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Masters' Research Report

Pausing dramatic tension within contemporary action cinema: The relationship between time slicing/slow motion and suspenseful situations in action feature films through praxis lead research.

Declaration:

I declare that the content of this research report is my own unaided work. It is submitted towards the degree of Master of Digital Arts by course work and research report in the Faculty of Humanities, the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any other degree or examination.

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On this the 15th day of March 2016.

Abstract:

Time slicing is a film-based visual effect that refers to an enhanced simulation of time at variable speeds by creating the illusion of frozen or slowly progressing motion in time; it is most commonly digitally manipulated. This report will research and analyse how it can be utilized to amplify dramatic tension, or suspenseful situations in contemporary action films through theories, technology and various filming techniques.

The theoretical methodology in this report is a historical account of the technology and process in the evolution of time manipulation within photography and film leading up to time slicing. Some Film theory is included in this report in a more conceptual manner as to why time slicing or slow motion is used in suspenseful situations, particularly in the action film genre. The report also demonstrates how the high standards of time slicing in feature films can be similarly achieved on a budget which will be demonstrated through a practical component that will compare a real time versus a time sliced scenario. While it would be preferable to use a full 360-degree array of cameras, the technology involved in time slicing has not yet reached a point where it is economically accessible to a student film maker and most local industries, which is why the focus of the research paper analyses a shorter array of cameras that is just enough to capture a time slice effect.

The results will then be assessed based on dramatic tension/suspense to see if they equate to the theories of montage and mise en scène discussed in the research report. As a case study, the report will then compare a scene from *The Matrix* to that of a scene produced as part of the practical component in order to draw conclusions on quality and the possibilities of a lower budget set-up.

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CONTENTS LIST

Introduction

This research report focuses on the relationship between time slicing/slow motion and suspenseful situations in action feature films. It aims to question how technology (with the aid of visual effects) is able to allow the filmmaker to control time for the viewer in order to amplify dramatic tension or suspenseful situations in contemporary action films. This research takes the form of both a literary investigation and contains a practical component - the creation of a short film that examines the methodologies and necessities required for expanding time in the film narrative, using visual effects (VFX). The final practical component of the research involves the processes of composing a time slice. This in turn aids in analysing the effects time slicing has on amplifying a suspenseful situation. Reasoning for the inclusion of a practical component is to put theory into practice and "practice does (or should) precede theory" (Monaco viii). It is important to note that this research report is not trying to establish a universal theory, but rather looking at the research from a specific vantage point (from the author's perspective), it will seek to put the theories into practice and establish whether a low budget approach to time slicing is possible, without compromising on quality.

Chapter 1 and 2 will establish the theoretical framework and discuss relevant literature in order to anchor the concepts of spectatorship, suspense and film theory. This report then makes use of a case study in order to begin tackling the proposed research question. Chapter 3 will look at a scene from the film *The Matrix*, (1999) a multi award winning Warner Bros. film, directed by the Wachowskis. T*he Matrix* was chosen as a case study because of the 'spectacle' of bullet time (which was one of the first known uses of this technique) and is what in fact, invoked the idea for this research. The findings from this chapter will then be applied and compared to the practical component: *Temps Mort* (a short film) which was created for this research. This discussion will also consider the theories covered in chapters 1 and 2.

The standards for comparing the case study: *The Matrix* to the practical component, *Temps Mort* are as follows: mise-en-scène, montage, professionalism, spectacle, spectatorship and suspense. The definitions of these theories are covered in greater length under the body of Chapter 2. The practical investigation allows for a greater understanding of the process required for performing a time slice as well as how digital technology enhances and affects the reception of film, thereby simultaneously improving professional practice and bridging the gap in the limited literature available on the subject.

The decision to examine the effects of slow motion/time slicing and its impact on the viewer is motivated by several reasons. The first being the critically acclaimed success received by *The Matrix*, after having won several awards for its editing and VFX. Exploring what key aspects of *The Matrix* made it so popular.

Secondly at the time of this report's conception, there is very little academic research in the field of VFX. While it may be a highly-debated subject in other writing mediums, there has been very little focus in using theoretical concepts of film and trying to apply them in order to gauge a better understanding of VFX and slow motion/time slicing particularly.

What is interesting is that many action films tend to use slow motion during moments of climax and spectacle. This research was undertaken to understand whether or not time slicing/slow motion and its effect on the viewer is determined by the overall quality of the time slice/slow motion sequence or if the emotional effect can be replicated on a limited budget.

Time slicing is becoming increasingly popular in today's world media, game shows and advertising. Feature films, television advertisements and some television series use various versions of time slicing. It is interesting that the techniques are becoming main-stream; hence the budget aspect is explored. Regardless of purpose the techniques and tools used follow the same principles. With experience in a multimedia and three-dimensional (3D) animation background, the discussions will focus around the aesthetics of the final product and the technology involved, where "one must be able to believe that everything in the scene was

photographed at the same time, by the same camera" (Brinkman 2). If the casual movie attendee is unaware that the final composition is a collaboration of different elements, then the goal of creating a quality seamless composition on a budget will be accomplished, making it an invisible art. This lastly proposes a praxis lead research paper that will aid in furthering the body of knowledge in the digital field and digital visual effects.

Chapter 1 Studies about time and the birth of visual effects

1.1 Introduction to the concept of 'time'

Time, has been described as "the unlimited continued progress of existence and events in the past, present, and future" ("Pocket Oxford English Dictionary" 958). The fourth dimension (in which events are ordered and measured chronologically from the past through the present and into the future) has extensively been a major subject of study in various fields such as science, philosophy and even the arts, all with their own respective measuring procedures of time. Time is the governing force that engenders prominent proverbs such as "time and tide wait for no man" - Geoffrey Chaucer, meaning no one is so powerful that they can stop the march of time and "time is what keeps everything from happening at once" - John Wheeler. They are reminiscent that the living is at the mercy of time and without it, our world would not be clear and coherent. Our existence is calculated relative to time in relation to how many years we have lived in our world, even the way that we perceive space is time based. But how did we, as mankind, come to comprehend time? According to Bataille it was the invention of tools that introduced humans to the idea of time:

> Only through working stone did man make an absolute break with the animal. What caused this scission was the exclusively human thinking work demands. Work anticipates, presupposes the object that does not yet really exist, which is presently being made, and which is, simply, the reason the work is being done. Two sorts of objects immediately come into exist in the worker's mind: actually present objects and objects later to come. This already dual aspect is completed by the object of the past; therewith, all the gradations of objective existence range themselves in proper order. From incoherent barkings of desire, man can advance to distinct speech now that, labeling (sic) the object with a name, he is able to make an implicit connection between the material it is made of and the

> work required to get it from the old state to the new in which it is ready for use. Thenceforth, language firmly anchors the object in the stream of time. But man, designating the object, has been wrenched out the world of nameless feeling – of sensibility. Though drawn back to this world, man cannot re-enter it unless, through his labour, he makes not only useful things, but creates a work of art. (cited in Gere 13-14)

Bataille indicates that it was not man who invented technology, but technology that created man and man's documentation of history, because "tool use also introduces humans to the concept of death, in that they can see that tools can outlive them ... With this knowledge comes awe and terror, which in turn leads to the first prohibitions" (cited in Gere 14). In turn art is created as a means of coming to terms with the problem of time in the knowledge that our time of living is limited. As a result, we live in a rapidly paced world increasingly dominated by technologies with man continuously striving to craft or improve useful things. This is in order to preserve their existence in history. Richard Beardsworth suggests that "one of the major concerns of philosophical and cultural analysis in recent years has been the need to reflect upon the reduction of time and space brought about by contemporary processes of technicization, particularly digitalisation" (cited in Gere 6). Gere argues, "if art is to have a role or a meaning at all in the age of real-time technologies it is to keep our human relation with time open in the light of its potential foreclosure by such technology" (2).

1.2 Time manipulation

Technology is endlessly advancing and it has transported us into a modern world where annihilating time and space has become a common goal for speeding up communication and service delivery. "Annihilating time and space most directly means accelerating communications and transportation ... new communications, reproduction, and transportation technologies only continue the process" (Solnit 11). This is echoed by Huyssen when he states that, "Both personal and social memory today are affected by an emerging new structure of temporality

generated by the quickening pace of material life on the one hand and by acceleration of media images and information on the other. Speed destroys space, and it erases temporal distance" (cited in Gere 5). Photography and film have presented us with systems of allowing us to have agency over or freeze time in the form of photographs or video recordings, and hold onto events from our history instead of us having to refer to our own memories. Huyssen also proposes that "our obsessions with memory functions as a reaction formation against the accelerating technical processes that is transforming our Lebenswelt (lifeworld) in quite distinct ways. [Memory] represents the attempt to slow down information" (cited in Gere 5).

Today high definition and high speed cameras allow for individuals to not only view the past, but in addition observe details in memory (our recorded past) that was once hidden from the naked eye due to its inability to see extremely fast motion in detail. Even so we are able to further control or manipulate time and space, radically expanding events in time creating 'spectacles' that are only achievable by film VFX such as time slicing, which is elucidated later in this chapter of the report.

The definition of spectacle "comes from the film historian Tom Gunning's idea of the cinema of attractions, which has become the most pervasive model for thinking about film's powers of stimulation" (cited in Higgins 75-76). Spectacle is a film's pleasure point; its attractive point made to astound, stun and leave a lasting impression on audiences (spectators). This can also be applied to any form of entertainment that invokes similar reactions out of an audience. The following section delves into how the power of capturing time in film originated.

