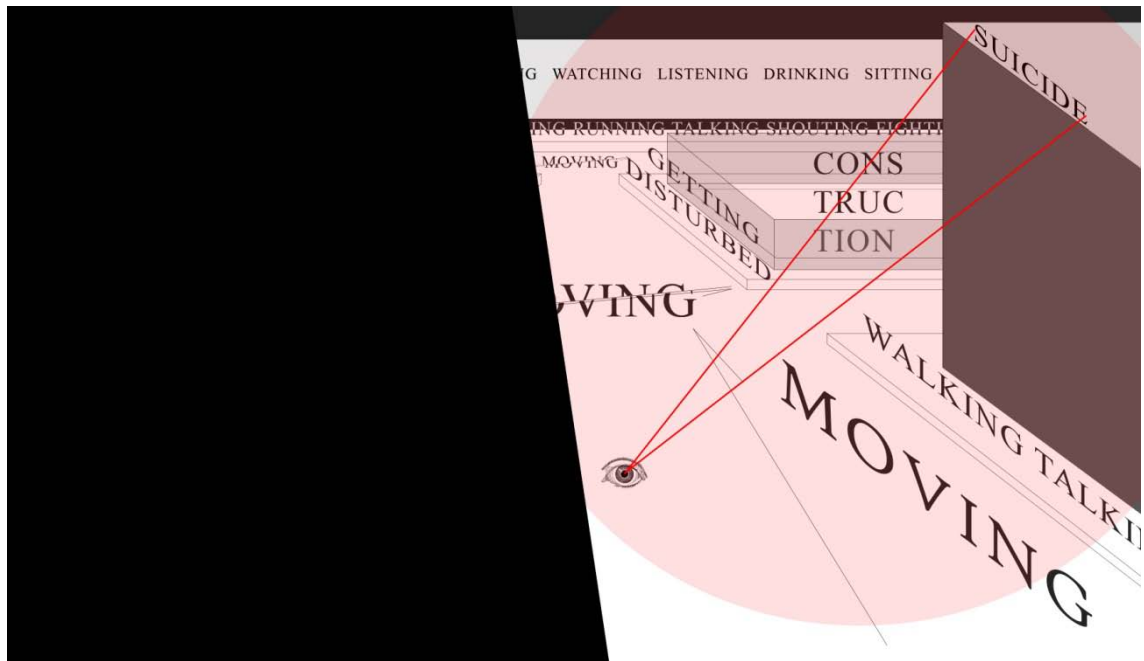


Figure 1.7: One eye movie graphic / new watching experience



Figure 1.6: Insignificant scenes created by montage

Thus, it is possible to create different reactions in the spectator's brain by this new experience.

The other important technique used in cinema is *montage* –as important as cinematography. Montage means, creating relationship between series shots of the movie. By this information it can be said that, for creating insignificant scenes, which is said before, one-eye movie experience will provide a chance to create different relationship between shots when montage on progress (see Figure 1.8).

Haptic system information is also related with this research. It can be said that, seeing with two eyes provides to perceive depth more efficiently. It means if we shut our one-eye down, our ability to perceive depth in our vision will decrease. This is the other issue which will make the movie more interesting and a result of this, more memorable for the spectators.

Structure of Experiment

Within the experiment besides making one-eye movie, it is planned to make two-eye –regular- movie also. In the cause of comparing movies at the end of experiment, four type of movie presentation will be done. These are;

- Two-eye movie – presentation in normal screen
- One-eye movie – presentation in normal screen
- Two-eye movie – presentation in CAVE system
- One-eye movie – presentation in CAVE system

At the end of the experiment there will be a test to comprehend which type of movie presentation is more effective. Same questionnaire will executed with the participants, after each movie. In this manner, after analyzing statistics, it is going to possible to comprehend which type is more effective.

1.2. Variables

“...to understand how our sense of vision allows us to view world we must first begin outside the body and consider the nature of stimulus that produces vision – Light...” (Feldman, 1992).

There are several variables in movies. Artificial and natural lighting, camera angles, sound of the movie, position of the camera etc. These variables can be said as an independent and dependent variables. Within this project the movie will be prepared by cinematographic techniques. However due to suppose of this experimental project, there will be changes about the techniques.

Main difference than cinematographic techniques in this experimental movie making phase is using separated screens for creating one eye expression on the viewers or users. Other sub variables are using diverse camera angles for creating interesting angle of views. Using unusual focal length for camera lenses will create another expression for the movie.

Sound is another independent variable for the movie which is very important for the effectiveness of the movie on the users.

1.3. Methodology

Main purpose of this experiment is enhancing the attention of users, spectators, viewers by bringing effectiveness to the movie. By this experiment there are several methods planning to use to achieve aim of experimental project; improving effectiveness.

Various CAD / CAAD computer programs are going to be used for building the model of the Istiklal Street which is placed in one of the most crowded district of Istanbul.

At the end of the project there will be a questionnaire which may help to measure the effectiveness of the movie. Questionnaire will be executed to the participants for measuring. Questionnaire will be formed by the questions which are asking what the participants remembered about the movie or what he/she saw in the movies to comprehend if participants saw what we wanted them to see.

One another method that will be used for measuring the effectiveness of the one eye movie experience movie is using an eye tracking system. This system will be used in the middle of the experiment unlike questionnaire. While participants watching the movie it will be measured which part of the scene is looked by them mostly.

Chapter 2. Cinematography

Word of cinematography is a Greek word which is formed by two words: 'movement' and 'to record'. Cinematography is the discipline of making lighting and camera choices when recording photographic images for the cinema. It is closely related to the art of still photography, though many additional issues arise when both the camera and elements of the scene may be in motion (He, Salesin, & Cohen, 1996).

The first attempt at cinematography was an animation – motion picture movie which made in 1888. This date is known as the birth of cinema. In the first years of cinema, the cinematographer was also the director and the camera-man who handles the camera. After years passes by, because of the form of art and development of technology, a separation between director and camera-man needed. With the advent of artificial lighting and faster film stocks, in addition to technological advancements in optics and various techniques such as color film and widescreen, the technical aspects of cinematography necessitated a specialist in that area (Fear, 2000).

“Cinematography; as a creative and interpretive process that culminates in the autorship of an original work of art rather than the simple recording of a physical event. Cinematography is not a subcategory of photography. Rather, photography is but one craft that the cinematographer uses in addition to other physical, organizational, managerial, interpretive and image-manipulating techniques to effect one coherent process” (ASC: American Society of Cinematographers, 2009).

Aspects of cinematography

There are numerous general aspects in cinematography. Mostly they are technical aspects like film stocks which affect the type of movie with film gauge selection, laboratory where the cinematographers achieve very different looks for shots, filters which widely used to enhance mood or dramatic effects, lenses for high quality shots, focal length which camera behave as an human eye with it, depth of field and focus for arranging how much background will be rendered and will anything be blurred in the shot, aspect ratio which an screen height and width ratio.

Lighting is one of the most important aspects for cinematography which is necessary to create an image exposure on a frame of film or on a digital target. The job for cinematographer is basically visual storytelling. The control of light quality, color, direction and intensity is a major factor in the art and science of cinematography.

The other most important aspect in cinematography is camera movement. The reason that makes the camera movement important, it strongly separates it from still photography. By moving camera it represents the audience's viewpoint during the film. This movement has a substantial role in the emotional language of film images. Like an every actor's movement represents an emotion, camera movements describe an emotion because of its represents.



Figure 2.1: Graphical definition of camera motion



Figure 2.2: Frame per second effect on movies

The third important affect of the cinematographer above the movie is arranging special effects which give the emotion for scene. Firstly, effects were creating while movie being shot. After year passes by and the technology that cinema sector used developed, optical and digital effects were created.

And the last important aspect in cinematography is frame rate selection. There is various types of fps selection has to be chosen. By varying the speed at which the image is captured, various effects can be created knowing that the faster or slower recorded image will be played at a constant speed (see Figure 2.2). For instance, time-lapse photography is created by exposing an image at an extremely slow rate.

Role of the cinematographer

In movie making period, the cinematographer is responsible for the technical aspects of the scenes which be formed by shots. This is the reason of cinematograph has to be work closely with the director to ensure that the artistic aesthetics are supporting the vision which is the main aspect for telling the story. The cinematographers are the main controller of the camera movements, grip and artificial and natural lighting. That's why cinematographs are called directors of photography.

Cinematographers make many decisions during the work, from pre-production to post-production. Many of these decisions are similar to what a photographer needs to note when taking a picture. Because movies scenes are be shaped by pictures and cinematograph is the person who makes decisions about pictures namely every scene individually.

“Traditionally the term ‘cinematography’ referred to working with motion-picture film emulsion, but it is now largely synonymous with videography and digital video due to the popularity of digital cinematography” (Calderon, Worley, & Nyman, 2005).



Figure 2.7: An example for light using in Citizen Kane the movie

Format	Creator	Year Created	Projection gauge	Lens
Chronophotographie ^[2]	Etienne-Jules Marey	1888		
Paperfilm ^[3]	Louis Le Prince	1888	54 mm or 63.5 mm	spherical
Chronophotographic	William Friese-Greene	1889		
Silent film standard	William Dickson and Thomas Edison	1892	35 mm	spherical
Bioskop	Max Skladanowsky	1892	54 mm (two strips interleaved)	spherical
Lumiere Wide	Lumiere Brothers	1900	75 mm	spherical
Cineorama	Raoul Grimoin-Sanson	1900	70 mm x 10 projectors (360°)	spherical
11 mm	(American)	1916	11 mm	spherical
28 mm safety standard	Alexander Victor	1918	28 mm	spherical
26 mm	(French)	1920	26 mm	spherical
9.5 mm	Pathe	1922	9.5 mm	spherical
Widescope ^[4]	John D. Elms and George W. Bingham	1922	35 mm x 2 projectors	spherical
48 mm	J.H. Powrie	1924	35 mm	spherical
13 mm	(French)	1925	13 mm	spherical
18 mm	(Russian)	1925	18 mm	spherical
Widevision ^[10]	John D. Elms and George W. Bingham	1926	57 mm	spherical
Realife ^[13]	MGM	1930	35 mm	spherical
50 mm ^[19]	Fox Film Corporation and SMPE	1930	50 mm	spherical
17 mm sound	(French)	1930	17 mm	spherical
8 mm	Eastman Kodak	1932	8 mm	spherical
70 mm ^{[24][57]}	American Optical Company	1958	70 mm	spherical
IMAX ^[56]	IMAX Corporation	1970	70 mm, horizontal	spherical
Cinema 180 ^[62]	Omni Films	1979	70 mm	fisheye
IMAX HD ^[73]	IMAX Corporation	1992	70 mm, horizontal	spherical

Figure 2.4: List of film formats

Chapter 3. Virtual Reality

Virtual reality (VR) is a technology which maintain a chance to a user or spectator for interact with a computer-simulated digital environment that it is a real or imagined environment (see Figure 3.1). Latterly current virtual reality environments are basically be formed by visual experiences namely using displays for publishing, on a computer screen or through special or stereoscopic displays or CAVE³ systems. However some simulations include additional sensory information, such as sound through speakers or headphones. By starting to use sound in virtual environments, usability of haptic systems invented. And nowadays with these developments, some advanced, haptic systems latterly started to include tactile information in virtual reality environments.