1.3 A brief technological history and its contemporary development into time slicing

Paul St. George and his volume *Sequences: Contemporary Chronophotography and Experimental Digital Art* explores a form of contemporary art that uses sequences of images to explore ideas of space, time, movement, and duration. According to St. George, the term "Chronophotographers" is given to those individuals who first explored the ideas of aesthetics at the intersection of time and space. "'Chronophotographers' is the term given to those who

invented and developed methods of analyzing a wide variety of subjects and their motion" (2). Much of their experiments with time was recorded photographically and is seen as one of the most significant contributions/developments which lead to the invention of cinema, but this was not their objective. "Chronophotography is very different from cinema. A sequence of still images of an event seen side by side rather than one after another can help us to understand motion, time, duration, simultaneity and sequentiality" (St. George 2). One of the prevalent figures involved in chronophotography was Eadweard Muybridge.

i. Eadweard Muybridge

Time manipulation began in the 1830s as told by Rebecca Solnit in her book, *River of Shadows: Eadweard Muybridge and the Technological Wild West*. The railroads were the fastest transportation technology. Telegraphy was the fastest form of information through electrical impulses over wires. It was a time were progression paved the way to the modern world by annihilating time and space. "The domestication of the horse and the invention of writing made it possible for stories to reach farther across time and space than their tellers and stay more stable than memory" (Solnit 11). Accordingly, McShane writes, "in the mid-nineteenth century, the horse was featured as a symbol of prosperity and modernity" (cited in Ott 412). In such a time of rapid progression, technology needed to be created in order to record fast motions:

> To represent movements in real time, machinery had to move faster than the human eye, both in capturing fragments of motion and in reassembling them into a continuity. This is what cinema would be made out of, the speed of projectors matched to the speed of the camera... It began as photographs of horses in motion. (Solnit 182)

This was made possible by photography and Eadweard Muybridge, "the man that split the second, as dramatic and far-reaching an action as the splitting of the atom" (Solnit 7). Photography did not appear all at once. "For the first time in the process of pictorial

reproduction, photography freed the hand of the most important artistic functions which henceforth devolved only upon the eye looking into a lens. Since the eye perceives more swiftly than the hand can draw, the process of pictorial reproduction was accelerated so enormously that it could keep pace with speech" (Benjamin 2). More importantly, "the speed of Muybridge's inventions allowed real motion to be recovered at their own pace, though watching them meant stepping out of one's own time" (Solnit 23). While the world was rushing forward, Muybridge was holding onto the past through photography. Photography may have been its most paradoxical invention: a technology always rushing forward, always looking backward. Muybridge's studies of motion began in 1872.

The story begins when Muybridge was hired by a passionate horse owner to settle a bet. He was approached by American tycoon, industrialist, politician and founder of Stanford University, Leland Stanford. "Sometime in the spring of 1872, Stanford solicited Muybridge to produce a still photo of a horse in full trot. The industrialist hoped to prove his theory of unsupported transit, which hypothesised that all four hooves of a trotter left the ground entirely for a split second over the course of its gait" (Iron Horses, Ott 410). It took a number of years and attempts for him to develop a sound method for capturing airborne horses, but "it was a combination of the triggers, the shutters, the photochemistry, and their orchestration with the horses on the whitened track that made the instantaneous photographs of 1878 possible" (Solnit 188), through a multi-camera system and a series of trip-wires.

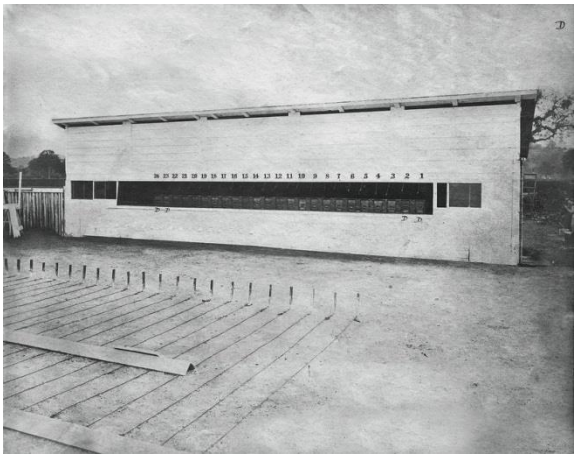

Fig. 1.1. Front of Muybridge's operations room. 1881. Photograph. *National Media Museum*, London. *Sequences: Contemporary Chronophotography and Experimental Digital Art*. London: Wallflower, 2009. 26. Print.

The movements of horses dismayed artists and amused members of the public when Muybridge's instantaneous photographs revealed them as much more complex and ungainly than the rocking-horse gallopers in paintings. Then he offered his audience of scientists, artists, dignitaries, and connoisseurs the whole world of everyday gestures. Those gestures - a gymnast turning a somersault in mid-air, a nude pouring water - were unfamiliar and eerie because they showed what had always been present but never seen. (Solnit 24)

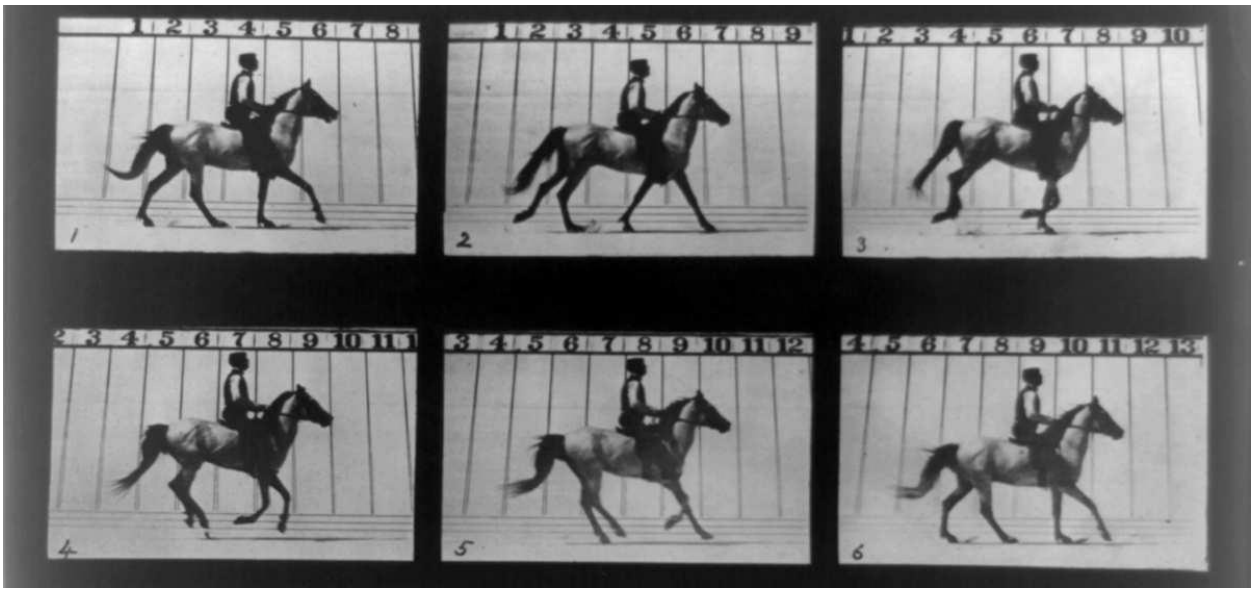

Fig. 1.2. Muybridge, Eadweard. *The Horse in Motion*. 1878. Photograph. *Morse's Gallery*, San Francisco. *Sequences: Contemporary Chronophotography and Experimental Digital Art*. London: Wallflower, 2009. 26. Print.

Muybridge unwittingly set the stage for motion pictures a year later when he "unveiled his 'zoopraxiscope' and its specially prepared glass discs, transparent save for the parade of horses rimming the perimeter in proper locomotive sequence. When set in motion before a projecting magic lantern, the shadows thrown from the discs produced a convincing illusion of motion" (Ott 412). Muybridge's photographs also taught scientists to see photographs as data, launching the study of animal locomotion. "The images shook the art world by exposing postural errors in classic equine sculptures and paintings. Especially disconcerting was the discovery that steeds in full gallop did not fully extend their limbs 'hobby-horse' fashion, as had been depicted since the earliest renderings of horses" (Ott 412). There were many sceptics who

were reluctant to accept the discoveries made by Muybridge's photographs and to account for millennia of inexact equine representations. In the book, *The Horse in Motion*, Dr Stillman stated "by his reasoning, the scientific theory of the retinal afterimage explained why people saw galloping horses in the 'hobby-horse' position; the human eye could only register a horse's limbs at their point of greatest extension, when, like a pendulum, they moved most slowly" (cited in Ott 416).

Solnit links the similarities of photography to other inventions of the time, "If railroads and photography had one thing in common, it is that they brought the world closer for those who rode or looked" (Solnit 14). This reading touches on the spectacle created from Muybridge's new discoveries and gives examples of people's fascination with the slow or frozen world since as early as the eighteen hundreds. '*River of Shadows: Eadweard Muybridge and the Technological Wild West'* also gives insight into the early history of time manipulation technology which started with Muybridge because his inventions were able to capture rapid events in time whether they were occurring outdoors or indoors, but moreover could reconstruct them into moving pictures.

> There were three great breakthroughs in Muybridge's motion studies. The first was the achievement of a photographic process fast enough to capture bodies in motion. The second was the creation of successive images that mounted together, reconstituting a whole cycle of motion rather than isolating a single moment. And the third was their reanimation as a moving picture. (Solnit 185)

ii. Doctor Harold Edgerton

Turn of the century research into the principles of electronics paved the way for Doctor Harold Edgerton and his stroboscopic lighting designs. When adjusting the frequency of the strobe light it bares the ability to generate optical illusions of moving objects as stationary enabling people to see images that occur too fast for the human eye to discern. In addition, by

further changing the frequency of the strobe light, one can make the objects in motion appear to be flowing backwards as well.

In his work, the science of electricity met the art of photography. Edgerton was always interested in how things worked and whilst studying the effects of lightning strikes on electric motors at the Massachusetts Institute of Technology (MIT) he noticed that a bulb or tube that he was using to monitor the surges to the motor flashed brightly as the power peeked. When the frequency of the flashing tube synchronized with the speed of the motor's turning parts, it created an optical illusion making the parts appear as if they were standing still. Edgerton sought to replicate this illusion by building on the work of others who had tried to film actions too fast for the eye to see. In 1882 French Physiologist, Étienne-Jules Marey, designed a photographic gun which he called the chronophotographic-gun (time-gun) that was capable of exposing 12 consecutive frames a second. All these frames were recorded onto a single rotating glass plate negative ("High Speed Camera « Harold "Doc" Edgerton").