In virtual environments users can interact with a virtual environment either through the use of standard input devices such as a keyboard and mouse, or through multimodal devices such as a wired glove, the boom arm, or wireless equipments. The simulated environment can be similar to the real world, for example, simulations for pilot or combat training, or it can differ significantly from reality, as in VR games. In practice, it is currently very difficult to create a high-fidelity virtual reality experience, due largely to technical limitations on processing power, image resolution and communication bandwidth (Kalay, 2004).

³ CAVE: Cave Automatic Virtual Reality

For now with existing technological generations, sight and sound are the two senses which using to affect spectators by high quality simulation. However, attempts to simulate smell have begun.

Latterly there are researches to engage the other sense of taste. In order to create this feeling for spectators, researches show us that brain must be manipulated directly. To manipulate the brain directly, these systems must use a virtual reality tool like a helmet, HMD⁴ or virtual cubes (see Figure 3.2).

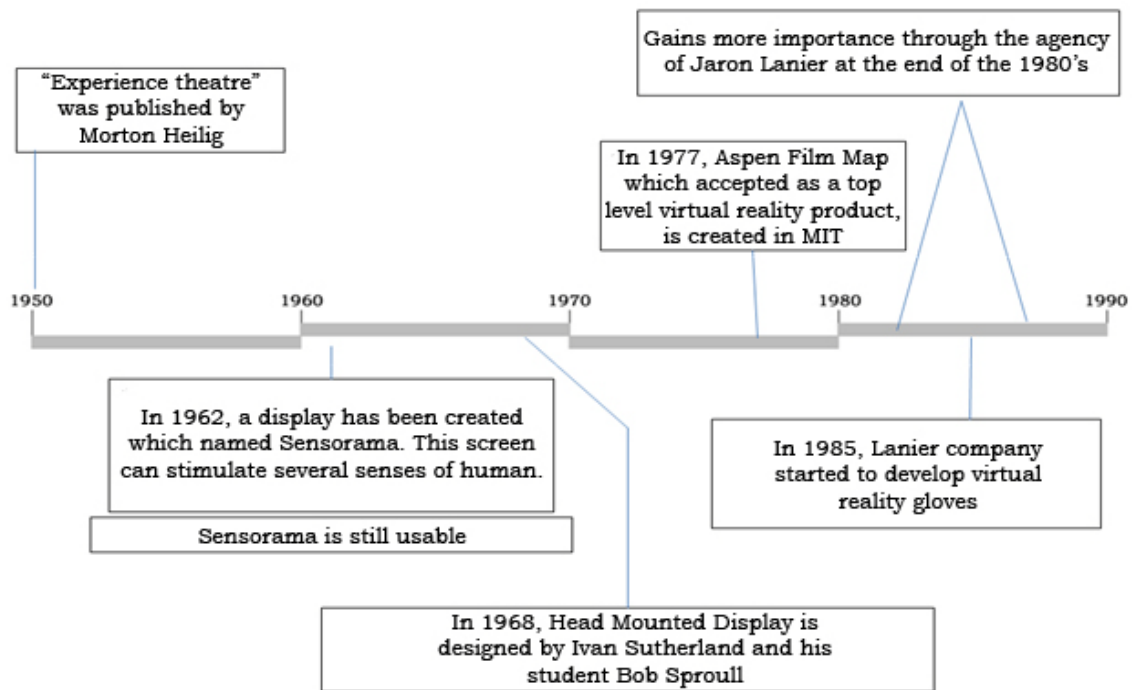


Figure 3.1: Timeline of Virtual Reality

⁴ Head Mounted Display



Figure 3.2: Sensorama

Television

The first big development in virtual reality sector is definitely the television which has a right to go inside through the houses. Also television is interconnected with virtual reality by affecting two senses of humans at the same time.

By invention of cinema, television gains more importance for spreading movies all over the world. However when the television is not enough for effectiveness of wanted to be given by movie, big screen television even big rooms with huge screen and surround sound systems which called cinema is invented.

Games

Nowadays, secondary big sector is computer game sector which is using virtual reality and its components very efficiently. As well as movies, games are created – basically – to give an impact for the players. After years, all gaming tools like monitors,

keyboards, graphic cards, gloves etc. is getting developed for one reason. Reason is to be more effective in players mind.

Haptic Sense

Word of haptic is coming from Greek etymology which means relating to the sense of touch. Its origin is coming from another Greek word, *haptesthai* meaning to “contact” or “touch”.

Haptic is already using in virtual reality world as a touching experience. These types of tools named as haptic systems because of haptic senses of human beings. Haptic systems are the study of how to connect the human sense of touch – but not feel - with a computer-generated world. One problem with current virtual reality systems is the lack of stimulus for the sense of touch. Namely user can not feel the object because it not really there.

However haptic research attempts to solve these problems by subdividing into two sub-fields, force (kinesthetic) feedback and tactile feedback. Force feedback is the area of haptics that deals with devices which interact with the muscles and tendons that give the human a sensation of a force being applied. These devices mainly consist of robotic manipulators that push back against a user with the forces that correspond to the environment that the virtual effectors are in. Tactile feedback deals with the devices that interact with the nerve endings in the skin which indicate heat, pressure, and texture. These devices typically have been used to indicate whether or not the user is in contact with a virtual object (see Figure 3.4) (Smith, 2004).

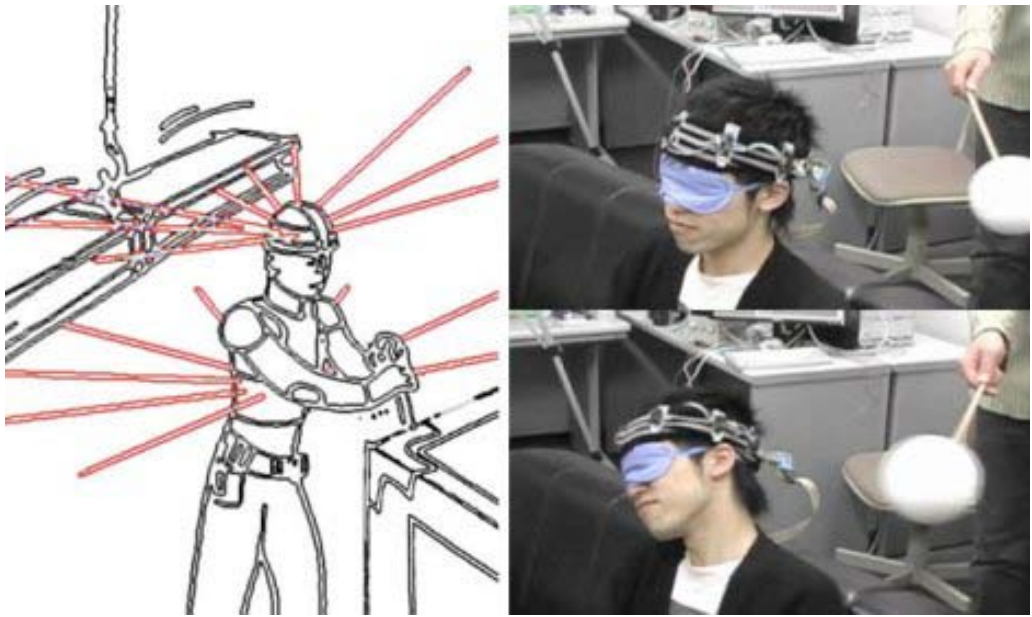


Figure 3.4: an example for haptic sense tool

On the other hand, haptic sense is human sense. Which maintain the ability of human bodies to sense their own movement in space and it is also related to kinesthesia -the ability to feel motion of the body and limbs- (Marcus & Neumann, 2007).

All the researches about haptic sense of human and the medical ones, show us that people can comprehend the world with ability to perceive the depth because of having an interconnected two eye. This information says to us that, seeing with two eyes provides us to perceive depth more efficiently.

3.1. 3D Modeling & Animation

Three-Dimensional modeling gained indispensable position in the sector of architecture and engineering since CAAD system started to develop. When the need for three-dimensional modeling has increased, the market starts to create programs for these types of outcomes. Accompanied by this type of programs starts to use by the companies and architects, they started to use by creating animations which *is not new*.

Animation is an optical illusion of motion of a sequence of images of 2-D or 3-D artwork or model positions in order to create an illusion of movement. This means animation is another way of creating movies.

Humans are sees the world in frames like an animation. But the difference is, frames are too much per second which makes harder to see frames independently in real world. Before animation human being is trying to draw the motion of emotion since they feel that emotion in their brain. This trying can be named as a starting point of animation.

Early examples of attempts to capture the phenomenon of motion drawing can be found in Paleolithic cave paintings, where animals are depicted with multiple legs in superimposed positions, clearly attempting to convey the perception of motion (Tehran Times Art Desk, 2008).

First developing in animation, can be said phenakistoscope (see Figure 3.5), praxinoscope (see Figure 3.6 & Figure 3.7), as well as the common flip book which they were early popular animation devices invented during the 1800s. These devices produced movement from sequential drawings using technological means, but animation did not really develop much further until the advent of cinematography (Dancyger, 2007).

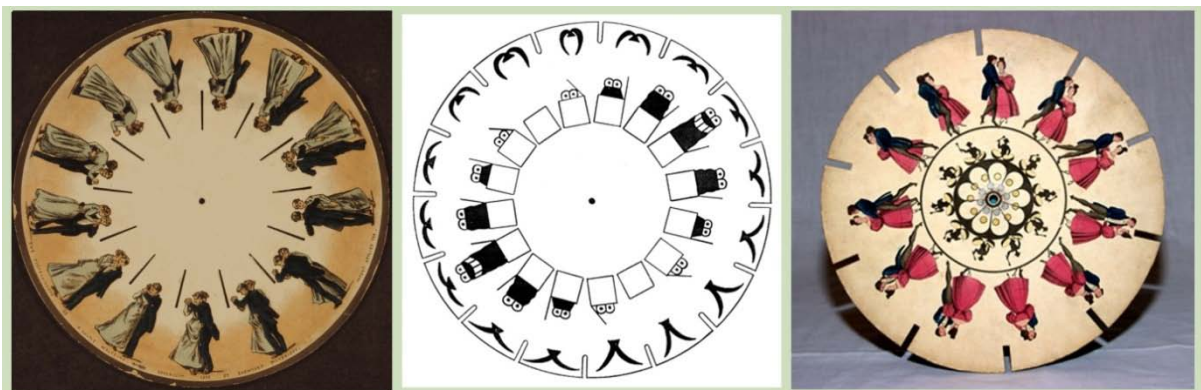


Figure 3.5: Phenakistoscope

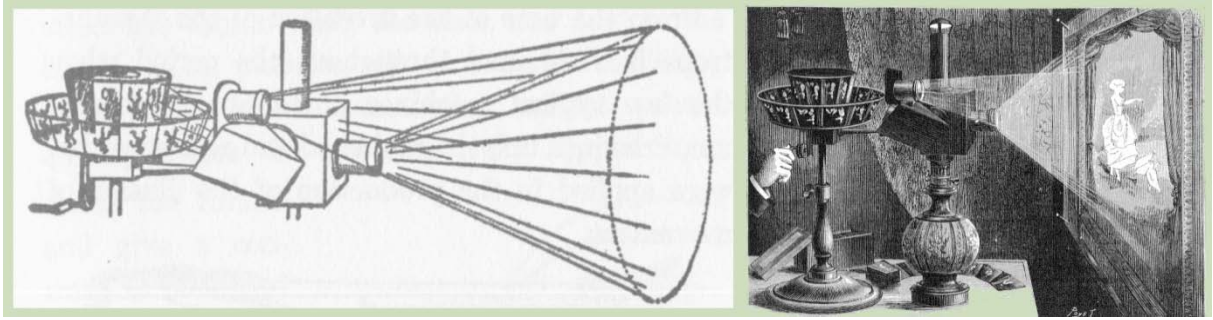


Figure 3.6: Praxinoscope



Figure 3.7: Praxinoscope

3.1.1. Traditional and Modern Methods

There are several types of animation generated since animation invented. Those types can be described in the following part.