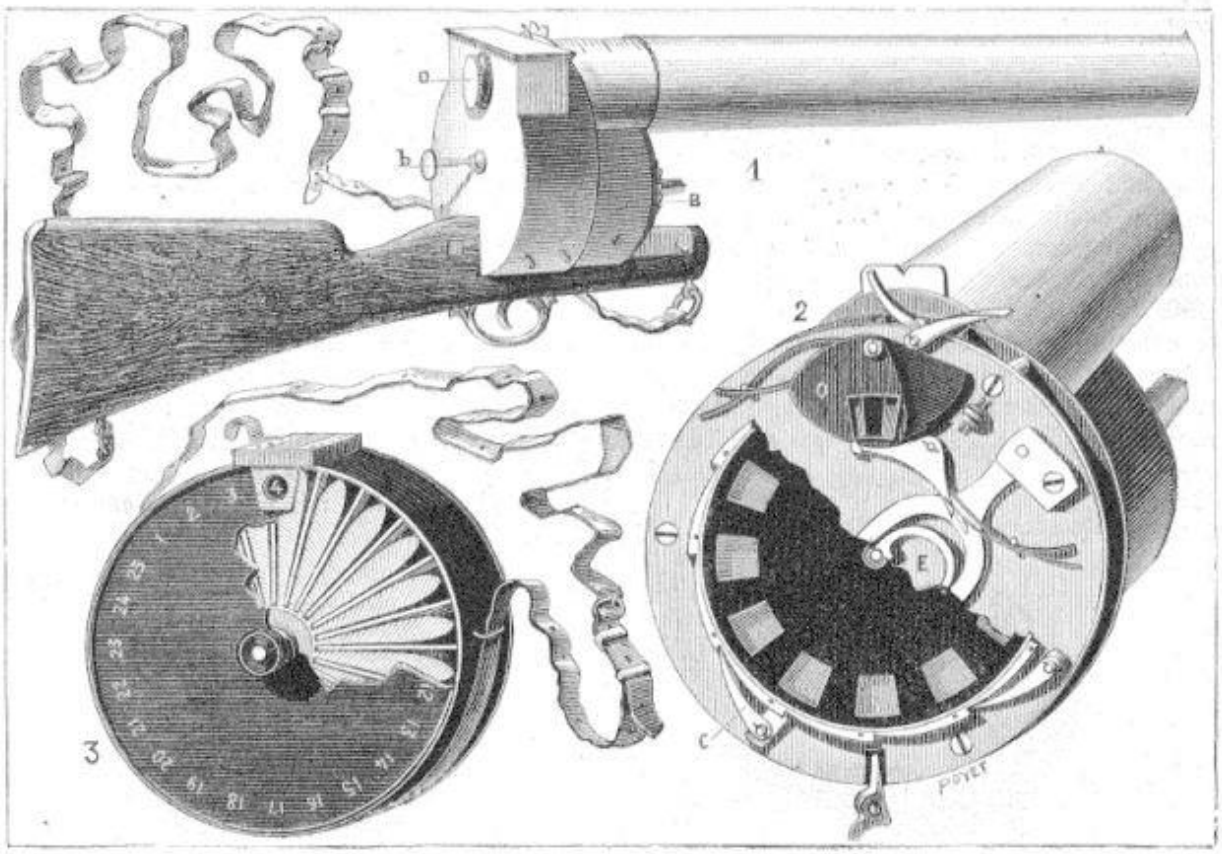

Fig. 1.3. Photographic gun designed by Etienne Jules Marey, 1882. 1956. Print. *Things*, London. *Sequences: Contemporary Chronophotography and Experimental Digital Art*. London: Wallflower, 2009. 28. Print.

Edgerton was able to synchronize his electronic stroboscope with a special high-speed motion picture camera that he developed so that each flash from a strobe exposed exactly one frame of film at high frequencies. The number of flashes per second determined the number of pictures taken. To place this into perspective, in South Africa we employ the Phase Alternating Line (PAL) system which displays 25 frames per second (fps) for. Films are normally exposed and projected at 24 fps. Edgerton's high speed motion picture cameras could expose as many as 6 000 - 15 000 fps. When these pictures are made at higher rates and projected at normal speeds (24 – 25 fps), the apparent movement is slowed down and can be studied in extremely slow motion. Another capability of Edgerton's strobe was when he synchronized the flash of his

strobe to be triggered by sound through a microphone. This enabled him to expose bullets in full flight and capture them as they were fired out of guns.

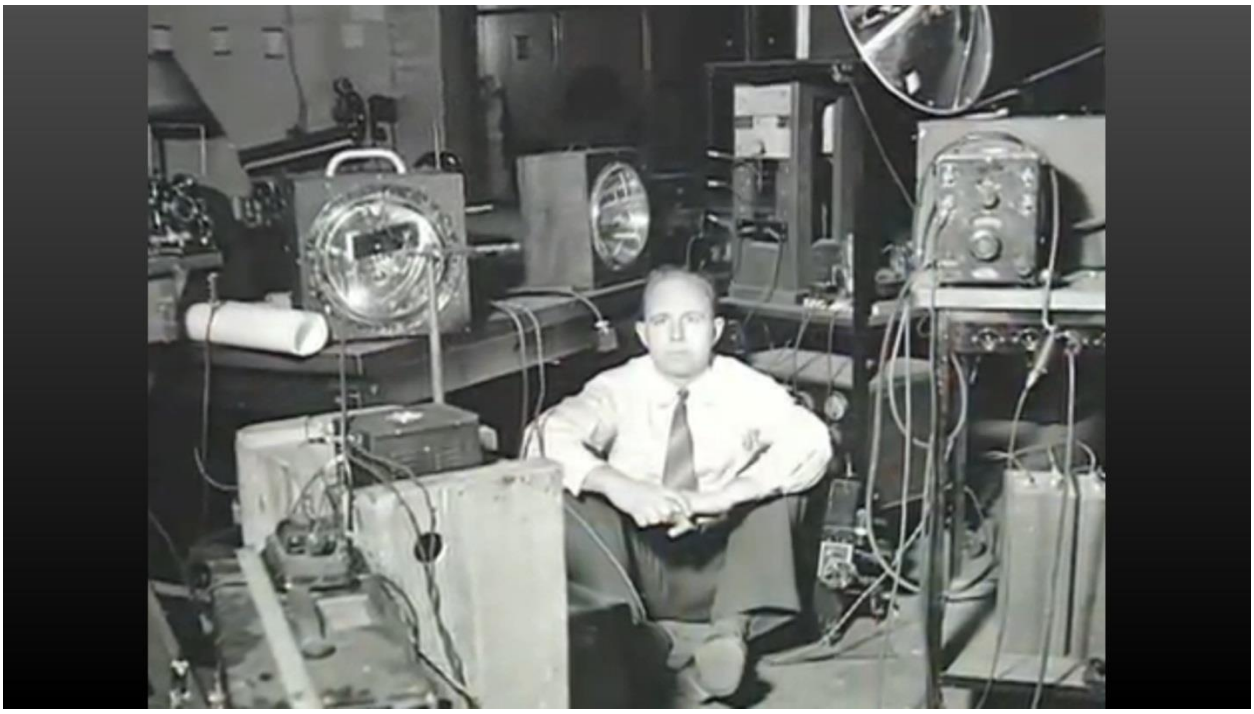

Fig. 1.4. Harold E. Edgerton sits in his MIT laboratory surrounded by a selection of his high-speed photography and multiflash instruments; edgerton-digital-collections.org, 1942; Web; 19 June. 2013.

> A stroboscope consists of three basic parts. A power supply (an electrical outlet or battery) that sends electricity into a capacitor, which stores the electrical energy. The capacitor dumps its stored-up energy into the third component, a tube filled with a rare gas, causing the gas molecules to vibrate rapidly enough to produce a bright flash of light. The flash lasts until the energy is expended. The fact that the flash is renewable makes the stroboscope so useful: as soon as the capacitor recharges, it is ready to go again. ("High Speed Camera « Harold "Doc" Edgerton")

The human eye can acknowledge motion in frame rates as low as 10 – 12 fps before the motion becomes excessively broken up. The ability to register motion in frames is often wrongfully explained through a "phenomenon known as 'the persistence of vision', the fact that

the human retina registers any image in front of it for a fraction of a second after it has already gone. It is this flaw in human vision which enables the illusion of motion to be created using a sequence of slightly differing images" (Botha 19-20). Andersson and the Olofssons explain how humans are able to distinguish motion through frames;

> One of the reasons why some of these techniques work perfectly is the human eye's physical method of seeing motion … These include motion perception, visual perception, persistence of vision and several others. Unconscious inference is a branch of visual perception and motion perception that aids in explaining the illusion of this specific effect. It refers to how the movement of the body or head is interpreted. We unconsciously expect the objects to be stationary in the images perceived in our brain even though they move on our retina. The brain correctly excludes such motion patterns and interprets them as stationary objects. Another theory in visual perception is called parallax. Parallax is the difference or change in the apparent position or direction of an object as seen from two different points. In other words while moving, points with differing distance from the viewer will change position on the retina with different speed according to the distance from the viewer. A point that is close to the viewer will move much faster than a point further away … Another phenomenon of visual perception is Persistence of vision that actually was falsified as a theory in 1912 but is sufficient for the explanation of human vision … This theory explains how rapid playback of video frames portraying an event of motion is interpreted as a seamless motion. A motion picture camera is actually only recording multiple pictures of the event captured by its lens. If it is moving, all these images will be taken from different points in space or when static, they will portray minimal changes in the motion that it is capturing. Again, when all the images are played

> back, the brain uses memory and complex interpretation methods to visualize it as motion. (6-7)

St. George further explains why the persistence of vision is not sufficient for explaining why we are able to register motion while observing a sequence of frames being played in quick succession. The persistence of vision is the usual answer given to explain why a sequence of images appears to be a continuous moving image, but this is not the case. The persistence of vision does exist but that is not the true answer. If persistence of vision were the answer, the lingering image would blur together with the next image in the sequence creating a smudge of ghosted images across the screen, making motion analysis rather difficult. The answer can be found in analysing a combination of Marey's chronographic dial (special and temporal acuity) and how Worthington made sequences of still images through economic assumptions and montage according to St. George, "For any given speed of motion of an animated object when the frequency is higher and the spacing is smaller than our spatial and temporal acuity can resolve we see the gaps and the intermittent showing of the static frames as continuous and the movement as smooth" (12).

iii. Tim Macmillan

The term 'time slicing' was spawned in the 1980s when Muybridge's technique was further developed by a man named Tim Macmillan according to Andersson and the Olofssons in '*Methods for Freezing Time with Computer Graphics Imagery.'*

> Tim Macmillan… was an artist inspired by the cubist method of expressing objects from multiple views in one image. He became interested in creating a similar effect and exploring time with photographic techniques. His first experiments were of a swimming pool with bathers and buckets with falling water, he called it time-slice. (5)

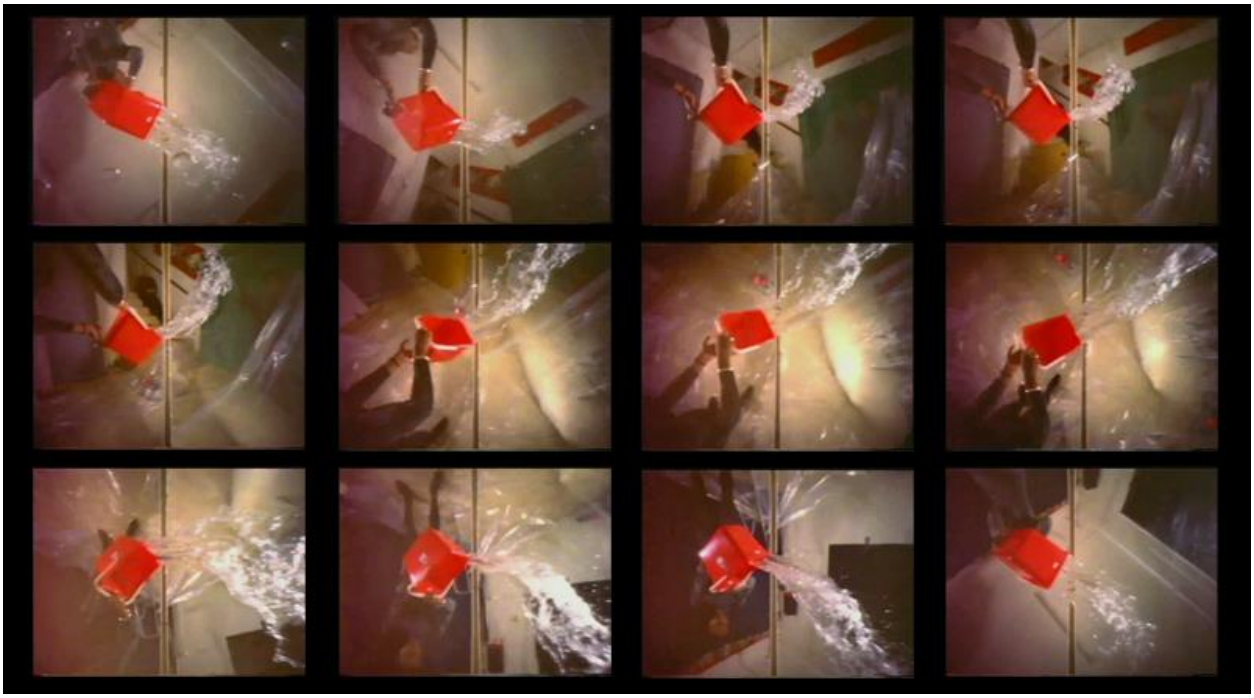

Fig. 1.5. *BBC Tomorrows World 1993: Time-Slice Films Feature*. BBC, 1993. *Timeslicefilms*. 19 Jan. 2010. Web. 13 July 2013.

Tim Macmillan first devised the 'Time-Slice' camera in 1980 at the Bath Academy of Art during his BA Fine Arts degree course. He was originally a painter interested in combining cubist theory with contemporary technology. He went on to create a series of cameras creating multiple viewpoints of a space which were then collaged (edited) together. He imagined that he could see a bucket of water suspended in time and space and move freely around it.

> The multiple camera concept then made a lateral leap to being applied to ciné film. The first camera involved a length of 16mm film negative, clear perspex spacers providing a focal length and a strip of opaque 16mm ciné magnetic tape with a pinhole drilled into each frame. A simple shutter over the magnetic tape then provided the means of exposure. ("Timeslice Films")

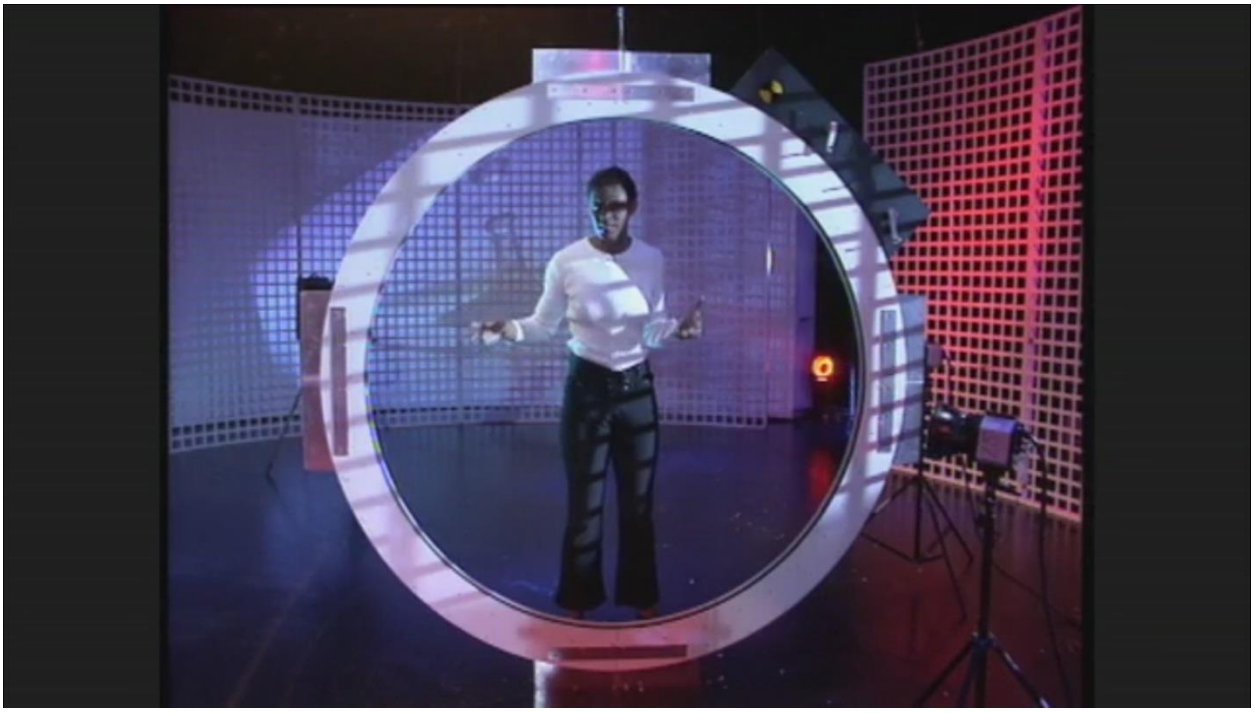

Fig. 1.6. *BBC Tomorrows World 1993: Time-Slice Films Feature*. BBC, 1993. *Timeslicefilms*. 19 Jan. 2010. Web. 13 July 2013.

The result was a tracking shot through a space around a central subject that triggered an exposure by moving through the ring. The looped film could then be played back creating a short film of the suspended captured subject in space. “The profound revelation was that while the viewer experienced a move through space, time was frozen - a paradox. The effect is also known as ‘*temps mort*’ (dead time) & ‘virtual camera’, with various companies advertising under names such as ‘Timetrack’, ‘Multicam’ & ‘Big Freeze’” (“Timeslice Films”).

1.4 Time slicing

Special effects, “a term used to encompass both pictorial effects and visual effects … A broad term that refers to just about anything that cannot be captured using standard photographic techniques. Visual effects can be accomplished in-camera or via a number of different optical or digital post-production processes. Visual effects are a subcategory of special effects” (Brinkman 665 - 671). Special effects can be accomplished both digitally (contemporary method) or through analogue means. The term analogue is used “to refer to any data stored by

a continuously changing range of physical qualities such as the photochemical reaction which happens on film. Analogue special effects thus include any physically created special effects, effects filmed on camera and optical effects created by using the properties of light sensitive photochemical film. This is in contrast to data stored digitally in numerical values" (Botha 2).

Time slicing is known more by its present registered trademark title as "bullet time" through Warner Bros. Entertainment Inc. It is a visual effect because the process involves manipulating and compositing (combining) pre-existing images or footage to produce a new desired image or film. Today VFX using computer or digitally generated imagery has recently become accessible to the independent filmmaker with the introduction of affordable and user friendly animation and compositing software. Because of this, time slicing is becoming increasingly popular in today's world media, game shows and advertising. Feature films, television advertisements and some television series use various versions of modern time slicing. The spectacle of bullet time is what invoked the idea of this report. This is because a decade since the iconic scenes in *The Matrix* were created, the film still has an inspirational and memorable effect on spectators. Even so, the technology involved in bullet time has not yet reached a point where it is economically accessible to a student filmmaker and most local industries, which is why the focus of the research was to analyse the less expensive aspect of time manipulation in bullet time - time slicing.

It is interesting that the techniques are becoming main-stream; hence the low-cost aspect is explored. Regardless of purpose, the techniques and tools used follow the same principles. Digital compositing is the backbone of special effects production and Ron Brinkman's book, '*The Art and Science of Digital Compositing Second Edition'* is an excellent complete overview of the technical and artistic nature of the field of digital compositing by combining various elements into one seamless sequence of images. "Digital compositing … deals with the process of integrating images from multiple sources into a single, seamless whole" (Brinkman 2). Brinkman's book covers a wide range of topics, from basic image manipulation to the visual

cues that create a believable composite. It also discusses the topic of how little recognition is given to artists behind visual effects because “usually the credit for these fantastic visuals is given to ‘CGI’ (computer-generated imagery) or ‘computer graphics,’ an attribution that not only broadly simplifies the technology used but also ignores the sizable crew of talented artists who actually created the work” (Brinkman 1).

“Though a great deal of new science has been added to the toolbox available to digital artists, the fundamentals of compositing and more importantly, the fundamentals of the artistry behind the process of digital compositing, has remained the same” (Brinkman xiii). Brinkman stresses the ability for creativity as being essential and that the fundamentals are just as important today as they were in the past. Any artist can know how to use certain mediums, but there needs to be a balance between knowing the fundamentals of their field and the artistry behind the processes. Brinkman’s book is both an introduction to the field and an authoritative technical reference. It is essential to both the written and practical component as it will provide a basis not only as a technical reference, but as a key reading into the discourse surrounding digital compositing in general.

Chapter 2 Film theory

2.1 Introduction to film theory and techniques

Film theory forms a vital section to the investigation. In this chapter the focus will concentrate on the scope of filming techniques and theories from film theorists in their respective fields, or categories of film theory and how their theories relate to both time slicing and suspense in order to determine a tie between them.

When looking at both Monaco and Solnit's readings, one can begin to notice that there are close similarities amid film and photography in terms of application and technology. Both fall under the pictorial arts, or representational arts as does painting, thus what is stated about the one could correlate to the other. The intention of Monaco's reading, *'How to read a film'* is to explain in brief how film operates on the viewer psychologically and politically. Film is a general medium for mediating a message next to television, a system of signs, semiology, or semiotics: the study of symbols or signs, how they communicate and what their meanings are.