Traditional animation

Traditional animation is the method which mostly used for animated films of the 20th century. The individual frames of an animated film are photographs of drawings, which are first drawn on paper. To create the animation, movement of the papers has to be created for the illusion.

The traditional animation process became obsolete by the beginning of the 21st century. Nowadays, animation companies and creator's are using the method which needs to passed the drawings to the computer or drawn directly into a computer system. Various software programs are used to color the drawings and simulate camera

movement and effects. By this developed version of the traditional method, it is possible that taking output of the final piece in several mediums (Auzenne, 1993).

- Full animation

‘Full animation’ definition is using to describe producing high-quality traditionally animated films. Fully animated films can be done in a variety of styles, from realistically designed works (see Figure 3.8) to the cartoon styles (see Figure 3.9) (Auzenne, 1993).



Figure 3.8: Full Detailed Animation - Polar Express



Figure 3.9: Cartoon style animation

- Limited animation

Limited animation concludes less detailed and/or more stylized drawings and methods of movement. Its primary use has been in producing cost-effective animated content for media such as television and later the Internet (web cartoons) (Auzenne, 1993).

- Rotoscoping

Rotoscoping is a technique - patented by Max Fleischer in 1917 - where animators trace live-action movement, frame by frame. The source film can be directly copied from actors' outlines into animated drawings. As an example, movie *The Lord of the Rings* (US, 1978) can be said which used this method for character animation (see Figure 3.10 & Figure 3.11) (Sturman, 1994).



Figure 3.10: an example for rotoscoping from Lord of the Rings the movie



Figure 3.11: an example for rotoscoping - Waking Life the movie

- Stop motion

Stop-motion animation definition, used to describe the method of animation which created by physically manipulating real-world objects and photographing them one frame of film at a time to create the illusion of movement (Sturman, 1994).

- Clay animation

Clay animation uses figures made of clay or a similar easily shaped material to create stop-motion animation. The figures may have an armature or wire frame inside of them that can be manipulated in order to pose the figures (Auzenne, 1993).

- Cutout animation

Cutout animation is a type of stop-motion animation produced by moving two-dimensional pieces of material such as paper or cloth (Sturman, 1994).

- Silhouette animation

Silhouette animation is a variant of cutout animation in which the characters are backlit and only visible as silhouettes (see Figure 3.12) (Sturman, 1994).



Figure 3.12: an example for silhouette animation from Karagöz & Hacivat

- 2D animation

Figures are created and/or edited on the computer using 2D bitmap graphics or created and edited using 2D vector graphics. This includes automated computerized versions of traditional animation techniques such as of tweening, morphing, onion skinning and interpolated rotoscoping. This method is mostly seen in cartoon making (Sturman, 1994).

- 3D animation

Digital models created by an animator or animators in digital medium. Various techniques can be applicable, such as mathematical functions, simulated fur or hair, effects such as fire and water and the use of Motion capture (see Figure 3.13) (Sturman, 1994).



Figure 3.13: an example for 3d animation - Ratatouille the movie

3.2. CA (A) D

Computer-aided architectural design (CAAD) software programs are used by architects and architectural companies for designing and drawing buildings. Firstly, a CAAD program was created in the 1960's, to help architects save time instead of drawing their blueprints (see Figure 3.14 & Figure 3.15) (Kalay, 2004).

Computer-aided design also known as CAD was created to supply the demands of architects and companies. But since CAD couldn't offer all the tools that architects and companies needed, CAAD developed as a distinct class of software. And a result of this, CAAD system has differences from other CAD systems. It has knowledge about construction and building parts and clear object database (Kalay, 2004).

In a general sense, CAAD system refers to the use of any computational technique in the field of architectural design other than by means of architecture-specific software (Kalay, 2004).

“CAAD has two types of structures in its program. The first system is surface structure which provides a graphics medium to represent three dimensional objects using two dimensional representations. The second system is deep structure which means that the operations performed by the computer have natural limitations.

Computer hardware and machine languages that are supported by these make it easy to perform arithmetical operations quickly and accurately” (Kalay, 2004).

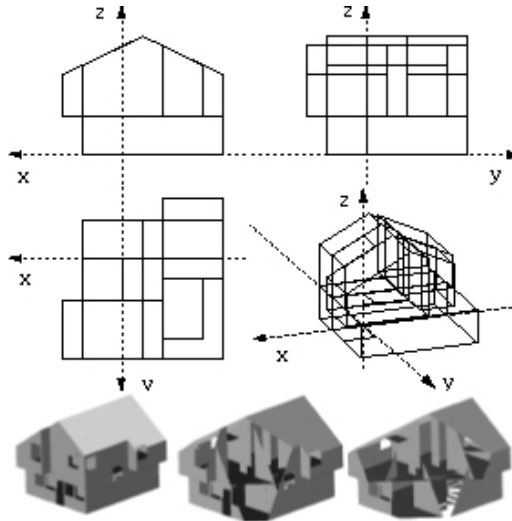


Figure 3.14: CAD drawing

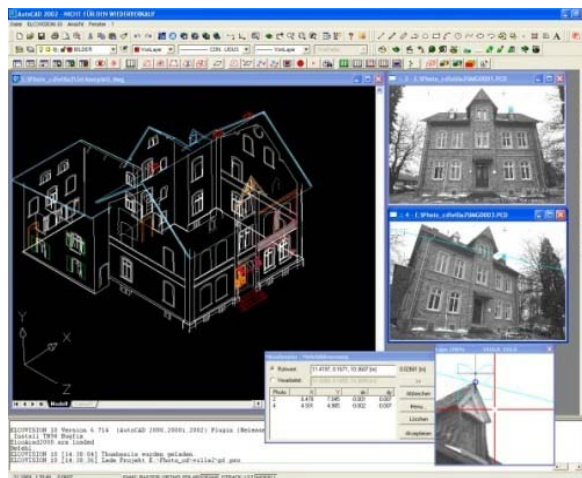


Figure 3.15: CAAD drawing

CAAD systems are creates the start point of the generation of three-dimensional modeling and animation. By developed CAAD software and hardware which interconnected to the software, industry of animation and modeling has rapid development process.

Chapter 4. Case Study

Within this experiment an animation will be generated about an urban phenomenon, Istiklal Street, in Istanbul. A case study generated to measure the effectiveness of one eye movies within the experiment. In order to measure the effectiveness of one eye movie watching experience, it is necessary to make a comparison between one eye movie and regular, namely two eye movies.

Therefore four different types of movies going to be exist in experiment process. These are:

1. Two-eye movie in regular screen
2. One-eye movie in regular screen
3. Two-eye movie in cave system (full vision for spectator)
4. One-eye movie in cave system (full vision for spectator)

4.1. Building the Experiment

By creating one eye movie watching experience, it is planning to;

- Enhance the attention
- Facilitate understanding of virtual worlds

Within the experiment the basic method is combining cinematographic techniques into virtual world movie making methods.

Phase I - Collection of data

With the contribution of Beyoğlu Municipality, CAD drawings of Istiklal Street are collected. These drawings constitute the basis of the 3D model which will be used to generate animation movie. And four building models of all twelve are collected from Google's public model library, which are: Ataturk Cultural Center, The Marmara Hotel, Galata Tower and Ataturk Library.

Phase II - Modeling the subject with the drawings

CAD drawings which collected with the file format .dwg are arranged (see Figure 4.1). Afterwards, an area selected from Beyoğlu drawing, to be modeled. Model area, includes whole Istiklal Street and several buildings around the street (see Figure 4.2).

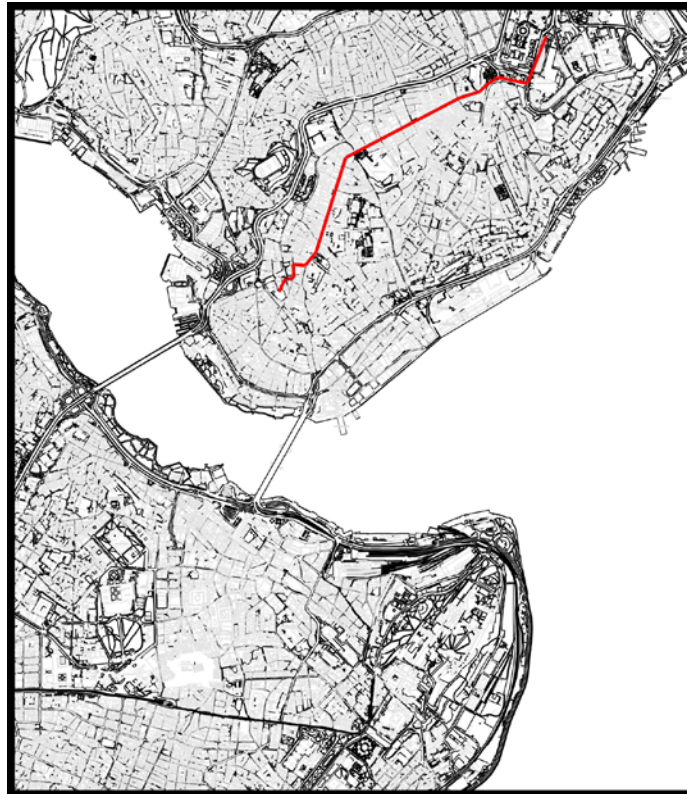


Figure 4.1: Historical Peninsula of Istanbul includes Beyoğlu / Istiklal Street



Figure 4.2: Model area for animation

Afterwards selected model area is moved from AutoCAD⁵ to Archicad⁶ for 3 dimensional building modeling. By the information located in the original Beyoğlu drawing files, each building extruded to same height as the real building (see Figure 4.3).

⁵AutoCAD is computer aided design software which is created by Autodesk.

⁶Archicad is 3 dimensional computer aided design software which is created by Graphisoft.

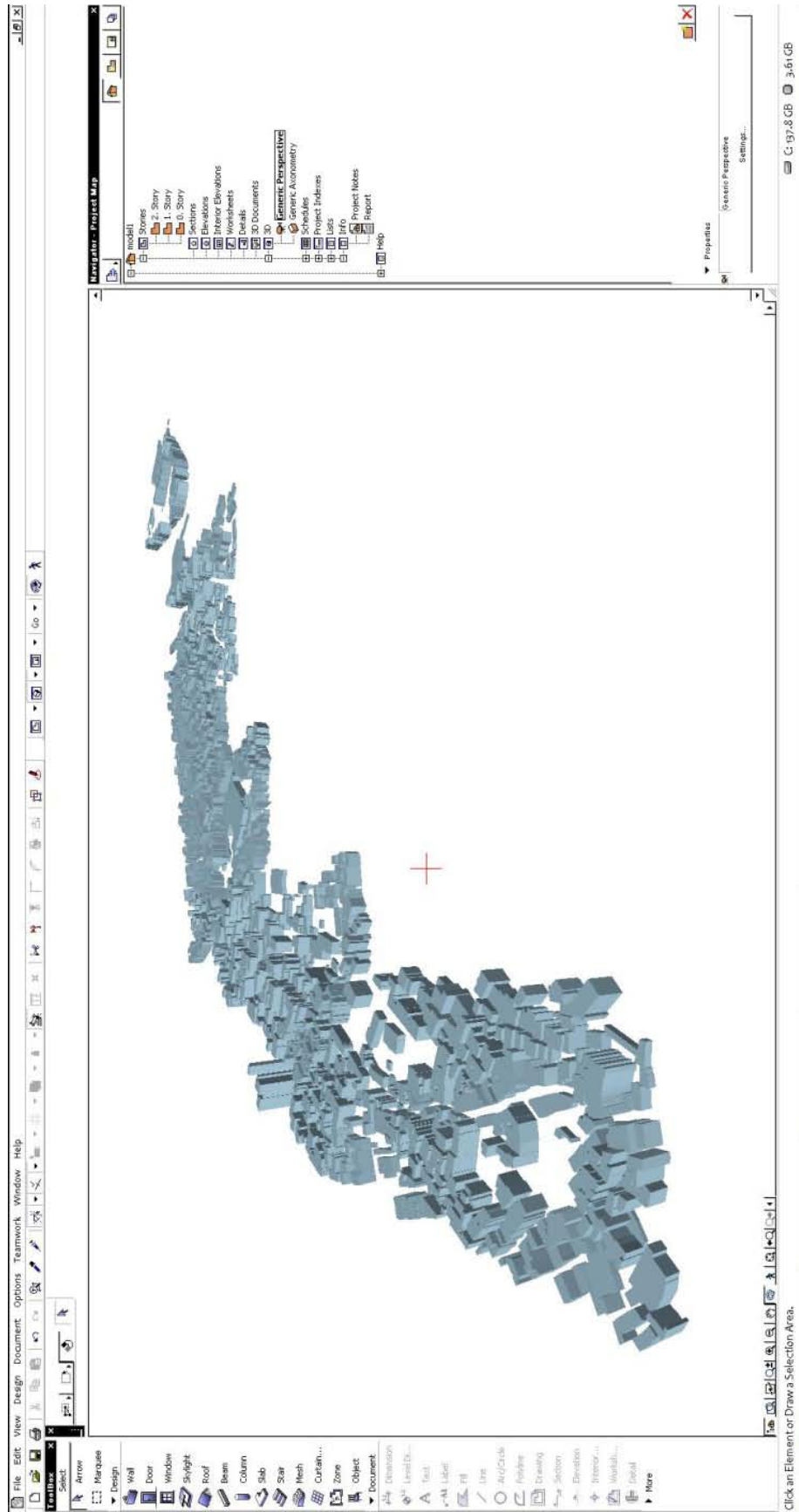


Figure 4.3: Model of Istiklal Street and buildings around it

Phase III - Generating one-eye vision

To generate one eye vision effect on spectator it is necessary to prepare animation with special features.

After modeling the streets model via 3D studio max, a human face with eyeholes also modeled. Two target cameras placed in the eyeholes of the face and field focus values set on 18° , which is human eyes field of view (see Figure 4.4).

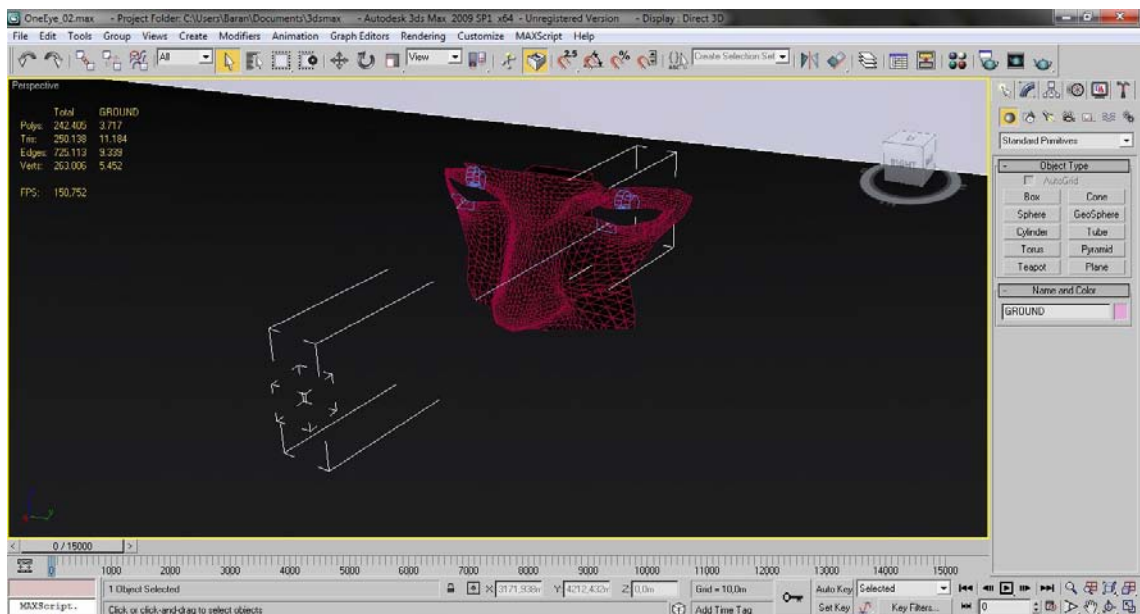


Figure 4.4: 3ds Max scene shows face model with two target cameras

By this camera placement in 3D studio max scene, simply one eye vision is already created. At this point there is a handicap with the 3D studio max program. It is not possible to take output visions of cameras in one screen. In order to solve this situation, a video editing program called Adobe Premiere⁷ is used to connect two movies with each other.

⁷ Adobe Premiere is video editing software which is created by Adobe.

Depth Perception

The ability to view the world in three dimensions and to perceive distance -an ability known as depth perception- is due to largely to the fact that we have two eyes. Because there is some distance between eyes, a slightly different image reaches each retina and the brain integrates them into one composite view. However it does not ignore the difference in images, which is known as binocular disparity; the disparity allows the brain to estimates the distance of an object from us.

Phase IV - Creating a scenario

An urban phenomenon, Istiklal Street, had been chosen for the animation. Within the animation several sign nodes will be shown to the spectators as a route planning on the street (see Figure 4.5). These signs had been chosen by their value of importance. The movie will be representing a route between those signs nodes.

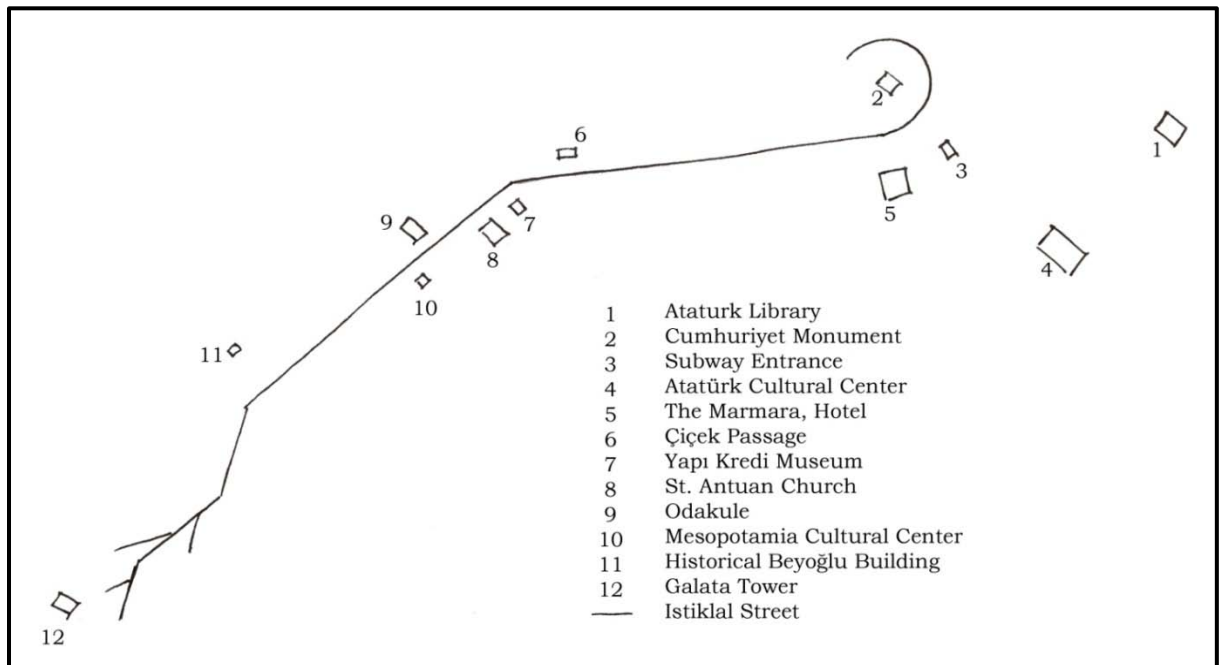


Figure 4.5: A sketch that shows sign nodes around the Istiklal

Phase V - Writing questionnaire

Selected participants do not know the selected area in Istanbul. After each movie participants will answer sixteen questions -four question per movie-. With the questions the shape, color, material or the order of the building is asked to the participants.

There are 12 sign nodes within the route. Also within the experiment there are 4 different types of movies. To prevent inaccuracy, each movie has its own questions.

Also 12 nodes of all sign nodes will be asked each participant however in different ways. This means, the questions are asking about different sign node in each time (see Figure 4.7 & Figure 4.8).

Another method used to prevent inaccuracy is, changing movie watching order for each participant (see Table 4.1).