> 'Moving pictures' are on the surface most closely parallel to the pictorial arts. Until quite recently, film could compete directly with painting only to a limited extent; it wasn't until the late 1960s that film color was sophisticated enough to be considered more than marginally useful as a tool. Despite this severe limitation, the effect of photography and film were felt almost immediately, for the technological media were clearly seen to surpass painting and drawing in one admittedly limited but nevertheless vital respect: they could record images of the world directly. Certainly, the pictorial arts have other functions besides precise mimesis, but ever since the early renaissance mimesis had been a primary value in pictorial aesthetics. (Monaco 20)

Monaco explains the affiliation between painting, photography and film in the previous quotation as being a means of recording and mimicking moments of life in the world. Since the early renaissance period this life-like mimesis has been a primary goal for aesthetics in pictorial

arts. This reaches especially into special effects as explained by Brinkman where the aim of special effects artists is to create realistic, life-like visual simulations that are accepted by audiences and are not recognised as uncanny. What Monaco explains next could be a bridge to one of the reasons why time slicing is used in dramatic scenes. “There is something magical and intoxicating about the frozen moment of a still work of art that captures life in full flight” (26). The same could be said about photographs capturing everyday motions too fast to be seen. Similarly, time slicing too creates these frozen moments in film, forcing the audience to gaze upon focal elements in a fast paced, dramatic scene with awe. Directors, with the aid of compositors and editors frame shots with specific focal points through various techniques of mise-en-scène as well as montage in an attempt to create these awe-stimulating visuals known as spectacles. “In film criticism, generally, the modification of space is referred to as mise en scène. The French phrase literally means ‘putting in the scene.’ The modification of time is called montage (from the French for ‘putting together’)” (Monaco 142). Traditionally, time slicing is photographic stills edited into moving film as was practiced by Tim Macmillan taking an audience on a journey around a frozen event or moment.

Monaco describes how film is a system of signs, as semiology attempts to describe the codes and systems of structure that operate in cultural phenomena. It does so by using a linguistic model; that is, the semiology of film describes film as a ‘language’. According to Monaco, “There are three sets of terms that need to be elaborated on in terms of semiology or film ‘language’. The first is the signifier and the signified, the second denotation and connotation, and the third, the syntagmatic and paradigmatic” (cited in McKibbin 2). Firstly, the signifier and the signified in a textual context are undoubtedly different because there is a distinction between, for example, the word fire and an actual fire. There is no direct relationship between the signifier (the word) and what it signifies (elemental fire). Depending on the particular experience of an individual, the word fire may have a particular association for one person and not for another. In one culture, a word can have one meaning, and in another

culture the same word can have an entirely different meaning. “There is no intrinsic relationship between the signifier and what it signifies, at least in languages based on writing, no matter the odd exception in words that are onomatopoeic” (cited in McKibbin 2). But semioticians point out this is not the same in cinema: a film image or sound has a denotative meaning; it is presented to us and we do not have to interpret it. The image of a fire and an actual fire is much more observantly linked: the gap between the sign and what it signifies is much smaller, the recorded image of the fire (signifier) and the idea or meaning of the fire (signified).

Secondly, denotation and connotation is really the difference between what something is and what something implies. The denotation is the dictionary definition of a word: A fire is the state of burning, in which substances combine with oxygen from the air and give out light, heat and smoke (“Pocket Oxford English Dictionary” 336). But it also has numerous connotations: when we hear the word fire, it does not always have to be associated with destruction. It can just as easily be linked to burning passion. Connotations depend upon the experience of a particular person. A word may have a particular association for one person and not for another.

Lastly, the third set of terms is the paradigmatic and syntagmatic. These are vital in understanding what film means.

> When we see a shot, however consciously or unconsciously, we are aware of how the shot could be very different. If we are offered a low-angled shot of the villain as he chases our heroine through the streets, we are aware that there are other choices available to the filmmaker. He could have used a standard close-up, a high angled shot, or a point of view of the heroine as she turns to face him. This is different from the syntagmatic, where its significance resides in the shot chosen in relation to all the other shots chosen. Loosely, this is the difference between mise-en-scene [sic] on the one hand and editing on the other. The filmmaker must choose how to shoot a particular scene (the paradigmatic), but he must also work out how it will fit into the film’s overall scheme (the

> syntagmatic). As James Monaco says in How to Read a Film: “what choices to make: the paradigmatic … how to edit it: the syntagmatic how to film it”. The terms paradigmatic and syntagmatic are extremely useful in making sense of form, and denotation and connotation to make sense of content. (McKibbin 2)

We can further differentiate the various manners of denotation and connotation in film through the icon, the index and the symbol. The icon, is a sign in which the signifier embodies the resemblance to the signified (visual sign). The index, deals with language based on a written or spoken word that has no inherent relationship to the signified. The symbol is an illogical sign that has no direct or indirect link to the signified and is only recognized as such through the teachings of an individual’s culture or upbringing.

2.2 Film techniques

The objective of film is to mediate a message, through the two different manners, denotatively and connotatively, yet it also aims to entertain and retain the focus, or attention of audiences. For this to take place there needs to be an attraction formulated by a number of film techniques. For example: mise-en-scène as well as montage. A combination of these is used in an attempt to create stimulating visuals that influence an audience’s emotions in any direction to suit the message of a film. Eisenstein’s reading, *The Montage of Film Attractions* explains:

> An attraction... is in our understanding any demonstrable fact (an action, an object, a phenomenon, a conscious combination, and so on) that is known and proven to exercise a definite effect on the attention and emotion of the audience and that, combined with others, possesses the characteristic of concentrating the audience’s emotions in any direction dictated by the production’s purpose. From this point of view a film cannot be a simple presentation or demonstration of events: rather it must be a tendentious selection of, and comparison between, events, free from narrowly plot-related plans and molding the audience in accordance with its purpose. (40-41)

i. Mise-en-scène/framing (putting in the scene)

Mise-en-scène refers to the arrangement of everything that appears in the framing of a shot: actors, lighting, décor, props, costume … The codes (technically constructed text that is associated with a specific sign or convention through which we are taught, such as camera angles, framing, typography, lighting …) of mise-en-scène are the tools with which the filmmaker alters and modifies our reading of the shot. All the codes that operate within the frame, without regard to the chronological axis of film, are shared with the other pictorial arts.

ii. Montage/pacing (modification of time)

There are two manners or attitudes of approaching montage. “In the U.S., the word for the work of putting together the shots of a film is ‘cutting’ or ‘editing,’ while in Europe the term is ‘montage’” (Monaco 183). The U.S. terminology suggests a destructive process of eliminating unwanted footage, whereas the European term suggests a constructive process of building upon pre-selected footage that has been considered best for that specific time in a film. The discourse also insinuates that there is a more complex process of selection taking place during montage rather than simply just placing two chronological shots of footage together.

> It is important to note that there are actually two processes going on when shots are edited. The first is the joining of the two shots. Also important, however, is determining the length of an individual shot, both as it relates to shots that precede and follow it and as it concerns the action of the shot. (Monaco 184)

According to Eisenstein, montage is important as to how we as an audience perceive film. “Montage (in the technical, cinematic sense of the word) is fundamental to cinema, deeply grounded in the conventions of cinema and the corresponding characteristics of perception” (41). An audience could observe a single continuous long shot of a single scene or event, but a juxtaposition and accumulation of fragmented footage with different angles and periods of shots can create a greater effect in an audience’s psyche. “Each fragment is chosen to ‘provoke’ associations” (Eisenstein 41). This is called “Cine-Pravada where the audience has to first

guess what is going on and then become ‘intellectually’ involved with the theme” (Eisenstein 42).

With the advent of time slicing and slow motion, editors and compositors are able to reduce the pacing (montage) of films. Adding another dimension not only by lengthening what would originally be a fast event in reality, but time slicing also allows movement around these carefully framed (mise-en-scène) focal points, or spectacles in scenes, such as explosions commonly established in action feature films that are otherwise too fast to be appreciated in real-time. It is these focal spectacles that leave a lasting impression on audiences. “In our view, a prescription (or a list) of montage sequences and combinations by means of which the author intends to subject the audience to a definite series of shocks, a ‘prescription’ that summarises the general projected emotional effect on the audience and the pressure that will inevitably be exerted on the audience’s psyche” (Eisenstein 46), rather than actually presenting an authentic occurring fact or event. This often triggers a stronger response emotionally in an audience. Because we read the shot, we are actively involved in it.

2.3 Spectacle and the action genre

Sobchack’s readings will be elaborated on in relation to spectacle and time slicing, but Røssaak’s reading, *‘Figures of Sensation: Between Still and Moving Images’* is a rich insight into what makes frozen images or moments sensational.

With the action film genre, there is usually friction between scholars on the topic of spectacle over-powering or being the downfall of the narratives. Scott Higgins highlights this in his reading ‘*Suspenseful Situations: Melodramatic Narrative and the Contemporary Action Film*’ by stating “any account of the action film must confront the venerable question of spectacle and narrative. Most scholars approaching the genre are occupied with the tension between the two terms, seeing them in opposition, with spectacle dominating” (75). McClean believes that visual effects or spectacles are derived from the story in order to actually enhance narrative and it is in fact poor narrative that is to blame and not the over-powering imagery. “To make the accusation

that ‘technology swamps storytelling’ – perhaps meaning that the effects are more interesting than the story – is more a comment on the story than it is upon the technology” (McClean 3). It would be difficult to ignore this tension between narrative and spectacle, but rather than posing a conflict between spectacle and narrative, this report acts as a bridge, focusing on investigating time slicing as a narrative element conceived independently as visually sensational, a form of spectacle and how it contributes to dramatic tension visually. With time slicing the audience is placed in between modes of appearing, transporting them from the qualities of cinematography to that of photography and back again. Røssaak’s reading digresses back to the Lumière exhibitions that presented a suspended still image that suddenly took on motion with the flickering of the screen.