Table 4.1: A list to see how movie watching order changes

no	participant	movies			
		1	4	3	2
1		1	4	3	2
2		4	2	3	1
3		3	1	4	2
4		2	4	1	3
5		1	3	2	4
6		4	3	2	1
7		2	3	4	1
8		3	4	1	2
9		1	2	3	4
10		3	4	1	2
11		1	3	4	2
12		3	1	2	4
13		4	1	2	3

1

Two eye movie in normal screen

Age: Male Female

1- What was the name of building number 10?

Mesopotamia Cultural Center Cicek Passage
 St. Antuan Church Galata Tower

2- What was the dominant color building number 4, The Marmara, Hotel?

White/Black Blue
 Grey White

3- Approximately how tall was the building number 2, Atatürk Cultural Center?

24-27 meters 3-6 meters
 Ground entrance 9-12 meters

1

Two eye movie in normal screen

Age: Male Female

1- What was the name of building number 11?

Galata Tower Odakule
 Historical Beyoglu Building St. Antuan Church

2- What was the dominant color building number 4, Cumhuriyet Monument?

White/Black Blue
 Grey White

3- Approximately how tall was the building number 1, Atatürk Library?

3-6 meters 9-12 meters
 12-18 meters None of these

1

Two eye movie in normal screen

Age: Male Female

1- What was the name of building number 5?

Cicek Passage Yapi Kredi Museum
 Cumhuriyet Monument St. Antuan Church

2- What was the dominant color building number 2, Atatürk Cultural Center?

Concrete Yellow/Black
 Grey White

3- Approximately how tall was the building number 7, Yapi kredi Museum?

6-12 meters 18-21 meters
 42-45 meters 3-6 meters

1

Two eye movie in normal screen

Age: Male Female

1- What was the name of building number 8?

Odakule Galata Tower
 Mesopotamia Cultural Center St. Antuan Church

2- What was the dominant color building number 4, The Marmara, Hotel?

White/Black Blue
 Grey White

3- What was the shape for building number 6, Çiçek Passage?

Tall, Rectangular It was a street
 Circular Building with tiled facade

Figure 4.7: An example to see how questions change for each participant

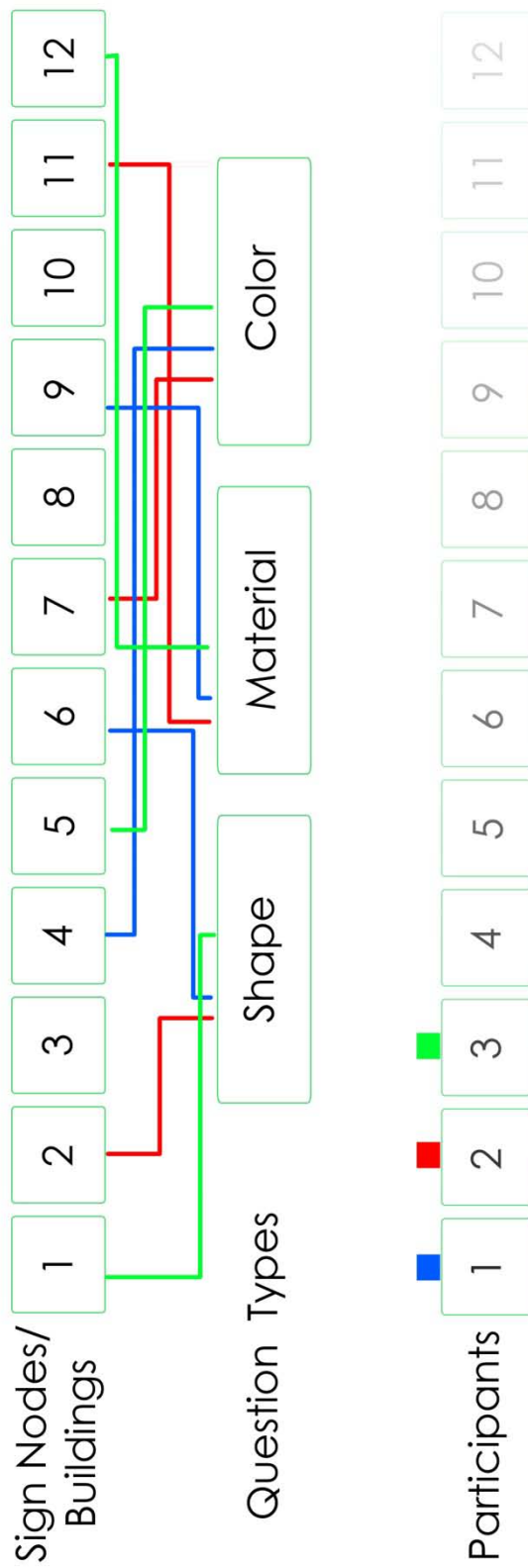


Figure 4.8: Graphical example on how questions differs for each participant

4.2. Running the Experiment

Phase VI - Showing movie to the selected participants

Four different types of movies will be shown to the selected participants. Each movie is approximately 5 minutes movie. There is no order between the movies; every participant will watch movies with a unique order (see Table 4.1).

Afterwards, participants will be asked to answer 4 questions per movie, 16 questions in total. Purpose of this questionnaire is to calculate effectiveness of one eye movie by creating comparison between regular movie and one eye movie.

Phase VII - Collecting results from the participants

Participants will answer the questionnaire after each movie. There are twelve sign nodes within the experiment and participant will answer different question within the test phase.

Questionnaire is planned to calculate the effectiveness of the one-eye movie. Thus, every question shall be different for correct result (see Figure 4.7 & Figure 4.8).

After all participants answered to all questionnaires, every test grouped by movie type for analyzing.

Phase VIII - Analyzing the data

To analyze the data collected from the participants, a statistic program will be used called SPSS. Every participant's answers entered in SPSS program to analyze (see Figure 4.9).

Within this experiment's analyzing phase participants specifically had been chosen, who do not know the selected area in Istanbul therefore to have correct results.

SPSS Data Editor window showing a statistical data view for 'Barans Movies Data 04.sav'. The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Window, Help) and a toolbar. The main area displays a grid of data with 75 variables and 23 rows. The first row is highlighted in blue.

ID	Sex	Age	Movies	B3_1_N	B7_1_N	B1_1_N	B10_1_N	B11_1_N	B3heig	B6_1_N	B12_1_N	B8nam	B5_1_N	B9_1_N	B4_1_N	B8_2_N	B4_2_N	B6_2_N	B2_2_N	B7_2_N	B11_2_N	B5color	B1_2_N	B10_2_N	B2
1	1	1	1432	0	0	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	0	0	0	0	0
2	1	1	4231	0	0	0	0	3	0	0	1	0	0	0	4	0	2	0	0	0	0	0	0	0	1
3	1	3	3142	2	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3	4	1	0	0	0	0
4	1	4	2413	2	3	2	0	0	0	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	0
5	1	4	1324	0	0	0	0	3	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0
6	1	1	4321	0	0	0	0	0	0	0	0	4	3	1	0	0	2	0	0	0	0	0	0	0	3
7	1	1	2341	0	0	0	1	3	2	0	0	0	0	0	0	0	0	0	3	4	1	0	0	0	0
8	1	4	3412	2	0	0	0	0	2	3	0	0	0	0	0	0	4	0	0	0	0	3	0	3	0
9	1	1	1234	2	4	3	0	0	0	0	0	0	0	0	0	3	1	2	0	0	0	0	0	0	0
10	1	2	3412	0	0	0	0	3	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0
11	2	3	1342	0	0	0	0	0	0	0	0	4	4	1	0	0	1	0	0	0	0	0	0	0	2
12	1	2	3124	2	0	0	0	0	0	2	1	0	0	0	0	0	2	0	0	0	0	4	0	3	0
13	1	32	4123	0	0	0	2	3	1	0	0	0	0	0	0	0	0	0	3	3	2	0	0	0	0
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									

The bottom status bar indicates 'SPSS Processor is ready'.

Figure 4.9: Statistical data view on SPSS

Chapter 5. Synthesis

Experimental project is set up to prove the hypothesis called one-eye movie watching experiences will be more effective than normal movies. Behind the scene, hypothesis claims that, different experiences have power. Also this hypothesis uses that power.

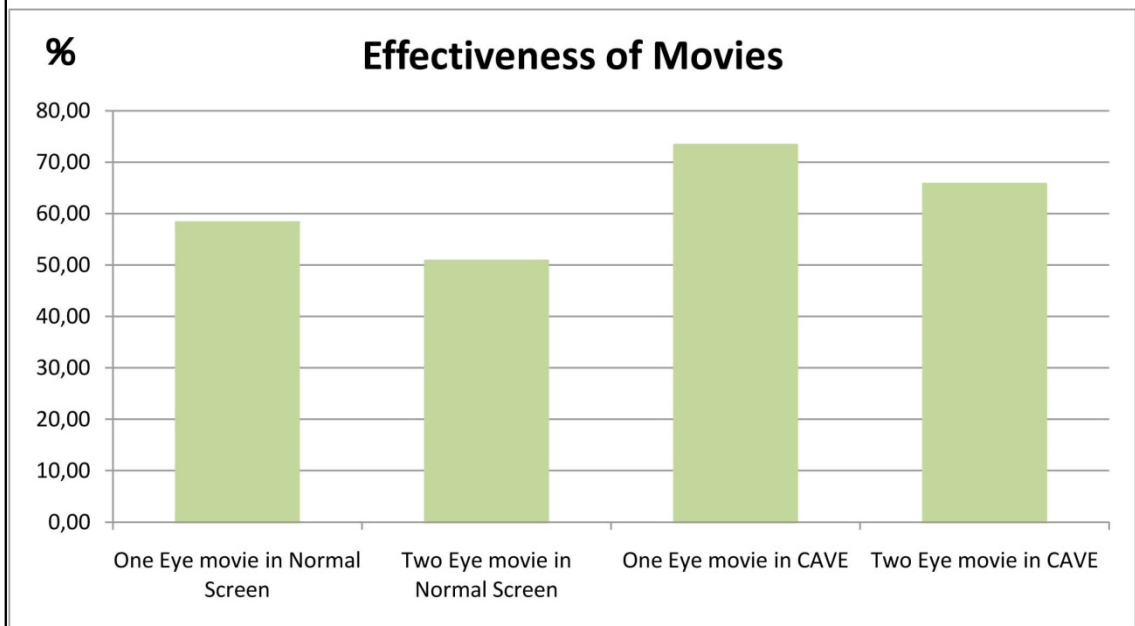
Since we are watching regular type of movies, which is not real experience. It is completely different experiences, walking on the camera path or watching that camera recordings. Namely, it is possible to shut one eye down while walking, however it is not possible to try one eye experience while watching a regular movie. With one eye movie watching, this experimental project provides opportunity to use one eye experience.

By generating new watching style with new experience and decreasing depth perception, one eye movie watching will be more effective, easily-remembered than normal movies.

After statistic information which collected from the participants, one eye movie is more effective than the normal movies.

Table 5.1: Statistic result for effectiveness of movies

Average Number of Correct Answers for each movie type	
One Eye movie in Normal Screen	% 58,33
Two Eye movie in Normal Screen	% 50,86
One Eye movie in CAVE	% 73,34
Two Eye movie in CAVE	% 65,76



5.1. Collecting the Data

With the answers collected from the participants, several statistic data's prepared. Main statistical result shows the comparison of effectiveness of the movies (see Table 5.1).

Also a statistic prepared that shows participants grouped by age (see Table 5.2).

Table 5.2: Participants grouped by age

Age group	Frequency	Percent
18-30	5	38,5
30-40	3	23,1
40-50	2	15,4
50-60	3	23,1

After every participants finish the movie, fills the regarding questionnaire before continue watching other movies. To prevent incorrect results, also movie order changes for every participant.

5.2. Statistical Results

Table 5.3: Statistic of how effective is movies by buildings/sign nodes

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	1	9 - 12 m	1	50,0	50
		12 - 18 m	1	50,0	
TENS	1	12 - 18 m	2	100,0	100
TENS	1	Green	2	66,7	33,3
		Blue	1	33,3	
OEC	1	9 - 12 m	2	66,7	66,7
		12 - 18 m	1	33,3	
TEC	1	Ataturk Library	3	100,0	100
				AVERAGE	70

Type of Movie	Building	Answers	Frequency	Percent	Result
OEC	2	Ataturk Cultural Center	2	100,0	100
OEC	2	9 - 12 m	3	100,0	100
TEC	2	Ataturk Cultural Center	2	100,0	100
				AVERAGE	100

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	3	Taksim Subway	5	100,0	100
OENS	3	12 - 18 m	1	50,0	50
	3,00	Ground Entrance	1	50,0	
OEC	3	Subway	2	66,7	66,7
	3,00	Ataturk Library	1	33,3	
OEC	3	M	3	100,0	100
				AVERAGE	79,18

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	4	The Marmara Hotel	3	100,0	100
TENS	4	White/black	3	42,9	42,9
		Blue	3	42,9	
		White	1	14,3	
OEC	4	White/black	1	33,3	0
		Grey	2	66,7	
				AVERAGE	47,63

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	5	none	1	33,3	66,7
		Marble	2	66,7	
TENS	5	Cumhuriyet Monument	3	100,0	100
TENS	5	12 - 18 m	1	33,3	66,7
		5 - 6 m	2	66,7	
OEC	5	Marble	2	100,0	100
TEC	5	Concrete	1	50,0	50
		Marble	1	50,0	
				AVERAGE	76,68

Table 5.4: Statistic of how effective is movies by buildings/sign nodes

Type of Movie	Building	Answers	Frequency	Percent	Result
TENS	6	Tall Rectangular	1	50,0	50
		It was a street	1	50,0	
OEC	6	Green	2	66,7	66,7
		Grey	1	33,3	
OEC	6	Cicek Passage	3	100,0	100
TEC	6	It was a street	3	100,0	100
TEC	6	Cicek Passage	2	100,0	100
				AVERAGE	83,34

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	7	Tile	1	50,0	0
		Curtain Wall	1	50,0	
TENS	7	6 - 12 m	2	66,7	33,3
		18 - 21 m	1	33,3	
OEC	7	6 - 12 m	1	50,0	50
		18 - 21 m	1	50,0	
TEC	7	Concrete	1	33,3	33,3
		White Stone	1	33,3	
		Curtain Wall	1	33,3	
TEC	7	Yapi Kredi Museum	1	33,3	33,3
		St Antuan Church	2	66,7	
				AVERAGE	29,98

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	8	none	3	100,0	0
OENS	8	St Antuan Church	3	100,0	100
TENS	8	Mesopotamia Cultural Center	1	50,0	50
		St Antuan Church	1	50,0	
OEC	8	St Antuan Church	3	100,0	100
TEC	8	Circular	1	33,3	33,3
		Cross Shape	1	33,3	
		Rectangular	1	33,3	
				AVERAGE	56,66

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	9	12 - 15 m	2	66,7	66,7
		33 - 36 m	1	33,3	
TENS	9	Historical Beyoglu Building	3	100,0	0
OEC	9	56 - 59 m	3	100,0	100
TEC	9	12 - 15 m	1	25,0	25
		56 - 59 m	1	25,0	
		33 - 36 m	2	50,0	
				AVERAGE	47,93

Table 5.5: Statistic of how effective is movies by buildings/sign nodes

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	10	Mesopotamia Cultural Center	1	50,0	50
		Cicek Passage	1	50,0	
TENS	10	Mesopotamia Cultural Center	1	33,3	33,3
		Cicek Passage	1	33,3	
		St Antuan Church	1	33,3	
OEC	10	Concrete	1	50,0	0
		Curtain Wall	1	50,0	
TEC	10	Stone	4	80,0	80
		Curtain Wall	1	20,0	
				AVERAGE	40,83

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	11	Dark/Light grey	5	100,0	100
TENS	11	Beyoglu Historical Building	1	50,0	50
		St Antuan Church	1	50,0	
OEC	11	Galata Tower	1	50,0	50
		Beyoglu Historical Building	1	50,0	
TEC	11	12 - 15 m	3	100,0	0
				AVERAGE	50

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	12	24 - 27 m	5	83,3	83,3
		51 - 54 m	1	16,7	
OEC	12	24 - 27 m	2	100,0	100
TEC	12	Grey	3	100,0	100
TEC	12	Galata Tower	3	100,0	100
				AVERAGE	95,83

Table 5.6: Statistic of correct answer ratio based on buildings/sign nodes

Correct Answer Ratio Based on Buildings	
Atatürk Library	% 70
Atatürk Cultural Center	% 100
Taksim Subway	% 79,18
The Marmara, Hotel	% 47,63
Cumhuriyet Monument	% 76,68
Çiçek Passage	% 83,34
Yapı Kredi Museum	% 29,98
St. Antuan Church	% 56,66
Odakule	% 47,93
Mesopotamia Cultural Center	% 40,83
Historical Beyoğlu Building	% 50
Galata Tower	% 95,83

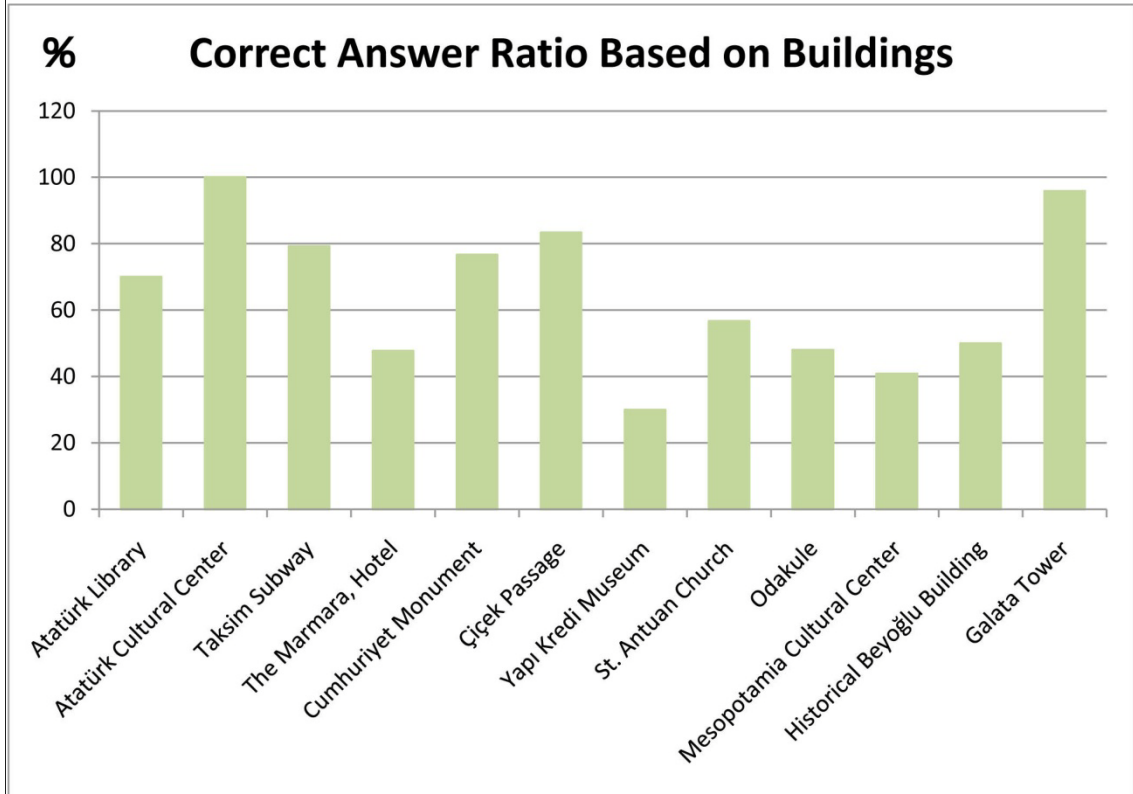


Table 5.7: Statistic of how effective is movies by movie types

Type of Movie	Building	Answers	Frequency	Percent	Result
OENS	1	9 - 12 m	1	50,0	50
		12 - 18 m	1	50,0	
OENS	3	Taksim Subway	5	100,0	100
OENS	3	12 - 18 m	1	50,0	50
	3	Ground Entrance	1	50,0	
OENS	4	The Marmara Hotel	3	100,0	100
OENS	5	none	1	33,3	66,7
		Marble	2	66,7	
OENS	7	Tile	1	50,0	0
		Curtain Wall	1	50,0	
OENS	8	none	3	100,0	0
OENS	8	St Antuan Church	3	100,0	100
OENS	9	12 - 15 m	2	66,7	0
		33 - 36 m	1	33,3	
OENS	10	Mesopotamia Cultural Center	1	50,0	50
		Cicek Passage	1	50,0	
OENS	11	Dark/Light grey	5	100,0	100
OENS	12	24 - 27 m	5	83,3	83,3
		51 - 54 m	1	16,7	
				AVERAGE	58,33

	Correct
	Wrong

Table 5.8: Statistic of how effective is movies by movie types - Two Eye Normal Movie

Type of Movie	Building	Answers	Frequency	Percent	Result
TENS	1	12 - 18 m	2	100,0	100
TENS	1	Green	2	66,7	33,3
		Blue	1	33,3	
TENS	4	White/black	3	42,9	42,9
		Blue	3	42,9	
		White	1	14,3	
TENS	5	Cumhuriyet Monument	3	100,0	100
TENS	5	12 - 18 m	1	33,3	66,7
		5 - 6 m	2	66,7	
TENS	6	Tall Rectangular	1	50,0	50
		It was a street	1	50,0	
TENS	7	6 - 12 m	2	66,7	33,3
		18 - 21 m	1	33,3	
TENS	8	Mesopotamia Cultural Center	1	50,0	50
		St Antuan Church	1	50,0	
TENS	9	Historical Beyoglu Building	3	100,0	0
TENS	10	Mesopotamia Cultural Center	1	33,3	33,3
		Cicek Passage	1	33,3	
		St Antuan Church	1	33,3	
TENS	11	Beyoglu Historical Building	1	50,0	50
		St Antuan Church	1	50,0	
				AVERAGE	50,86