> In the earliest Lumière exhibitions the films were initially presented as frozen unmoving images, projections of still photographs. Then the projector began cranking and the image moved. Or as Gorky described it, “suddenly a strange flicker passes through the screen and the picture stirs to life.” The sudden transformation from still image to moving illusion, startled audiences. (Røssaak 322)

The emotions are specifically linked to the appearance of motion, which transforms the random emotion into a defined state of shock. It is this magical metamorphosis that so astounds the audience. “Méliès says: ‘Before this spectacle we sat with gaping mouths, struck with amazement, astonished beyond all expression.’ Gunning also stresses the importance of suspension here, of ‘withholding briefly the illusion of motion...’” (cited in Røssaak 322). Røssaak reveals his thoughts on *The Matrix*: “When I experienced the fabulous bullet time or frozen time shots I didn’t believe my own eyes. The strange way the special effects of this movie manipulate time and movement had never been seen before” (cited in Røssaak 323). The well-known bullet time sequences take us on a magical ride from movement to statuette-like freeze, and then again back to movement. “I believe the sudden impact of this figure of sensation is to

be found in the way it recreates and extends energies and effects belonging to several media techniques and art forms, new and old. First of all, it remediates older techniques of photography developed by Eadweard Muybridge, before cinema as we know it" (cited in Røssaak 324).

If the original attraction for the early cinematic audience was that of movement from still images, it can be argued that the attraction for today's fast-paced and high-tech cinema audience would be the complete opposite, in that the attraction is the transition from extreme movement to the statuette-like freeze and back again. But to fully appreciate this reversal, it is essential to highlight that what attracts and astounds the audience is not merely the transition from movement to still or vice versa, but "rather, the movement from one terminus to the other – indeed, the movement of movement itself, which, made visible in slow motion, occupies the uncanny space 'between' these end points, and reveals them both to be merely different 'dimensions of the same process'" (Sobchack 340-341). As with many experiences, they fade. They are temporary. Being exposed to the same attraction constantly quickly diminishes the value of it to the audience. "Astonishment gives way to familiarity" (cited in Sobsack 341). We are getting used to technology and the freezes or slow motion in contemporary cinema. Needless to say, audiences have now become accustomed to the elaboration, exaggeration, and aesthetics that the use of freezes and slow motion add to our view of the numerous ways a person can be wounded or killed onscreen. So, when Peckinpah, director of 1969's *The Wild Bunch*, was asked why he slowed down his violence, he replied, "To take our breath away with its beauty, but also to give us time to reflect on its allure, and turn exhilaration into examination." For its use of both aesthetic and ideological ends, *The Wild Bunch* was, in many ways, the climactic expression of the technique (Peebles 48).

Slow motion helps emphasise the over-powering impact of new (fast) technology. But this is not to say that slow motion was not used in early cinema. On the contrary, slow motion was used to promote the context of the film to the audience. The difference is that early cinema

was not compelled to use slow motion in order to emphasise this contemporary sense of acceleration. Instead early cinema was not only used as a form of mimesis, but also converted passing life events into life history.

In contemporary cinema, particularly in the action genre, Sobchack discusses examples of how slow motion is used, not only as it was in early cinema, but the different applications thereof.

> The conventional use of slow motion (particularly in the martial arts genre) to punctuate and, by contrast, emphasize the force and speed of the live action as well as to foreground and display, through its extension, the virtuosity of physical bodies in the extremity of motion. Thus, we see slow motion shots inserted in the action to emphasize a small detail or elongate a particularly graceful trajectory of movement: … the arc of a body as it inscribes its slowed fury in the air. The sequence, however, also inserts close-ups of the still faces of the two men between bouts of action, their eyelids lowered in brief meditation that echoes and is echoed by the sequence's slowing of not only motion but also time. (Sobchack 342-343)

What deserves mention here is that time slicing like slow motion has become a modern prerequisite of action cinema, and this is not isolated to the martial arts genre. As mentioned before, time slicing in addition creates these frozen moments in film that can be trucked or moved through, forcing the audience to gaze upon focal elements in a fast paced, dramatic scene with awe, which would otherwise not have been seen or appreciated if the scene were played back in real-time. Sobchack recognizes this not only in the martial arts genre, but also in many others; time-slicing just like slow motion cinematography has become a convention of action cinema. It foregrounds and hyperbolizes such accelerated movements as large explosions and bravura physical stunts and, by slowing these down, makes their constitutive and elemental micro-rhythms viscerally visible. Nonetheless, the world is not really mastered

and not all attractions are easily tamed. These spectacular digital simulations remind us that the world cannot be really mastered or disavowed through technological substitution and simulation, or even by cinematic emulation (343). We believe that we can fully master time or our surroundings through technology, but this is not the case as we merely substitute reality with digital simulations. The example of Eisenstein's theory of attractions where the 'peak moments' of acts in a circus are in fact spectacles or the main attractions, could be used to refer to Sobchack's taming of attractions as if they were taming wild beasts in a circus.

So much is revealed to us through the cinematic technology of slow motion that it is hardly grasped by an individual as he lives through the micro-movements of everyday life. Cinematic technology allows for the interrogation of these micro-movements and energies, hardly seen and experienced, to be expanded upon and fully revealed. This too provides us with a different perception of our existence in the world, not only of our own movements but also those of our immediate surroundings of the natural world (Sobchack 344). Special effects, or more accurately compositing, aids in balancing different temporalities as visually relative to one another. "In *The Matrix*, the micro-movements of bullets can be dodged by the slower live-action human movements of Neo, who, different in his sameness and in an un-canny and confounding reversal, is now also 'faster than a speeding bullet'" (Sobchack 346). Quintessential to time slicing, the concepts "fast" and "slow" are not seen as contradictory and opposites, but rather as a tool to aid man in understanding and gaining agency over time. As cited in Sobchack and cementing previous statements, "Gunning suggests, 'new technologies' such as the cinema evoke 'a short-lived wonder based on unfamiliarity which greater and constant exposure will overcome'" (347). The attraction of cinema is that, as Bishop and Phillips suggest:

> …a virtual encyclopaedia of modernity's tropes: agency, control, technological prowess, speed, intelligence (both human and machine), the power to render the invisible visible, and the intimate connections between aesthetics and technology … Slow motion serves as both the uncanny affirmation and *memento mori* of

> modernity. Interrogating the differential speed of modernity's earliest and latest phases, the essential revelations of slow motion are radical – potentially sublime and dangerous in their capacity to wound. (cited in Sobchack 349)

On the other hand, special effects perform a purpose of attraction to spectators in film as spectacles (entertainment). These attractions involve a direct, exhibitionist address to the audience. Klein interestingly points out in his book, *'The Vatican to Vegas: A History of Special Effects'*, that "a jump cut can be a special effect, particularly if it shocks an audience. . . special effects are fundamentally the art of compositing. They are layers superimposed in space, or in time. By space I mean matte backgrounds; by time I mean substitutions" (213-215). Spectacles can be seen as special effects used in order to spark or induce a heightened emotional reaction from an audience.

The action film can be described as being one of the most popular and the most popularly ridiculed of contemporary genres. In conventional speech, the action genre is criticized for the use of vivid, loud and dramatic scenes in place of an exceptionally well-written narrative. "As the critic Annabelle Vilaneuva put it, 'action movies don't even feel like movies anymore, they're little more than two-hour trailers for action movies'" (Higgins 74). Despite this, every summer, the onslaught of block-buster films bears testament to the genre's place in major studio economics. Action films have treated Hollywood astonishingly well. So much so that "[ten] of the twenty-five all-time, worldwide, top-grossing films are in the action genre …" (Higgins 74).

Critics and marketers of action films have jumped on the band wagon of the genre's success and have actually collaborated in establishing the genre as a "vehicle for sensation" (Higgins 74), and therein gave rise to the catch phrase description of the genre, suggesting that the audience should fasten their seatbelts and get ready for the "roller coaster ride" (Higgins 74).

2.4 Spectatorship and attraction

“A movie is not thought, it is perceived” (Singer 52). A heightened emotional reaction reveals to us that the observer is not simply a consumer, but an active or potentially active participant in the process (Monaco 126). An observer does not physically interact or move between scenes in a film, but does so visually through agency of the gaze. “The eye transcends the body to roam across the multiple viewpoints and scenes of fiction feature film. Metz called the cinema ‘a variable psychic substitute, a prosthesis for our primally dislocated limbs’” (cited in Miller 405).

Spectatorship was first addressed theoretically in the 1970s as a result on the impact of semiotics and psychoanalysis on film theory. Cinema was discussed as an apparatus and imagery signifier to explain the effects it had on spectators as they sat in the darkened theatre with their gaze fixed upon the screen. Toby Miller in his reading ‘*Historical Spectator’* believes the relationship between films and their viewers is perhaps the key to film theory, and it is referenced under many rubrics. There are two main forms of analysis: audience research and spectatorship theory. The audience is seen as artificial, the creature of various agencies that then acts upon its creation. As John Hartley says: “The energy with which audiences are pursued in academic and industrial research bespeaks something much larger and more powerful than the quest for mere data... the quest for knowledge about it is the search for something special; literally, knowledge of the species” (Miller 337).

But what exactly is an attraction? Giraud describes it as the “captivating and sensational element of the program.” Or, as Gunning remarks, it is a moment of pure “exhibitionism” characterized by an implicit acknowledgment of the viewer’s presence, a viewer who is directly confronted in an exhibitionist manner. The attraction is there, before the viewer, in order to be seen. Strictly speaking, it exists only in order to display its visibility. As a rule, attractions are momentary, if not instantaneous. Gunning says that “‘they can be defined as an immediate presence.’ In other words, he comments elsewhere, an attraction is ‘an element which surges

up, attracts our attention, and then disappears without developing a narrative trajectory or a coherent diegetic universe'" (cited in Gaudreault 95-96). Therefore, it can be concluded that attractions are in fact spectacles, however this report demonstrates in the conclusion section under Chapter 5 that spectacles can in fact aid in narrative trajectory and are not just elements that only surge up, attract and disappear without developing narrative.

The attractions found in kine-attractography, which is described as virtually the entire body of film subjects of the pre-1908 period, in other words subjects that tended to show more than they told often even formed part of a narrative infrastructure. Kine-attractography is established when script is used in order to connect effects that are not related to one another, a view of visual narrative action based on the notion that only images are displayed. It was first referred to as cinematographie-attraction by early historian G.Michel Coissac. Méliès remarked: "We might say that in this case the script is nothing more than the thread for tying together the 'effects,' which are not closely connected, the way the announcer in a variety performance is there to link scenes which have nothing in common with each other" (cited in Gaudreault 96). Conversely, narrative cinema is often riddled with attractions. Indeed these are present, often on a massive scale, in popular entertainment films, even the most recent; this is especially true of adventure films, musical comedies, suspense films, science fiction films, etc. (Gaudreault 96).