	Correct
	Wrong

Table 5.9: Statistic of how effective is movies by movie types - One Eye Cave Movie

Type of Movie	Building	Answers	Frequency	Percent	Result
OEC	1	9 - 12 m	2	66,7	66,7
		12 - 18 m	1	33,3	
OEC	2	Ataturk Cultural Center	2	100,0	100
OEC	2	9 - 12 m	3	100,0	100
OEC	3	Subway	2	66,7	66,7
	3	Ataturk Library	1	33,3	
OEC	3	M	3	100,0	100
OEC	4	White/black	1	33,3	0
		Grey	2	66,7	
OEC	5	Marble	2	100,0	100
OEC	6	Green	2	66,7	66,7
		Grey	1	33,3	
OEC	6	Cicek Passage	3	100,0	100
OEC	7	6 - 12 m	1	50,0	50
		18 - 21 m	1	50,0	
OEC	8	St Antuan Church	3	100,0	100
OEC	9	56 - 59 m	3	100,0	100
OEC	10	Concrete	1	50,0	0
		Curtain Wall	1	50,0	
OEC	11	Galata Tower	1	50,0	50
		Beyoglu Historical Building	1	50,0	
OEC	12	24 - 27 m	2	100,0	100
				AVERAGE	73,34

	Correct
	Wrong

Table 5.10: Statistic of how effective is movies by movie types - Two Eye Cave Movie

Type of Movie	Building	Answers	Frequency	Percent	Result
TEC	1	Ataturk Library	3	100,0	100
TEC	2	Ataturk Cultural Center	2	100,0	100
TEC	5	Concrete	1	50,0	50
		Marble	1	50,0	
TEC	6	It was a street	3	100,0	100
TEC	6	Cicek Passage	2	100,0	100
TEC	7	Concrete	1	33,3	33,3
		White Stone	1	33,3	
		Curtain Wall	1	33,3	
TEC	7	Yapi Kredi Museum	1	33,3	33,3
		St Antuan Church	2	66,7	
TEC	8	Circular	1	33,3	33,3
		Cross Shape	1	33,3	
		Rectangular	1	33,3	
TEC	9	12 - 15 m	1	25,0	25
		56 - 59 m	1	25,0	
		33 - 36 m	2	50,0	
TEC	10	Stone	4	80,0	80
		Curtain Wall	1	20,0	
TEC	11	12 - 15 m	3	100,0	0
TEC	12	Grey	3	100,0	100
TEC	12	Galata Tower	3	100,0	100
				AVERAGE	65,76

	Correct
	Wrong

INTERIM RESULTS

This experimental project had been prepared to gain more effectiveness within the presentations. Generally, presentations are visual information systems. To make a presentation stronger it is needed to make it strong story teller. Cause it is all about storytelling and how your synchronization with the presentation. Therefore visual storytelling touches cinema right at this point. Cinema itself is a visual storytelling.

Nowadays there is various ways to create a movie from hand camera to computer simulation or animation. Movie is not just a visual screen show that plays on screen; it can be slide show with pictures held by people or just shadows playing on a curtain etc. Cinema is unlimited, this is the main theme makes it an art.

Nowadays, it is started to accept that cinema is divided into two branches. First one is movies made for money and the other one is movies for art. There are lots of cinema festivals walking on whole world and lots of movies winning awards within those festivals, however approximately none of them is on cinemas. To generalize, cinematography and its techniques are everything for artistic movies and within art movies it is not possible to see that much virtual / computer aided scenes. But, all of these movies have just one real purpose. Have a place in spectators' brains.

Cinematography is an art, developed in the cause of cinema development. To build cinema, cinematography is unique method that the producer / director needs to use. Cinematography has rules and paths that have to be followed to generate cinema.

Cinematographic techniques are mostly used to create effective and exiting scenes. Especially for advertisements, companies have to tell the story in a minimum time therefore the effect of the visual scenes which used in advertisements or movies is the most important thing.

Since cinema and presentations both are visual storytelling, the way will be used which is one eye movie experience makes them more effective.

Research and experiment is basically about generating more effective visual storytelling, it is not about some movies. Selected area and movie about that street is just an equipment to calculate if one eye movie is more effective or not.

Effectiveness of movie can be calculated if it is memorable by the users, listeners and watchers or not. In the end of this experimental project there will be questionnaires asks about movies which made for this project.

With all the questionnaires had been collected from participants, it is possible to see that one eye movie is more effective than regular movie (see Table 5.1). There are four different kinds of movies to create comparison between them. Main results show that, one eye movie of one kind is more effective than the regular movie of the same kind. Namely there are four movies with two main sub categories. First one is normal screen movie and the second one is CAVE movie which provides full vision for human eyes. Within every sub category there is two movies first one is regular and the second one is one eye movie. If we look every sub category separately, one eye movie is more effective than the regular movie in both sub categories. However still, normal movie in CAVE system is more effective than one eye movie in normal screen and regular movie in normal screen. The reason for this, actually, basic cinema fact; bigger screen, much sound, dark place... CAVE system provides bigger screen in dark place instead of normal movie.

With the statistical results (see Table 5.3, Table 5.4, Table 5.5) it is possible to see that how effective is movies by buildings/sign nodes. These statistics shows that which buildings/sign nodes are well remembered which are not. With the statistics there is result have been found that shows building memorable chart is decreasing at the first period and increasing at the last period. There are two reasons for this; first one is buildings / sign nodes placed in the middle are less texturized and less interesting buildings. However this is not about creating one eye movie experience. This result is secondary result that shows which building is well remembered.

Therefore these statistics proves also less remembered buildings / sign nodes by spectators were in two eye movie and in one eye movie even less remembered building / sign node are remembered better than normal two eye movie (see Table 5.6).

%70 percent of questions about Ataturk library building / sign node was true, because of its different shape and mainly because of it is first building / sign node in the movies. Ataturk cultural center had %100 correct results. The reason behind this is Ataturk Cultural Center's name and the building. However Yapı Kredi Museum had %29,98 correct result. It was one of the less texturized building / sign node placed in the movies and also it was nearly in the middle of the movies. Galata Tower had %95,83 because of its shape and it is the last building. The outline of the results can be said as, attention of the spectators were decreasing from start to middle then increasing from middle to end.

The statistical results Table 5.7, Table5.8, Table 5.9, and Table 5.10 are main results of this experiment and shows how effective are the movies by movie types. This is basically a comparison of the results of the questionnaires therefore the main result and the purpose of the experiment shows itself. Also with these statistics, it is possible to see that there is no question about building / sign node number two within the one eye movie questionnaire.

One eye movie in normal screen has %58,83 correct answer ratio while two eye movie in normal screen had %50,86 correct answer ratio. With these results it can be said that buildings / sign nodes were well remembered in one eye movie than two eye movie. The purpose of the experiment was creating more attention on spectators by providing new watching experience. Also same basic result can be seen on CAVE movies. One eye movie in CAVE had %73,34 correct answer ratio while two eye movie in CAVE had %65,76 correct answer ratio.

As seen before none of the participants faced same question ever. All questions were mixed, all buildings asked about within the questions were mixed, and all movie order was also mixed. This statistics by movie type shows that, for example building/sign node number 2 is never asked within the two eye normal movie

questionnaire but building/sign node number two is asked within the one eye normal movie. Therefore all of the buildings/sign nodes are asked within the one eye movie in Cave questionnaire. Main reason for that, it is new experience for spectators. Since the psychology history, it is accepted that new experiences have very important place in human brain.

Since all the participants are foreigner to the selected area, it will not be possible to have same result with the participants who know the area. Because since they already know the place, their minds will mislead themselves.

Other reason to have these results it is because decreasing the ability of depth perception. Descent of depth perception can be said as a new experience also like the watching experience itself. Humans see two different scenes with their two eyes and brains connect those different images with each other to create one image. So, basically there are two image and brain works for each one to connect with the other one. If one eye got shut down there will be just one image to see and there is no need to spend extra effort on that image for brain. As quick experiment; with the vision of your one eye while something in front of your other eye and the vision of your same eye while your other eye was closed were not the same. Cause first one brain still works for two images, but the other one brain works just for one image.

Insignificant scenes created by montage also a reason. Insignificant scenes alert the human brain by being new experience. By the statistical results it can be said that participants tend to learn the parts where used insignificant scenes. Within the movies there is a scene that camera gets through a woman who are walking on the street at that moment. This is completely insignificant scene what movie tries to tell this is not about buildings / sign nodes however that scene is remembered by every single participant.

These expected results had been collected by the questionnaires which executed with the participants who just watched the movies.

Future Development

Within this research new movie type is created to have more attention of the spectators, also famous street used while experiment process. Therefore this research can be developing as a tourist info project. Namely this movie about İstiklal Street can be used with kiosk machines on the street, open use for all tourists to show a touristic route as an animation video. After that video tourists will be remember the route that he/she just saw.

The second way for developing the experiment, this method is very useful for advertisements. In advertisements it is necessary to tell the story in a very short time so the important thing is the effect that you are giving on that much short time. To create this much effect on spectators' brain this research project is useable.

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APPENDIX

Questionnaire A

Two eye movie in normal screen

Age: Male Female

1- What was the name of building number 8?

- | | | | |
|--------------------------|-----------------------------|--------------------------|-------------------|
| <input type="checkbox"/> | Odakule | <input type="checkbox"/> | Galata Tower |
| <input type="checkbox"/> | Mesopotamia Cultural Center | <input type="checkbox"/> | St. Antuan Church |

2- What was the dominant color building number 4, The Marmara, Hotel?

- | | | | |
|--------------------------|-------------|--------------------------|-------|
| <input type="checkbox"/> | White/Black | <input type="checkbox"/> | Blue |
| <input type="checkbox"/> | Grey | <input type="checkbox"/> | White |

3- What was the shape for building number 6, Çiçek Passage?

- | | | | |
|--------------------------|-------------------|--------------------------|----------------------------|
| <input type="checkbox"/> | Tall, Rectangular | <input type="checkbox"/> | It was a street |
| <input type="checkbox"/> | Circular | <input type="checkbox"/> | Building with tiled facade |

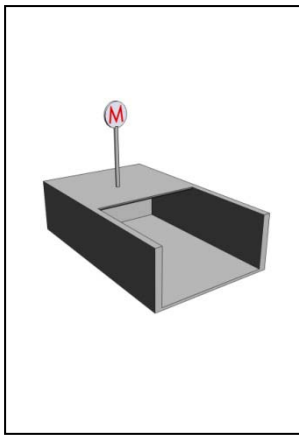
4- Sort the buildings in order of appearance?

X, Z, Y, Q

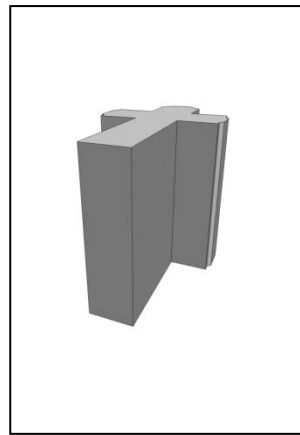
Q, X, Y, Z

Y, Q, Z, X

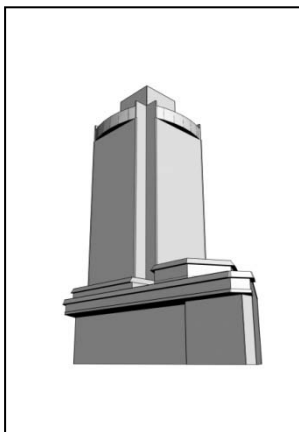
X, Q, Z, Y



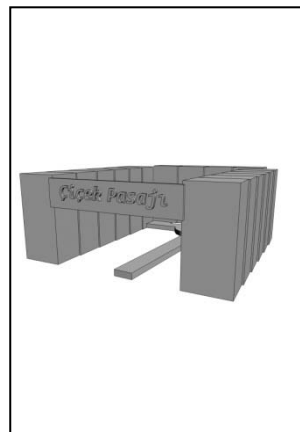
(X)



(Y)



(Q)



(Z)

Questionnaire B

Two eye movie in CAVE

Age: Male Female

1- What was the name of building number 2?

- | | | | |
|--------------------------|-------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Ataturk Cultural Center | <input type="checkbox"/> | Odakule |
| <input type="checkbox"/> | Subway | <input type="checkbox"/> | Cumhuriyet Monument |

2- What was building number 5, Cumhuriyet Monument made of?

- | | | | |
|--------------------------|---------------|--------------------------|----------|
| <input type="checkbox"/> | Metal | <input type="checkbox"/> | Concrete |
| <input type="checkbox"/> | None of these | <input type="checkbox"/> | Marble |

3- Approximately how tall was the building number 9, Odakule?

- | | | | |
|--------------------------|--------------|--------------------------|---------------|
| <input type="checkbox"/> | 12-15 meters | <input type="checkbox"/> | 99-102 meters |
| <input type="checkbox"/> | 56-59 meters | <input type="checkbox"/> | 33-36 meters |

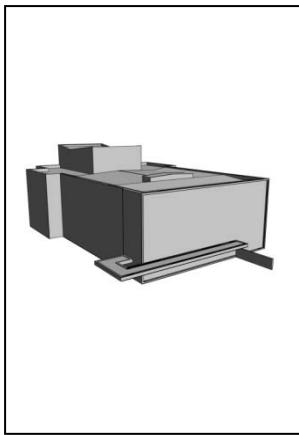
4- Sort the buildings in order of appearance?

X, Z, Y, Q

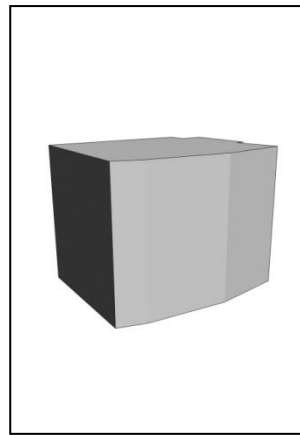
Z, Q, X, Y

Y, Z, Q, X

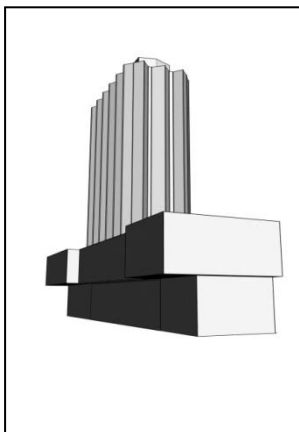
X, Q, Z, Y



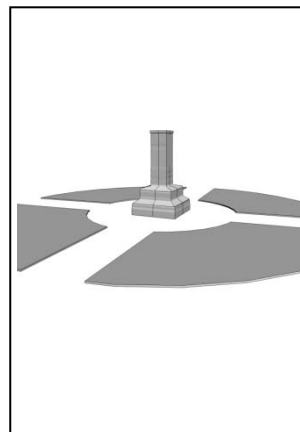
(X)



(Y)



(Q)



(Z)

Questionnaire C

One eye movie in normal screen

Age: Male Female

1- What was the name of building number 3?

- | | | | |
|--------------------------|--------------------|--------------------------|-----------------|
| <input type="checkbox"/> | The Marmara, Hotel | <input type="checkbox"/> | Subway |
| <input type="checkbox"/> | Galata Tower | <input type="checkbox"/> | Ataturk Library |

2- What was the main material of façade for building number 7, Yapi Kredi Museum?

- | | | | |
|--------------------------|----------|--------------------------|--------------|
| <input type="checkbox"/> | Concrete | <input type="checkbox"/> | White stone |
| <input type="checkbox"/> | Tile | <input type="checkbox"/> | Curtain Wall |

3- Approximately how tall was the building number 1, Atatürk Library?

- | | | | |
|--------------------------|--------------|--------------------------|---------------|
| <input type="checkbox"/> | 3-6 meters | <input type="checkbox"/> | 9-12 meters |
| <input type="checkbox"/> | 12-18 meters | <input type="checkbox"/> | None of these |

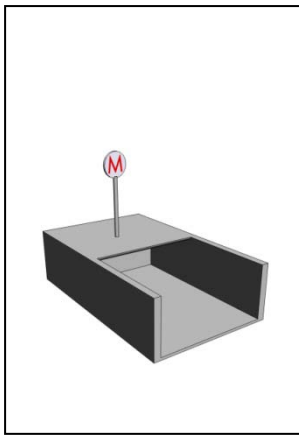
4- Sort the buildings in order of appearance?

Q, X, Y, Z

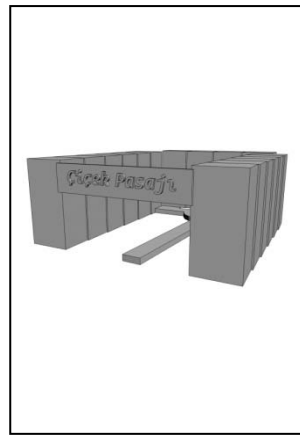
Z, Q, X, Y

Y, Q, Z, X

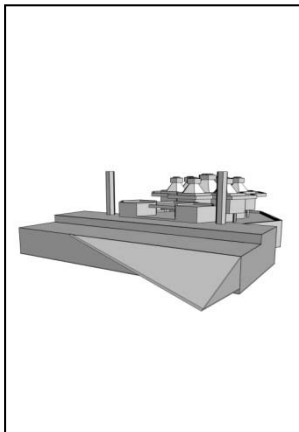
X, Z, Q, Y



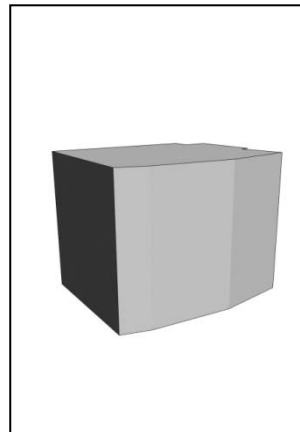
(X)



(Y)



(Q)



(Z)

Questionnaire D

One eye movie in CAVE

Age: Male Female

1- What was the name of building number 11?

- | | | | |
|--------------------------|-----------------------------|--------------------------|-------------------|
| <input type="checkbox"/> | Galata Tower | <input type="checkbox"/> | Odakule |
| <input type="checkbox"/> | Historical Beyoglu Building | <input type="checkbox"/> | St. Antuan Church |

2- What was the material for building number 10, Mesopotamia Cultural Center?

- | | | | |
|--------------------------|--------------|--------------------------|-------------|
| <input type="checkbox"/> | Stone | <input type="checkbox"/> | Concrete |
| <input type="checkbox"/> | Curtain Wall | <input type="checkbox"/> | White Stone |

3- Approximately how tall was the building number 12, Galata Tower?

- | | | | |
|--------------------------|--------------|--------------------------|------------|
| <input type="checkbox"/> | 24-27 meters | <input type="checkbox"/> | 6-9 meters |
| <input type="checkbox"/> | 51-54 meters | <input type="checkbox"/> | 3-6 meters |

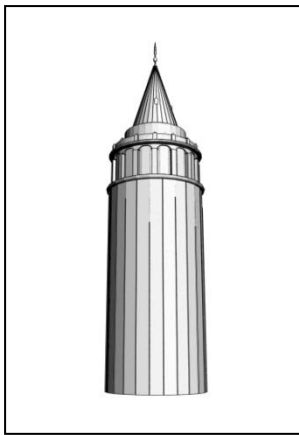
4- Sort the buildings in order of appearance?

Y, X, Z, Q

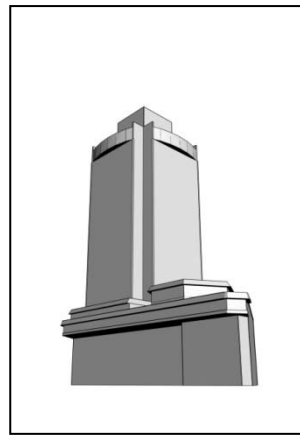
Q, Z, Y, X

Y, Q, Z, X

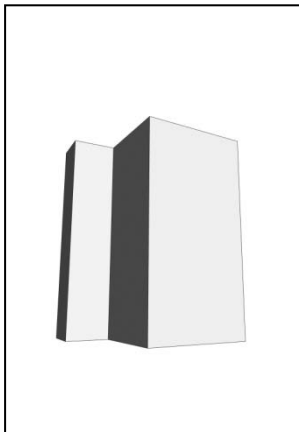
Z, Q, Y, X



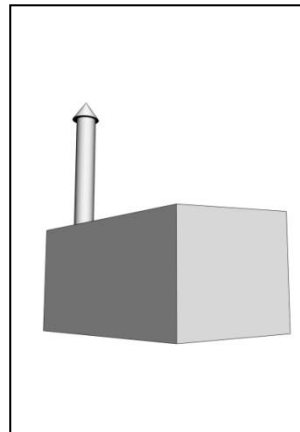
(X)



(Y)



(Q)



(Z)

Curriculum Vitae

Mehmet Baran Taşcı born in İstanbul in 1985. After successful elementary degree in Bilge Kağan High school he gained his high school degree in Fahrettin Kerim Gökay Anatolian High School with education language English. Between the years 2003-2007 he studied architecture in İstanbul Kültür University. Afterwards his bachelor degree in architecture, he started his master of science degree in İstanbul Kültür University. On 2008 with the Erasmus grant he won, Baran went to Netharlands - Eindhoven Technical University for one year to study about his master theses.

Nowadays he is working in a international architecture and engineering company as an IT manager and an architect.