One can conclude that if Eisenstein's theory of attractions is the 'peak moments' of acts in a circus, and if Sobchack's taming of attractions is compared to the taming of wild beasts in a circus, then one could associate Gaudreault's theory of kine-attractography as a ringmaster personified. A ringmaster is there to tie together or introduce different acts that have nothing to do with one another.

In the furtherance of spectatorship and cinema apparatus, Linda Singer's '*Eye/ Mind/Screen: Toward a Phenomenology of Cinematic Scopophilia'*, finds placement. The aim of her research was to analyse the aspects of cinematic experience so as to suggest how the visual situation is reinstituted in a way that produces the emergence of cinematic pleasure as

significant. Part of the cinematic experience is placing oneself in an environment that demands the full attention of the individual. The individual is encouraged to suspend all reality and allow himself to be completely submersed in an array of visual stimulation. Thereby giving himself "over to the flow of appearances that seem to emerge spontaneously before [him]... Part of our cinematic pleasure lies in our availing ourselves of an occasion to abandon ourselves to the moment of vision in its laterality in conditions of relative serenity and comfort" (Singer 54). The cinema itself is not without mention. The framed space of the screen provides a "strict intentional field of relevancy" to such an extent that to the individual all that matters at that moment is what happens on the screen (the framed space) and this "helps determine the character and trajectory of our visual intentions" (Singer 54). In a manner of speaking, the power behind the whole cinematic experience is to build a context where one cannot help but be overcome by what happens on the screen "and thus to compel our complicity with its limits and logic in their difference, without calling attention to it as such" (Singer 54). Part of the cinematic experience is that the members of an audience's beliefs are suspended and their desires find life on screen. Spectators appreciate the materialization of their imaginations on screen and because of this are willing to suspend reality, thereby creating the basis of pleasure and fascination. Part of this pleasure and fascination lies in the cinema's ability to relieve the spectator of the burden of choosing what to observe, "since the choice of what is worth seeing and how it is seen has already been made and is reflected in the way the film unfolds" (Singer 62).

> The cinematic situation, therefore, is conductive to the production of visual pleasure by providing vision with an occasion and a reason to emerge as an activity of fascinating, infatuation, and contagion … In the movies things often appear before us larger than life in a darkened room which focuses even greater attention upon them... such environmental and social factors could not sustain

> the demands of vision unless that vision were somehow engaged and involved by what unfolds. (Singer 57)

The camera is indifferent to the nature of what is being recorded and because of this its recording ability can be dissected into a variety of functions that can be varied at will and independently with the purpose of intensifying the potential of a situation. “The camera can intensify or concentrate the force of visibility and in so doing dramatically alter the character of appearances because it is not attached to them”, unlike with human sight where we are unable to detach our eyes and the camera is an extension of the desiring eye, emphasizing our eye’s restrictions by offering up various opportunities of seeing, “and thus is amendable to more direct and dramatic forms of control” (Singer 57).

2.5 Suspense

What are the contributing factors to suspense in film? These factors will be investigated and compared to see if time slicing relates to any of the contributing factors toward suspense in order to determine the relationship between time slicing and suspense in contemporary action cinema. Aaron Smuts’ *‘The Desire - Frustration Theory of Suspense’* argues for a theory called the desire frustration theory of suspense, “which holds that the frustration of a strong desire to affect the outcome of an imminent event is necessary and sufficient for suspense” (281). People feel suspense when they fear a bad outcome, hope for a good outcome, and are uncertain about which outcome will come to pass. “If there is no uncertainty, there can be no suspense. Similarly, if nothing is at stake, there can be no desirable or undesirable outcome, hence no fear or hope, and consequently no suspense” (282). Noel Carroll in his book, *‘The Philosophy of Horror,’* shares an equal view of suspense by defining it in terms of morality and desirability; “it occurs when an event has two very clear, opposed potential outcomes, and the evil outcome is most likely” (cited in Higgins 93). Smuts discusses what could be the ultimate reasoning behind the incorporation of time slicing and suspense. Slowing down suspenseful situations in action films creates frustration by delaying the outcome. “At root, frustration is a matter of impatience

and this is probably why suspenseful events need to be imminent... we are often not so patient, and when our ability to satisfy our desire for a particular out-come [sic] is frustrated, suspense is the typical result" (286).

"The intensity of our feeling of suspense seems to rely on two factors of an event's outcome: its uncertainty and the significance of what is at stake" (Smuts 282). Smuts remarks that it may seem obvious that uncertainty leads to feelings of suspense but even movies that are based on events with known outcomes to the audience can also be suspenseful. Yanal argues "that it is unquestionable that uncertainty is required for suspense. Often suspenseful narratives include many surprises, and one can feel suspense if they think a surprise is up ahead" (cited in Smuts 283-284). An audience could be unaware of the surprise and it too will lead to shock and heighten the suspense even though, as Yanal states, the connection stops at the prospect of surprise leading to some suspense. But it can also be true if an audience is aware of what is about to transpire. "One may know the outcome of a narrative... but still want to see it take place" (Smuts 286).

According to the desire-frustration theory, narratives are extremely effective at creating suspense because, unlike real life, where we can actively work towards the satisfaction of a desire, we are completely powerless over narrative. "Our inability to affect narratives is often something we are aware of - and something that masters of suspense frequently exploit" (Smuts 285). When the audience realises that their desire to affect the outcome of the narrative will have no effect of the outcome of the film, this realization translates into suspense. The level of care has a direct effect on the degree of suspense felt, and as such there can be no middle ground. One has to be totally invested in an outcome whether it is bad or good. The degree of suspense also has a very real impact on human lives or character that spectators have become attached to in relation to actual situations, thereby affecting one's efficiency by frustrating our ability to work towards the desired outcome. "In addition to a strong desire, the event one cares about must be imminent" (Smuts 284). Time slicing is a culprit of this theory as it guides an

audience through the narrative via editing and montage. The audience is helpless to act upon what is presented before them due to the abandonment of their gaze.

Higgins' discussion on suspenseful situations within action feature films throughout his reading *'Suspenseful Situations: Melodramatic Narrative and the Contemporary Action Film,'* seeks to find a more accurate understanding of the action film genre as a vehicle for storytelling. Higgins discusses this by means of comparing nineteenth century theatrical melodrama, contemporary action cinema and the similarities there of. Action films "appear to offer something distinct from classical narrative as it is commonly defined, but they are not wholly divorced from Hollywood tradition, nor are they necessarily anticlassical or nonnarrative" (74). One method for understanding the distinctiveness of the action genre is found in the theory of melodrama. The theory is derived from the study of feature film making in the 1910's *'From Theater to Cinema'* by Brewster and Jacobs. The study documents the close relationship between nineteenth and early twentieth century stage melodrama, and the development of the feature film. Brewster and Jacobs describe theatrical melodrama as a form "'dominated by the aesthetics of spectacle,' providing the terrain on which early feature filmmakers would work. Part of that terrain was characterized by a model of narrative as a series of pictorial, sensational moments, or situations" (cited in Higgins 77). This is similar to our previous discussion on the tension between the relationship of spectacle and the action genre feature film. Brewster and Jacobs tell of how the method of situational dramaturgy was a critically infamous, but lucrative way of generation narrative from spectacular situations. "Situations tended to be discrete moments, often moments of suspense or deadlock when characters are arranged in seemingly inescapable dilemmas" (cited in Higgins 77). The responsibility of resolving these situations was that of playwrights, which usually produced weak narrative with loose plausibility and broad environments for coincidences. This task was usually aided by playwriting manuals that provided various situations that could be united together.

> Perhaps the most influential, and certainly the most accessible, is Georges Polti's 1895 book '*The Thirty-Six Dramatic Situations'*. Polti challenged playwrights to construct more original plots, a project he undertook not by stressing creation of original scenarios, but by laying out a taxonomy of situations to foster the 'Art of Combination' … Polti declares that there are 1,332 possible combinations. (Higgins 76-77)

It would appear that situations are used as building blocks for action genre features and in the case of nineteenth century melodrama, they were both building blocks of plot and occasions for spectacle. "By the end of the nineteenth century, the emphasis on sensational situations was such that plays would be built around the effects that a theater could stage. A new method for staging an earthquake might occasion the development of a plot that featured a natural catastrophe" (Higgins 78). Not only were situations used as building blocks in plays, but they are used in relation to the action genre features, particularly suspenseful ones. Brewster and Jacobs explain that situations should not be seen as only associated with narrative or spectacle, as they are actually linked. "'Rather the term crosses this divide'. Such was the approach that early feature filmmakers inherited in the 1910s, and that led George Polti to proclaim in his conclusion 'the Dramatic [is] a language not of words but of thrills'" (cited in Higgins 78).

The situation of "the standoff" commonly found in contemporary action feature films is seemingly inherited from nineteenth century melodrama where good and evil lock horns and neither are able to strike. The situations may be parallel, but the innovation in contemporary action cinema lies in discovering unique methods of solving them. "As with the nineteenth-century melodrama, such situations are the stock and trade of the contemporary action film. Innovation lies in motivating and resolving them" (Higgins 80). Contemporary action cinema may not compliment and mimic nineteenth century melodrama directly, but "it has developed its own quite specific set which is open to combination and modification … the action film almost

invariably favors those situations that generate suspense in the face of physical danger" (Higgins 81).

"The suspense situation may be the most classically inclined of the melodramatic situations, and it thrives in the genre that most consistently delivers blood and thunder to contemporary viewers" (Higgins 93). This contemporary genre in discussion would be action, which can be easily identified by contemporary spectators. Another manner of increasing suspense is through parallel editing, where two simultaneous plots unfold during the same time frame and both play a significant role, fatefully converging and determining the climax or outcome of a film, as argued by Gunning: "D. W. Griffith developed and exploited parallel editing to create races to the rescue that were visual equivalents to melodrama's sensation scenes" (cited in Higgins 94). An example of this is pointed out by Higgins and can be found in the film, *The Matrix* (see fig. 2).

> *The Matrix* (Andy and Larry Wachowski, 1999) engages this situation with brio. Trinity (Carrie-Anne Moss), Morpheus (Laurence Fishburne), and Tank (Marcus Chong) must recall Neo (Keanu Reeves) from the computer program before he is destroyed by agents, but they face an additional deadline imposed by approaching sentinel robots, who can be disabled only by an Electro-Magnetic-Pulse that will disrupt their ability to rescue Neo. In this case, the seemingly inescapable situation is resolved, in true melodramatic fashion, by cupid-ex-machina. Trinity admits her true love for Neo and, with a kiss, resurrects him from death, granting him the power to control the matrix. Like the standoff, the race against time provides a well-defined formula for launching and elaborating spectacle. The exploding buildings, islands, and planets are not "attractions" distinct from narrative, but pictorial punctuations of last-minute reversals and resolutions; spectacle is part and parcel of a kind of narrative construction that favors sensational situations. (82)

Fig. 2. *The Matrix*. Dir. Andy and Larry Wachowski. Warner Brothers Pictures, 1999. DVD

Chapter 3 Case Study

Bullet time and *The Matrix*

The case study observes the digital techniques behind the scenes of the bullet time effect in the Warner Bros. Entertainment Inc. 1999 science fiction action feature film, *The Matrix*, directed by the Wachowskis. The feature is set in a future controlled by sentient machines that have captured most of humanity, by subduing them in a simulated reality called “the Matrix” in order to harvest their bodies’ heat and electrical activity to be used as energy. A group of rebellious humans who know this truth seek out a computer programmer named Neo, whom they believe to be “the One”, who will fulfil the prophesy, free humanity from the machines and bring peace to the world.

The visual effects of the film have played a significant role in determining the ground breaking perspectives, ambience and establishment of the bullet time scenes at the time. This section analyses the work of Manex Visual Effects in *The Matrix*, specifically the inventor of bullet time and visual effect designer, John Gaeta. Manex Visual Effects was a motion picture special visual effects company located in Alameda, California. Though a small company, their creation of bullet time for *The Matrix* has been highly influential resulting in international recognition including two Best Visual Effects Oscars and one Academy Award for Technical Achievement. The practical component of this research paper will be compared with a scene from *The Matrix* to conclude whether it is possible to attain similar standards of time slicing in feature film compositing on a budget.

Bullet time was invented by John Gaeta specifically to be used in the film, *The Matrix*, but Muybridge’s work is seen as a precursor to this. The revolutionary method used, “was that time could not only be suspended but that you could also create an infinite sense of space because you could potentially look at anything anywhere from any angle all at the same moment” (Douglass “Eadweard Muybridge and The Matrix”). Where Muybridge’s cameras were arranged in a linear array, Gaeta’s breakthrough was that the cameras were arranged in a ring

around a central subject matter and all the cameras could either be triggered simultaneously or sequentially. “Gaeta and his team ended up using up to 122 digital still cameras rigged in a circle around the actors. At both ends of the arc Gaeta placed high-speed photosonic motion-picture cameras, which can take more than a thousand frames per second” (Røssaak 324), with the aim of being able to show the images of frozen time consecutively, as film. The high speed cameras were used to transition spectators in and out of the bullet time effect from bullet time speed, to frozen time and back to normal time. What is most notable is that the effect occurs at times of spectacular and suspenseful action. “The effect is used in scenes where the action is fast, extreme and involves life-threatening interactions between the characters” (Røssaak 324). With bullet time, “[space] and time seem to switch places... Time is opened up and explored spatially outside time” (Røssaak 324). Gaeta had the idea that if this was done, the outcome would result in a single moment that was suspended in time and you would be placed in a position to gather more information of the subject matter than would normally be allowed. “If there is no time, space is effectively infinite and overlapping” (Douglass “Eadweard Muybridge and The Matrix”).

As stated above, bullet time is a visual effect obtained by a mixture between time slicing and a 360-degree camera spin aspect around a central subject matter or focal point. The bullet time effect was originally achieved photographically by a set of still cameras surrounding a central subject as can be seen in fig. 3.2. The cameras are fired sequentially, or all at the same time, depending on the desired effect:

> It is easier to use several cameras that have a static position and produce a virtual illusion that the viewpoint is roaming around the character. These cameras can then... be controlled to shoot simultaneously and create a frozen moment or within a fraction of time to produce a rotation around an object moving in super slow motion. (Andersson and Olofsson 12)

Andersson, the Olofssons as well as Douglass guide us through the pre-production procedures of bullet time, but Røssaak further elaborates on the post-production involved after the raw stills have been captured. Single frames from each camera are then arranged and displayed consecutively to produce an orbiting viewpoint of an action frozen in time or as hyper slow motion.

> The principal of this effect is to make a strip of film by using a series of still cameras instead of an ordinary movie camera. The complex mode of production also demonstrates the aesthetic negotiations at play. The effect mixes analogue camera techniques (Muybridge style) with digital interpolation and virtual camera techniques. (Røssaak 323)

The accelerations or decelerations of bullet time also allow spectators to transition between other art forms just as the characters are able to move in and out of the Matrix.

> The play of time and space in the bullet time effects works beautifully with the characteristic in-between-ness of the whole film. We follow a group of hackers into cyberspace, the matrix. We are in a world that obeys laws and speeds of a different order. We are in a way both inside and outside time or in the interstice between our communications and representations, inside the networks that condition what we see and what we can say. The film needed a new kind of special effects to mark this space. (Røssaak 324)

This is where Manex Visual Effects came on board. John Gaeta and Janek Sins teamed up with the Wachowskis in the summer of 1996. “They knew our reputation for doing specialized photography - building unusual rigs and bringing eccentric approaches to motion control - and approached us with the idea of doing something unique photographically” (cited in Martin 69).

The Wachowskis’ approach to numerous aspects of the filming of *The Matrix* was unique in that it incorporated

> ‘subtle, near-subliminal nuances into the film’s design,’ remarked Gaeta, ‘along with bold effects that jump off the screen. They played with shutter speeds to accommodate motion blur for different frame rates. They’d shoot a rehearsal, then have it speed-warped in After Effects at a variety of frame rates. They utilized 300-frame-persecond cameras on set for every day of the shoot. All of these techniques and alterations in time created new physiological and psychological moments for the audience.’ (Martin 69)

By the time the filming of *The Matrix* was well under way, similar frozen time/time slice effects had been developed by a number of facilities for use mostly in commercials. However, because this effect was highly innovative, it was still in its infancy. These processes involved a great deal of still cameras being fired at once with the aim of capturing a subject in motion and when these still images were joined together the result would be the viewing of the time frozen subject from a variety of different perspectives. Often high levels of image interpolation were used to lengthen the frozen moment to the desired duration (Martin 70). Interpolation is the process whereby new frames are constructed within the range between captured, existing frames. Interpolation eases or smooths the transition from one frame to the next, thereby lengthening the duration and fluidity of a sequence/shot.

When Morpheus is held as a captive in a building, Neo is confronted by a Matrix agent on the rooftop. The agent is able to easily able to out manoeuvre Neo’s gunfire by moving “in a dazzling blur of speed, before retuning it with some of his own.” The agent manages to move so fast that he seems to morph or separate into 6 different guys, “[creating] the agent in ‘bouquet’ form, as Gaeta described it. Without even realizing what he is doing or just how fast he is doing it. Neo dodges the incoming bullets” (Martin 85), triggering the bullet time sequence responsible for inspiring this research report. Where the audience is taken on a 360-degree scan of the entire rooftop with Neo’s now iconic back bending acrobatic manoeuvre, before Trinity dispatches the agent with a point blank round to the head (see fig. 3.1).

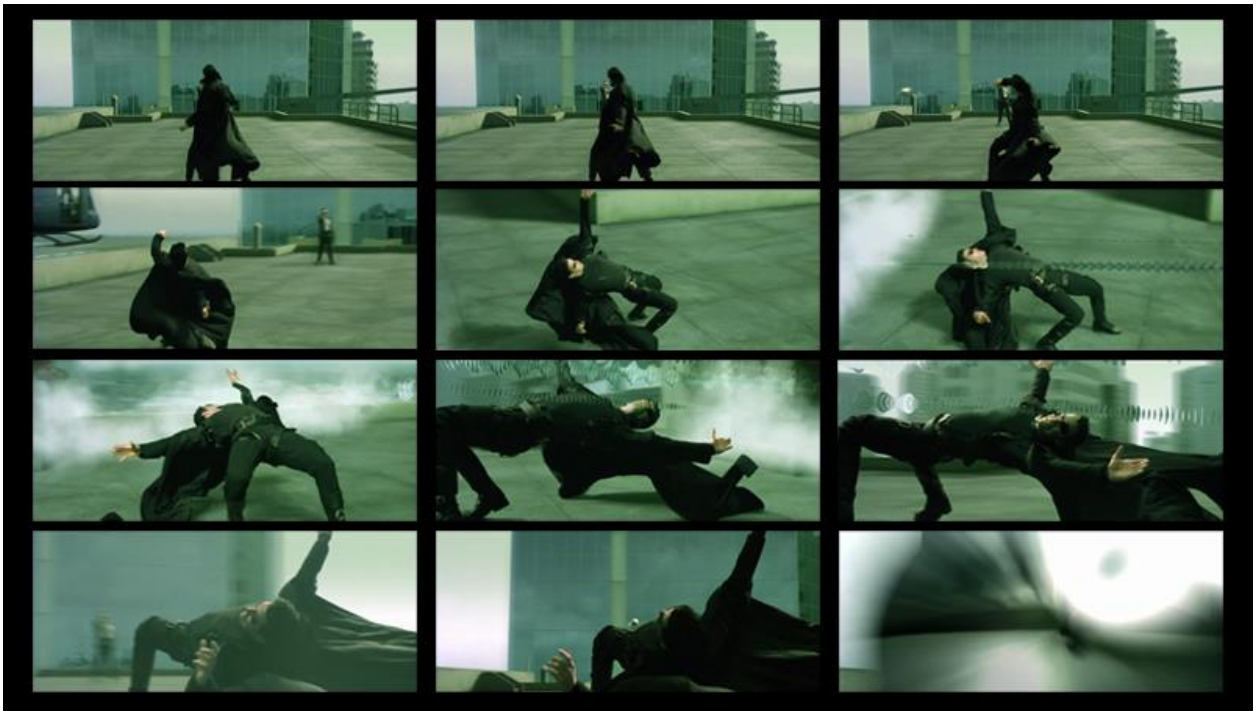

Fig. 3.1. *The Matrix*. Dir. Andy and Larry Wachowski. Warner Brothers Pictures, 1999. DVD.

The rooftop scene was created by layering various digitally produced effects on top of a live captured rooftop. The various layers included a green screen 360 degree, spiral bullet time of Keanu Reeves, re-created 3D elements of the physical rooftop in Autodesk Maya, such as the helicopter, an adjacent reflective building and an assortment of dead bodies in CGI by lead bullet time technical director Gerard Bertlamin Pierre, together with technical supervisors George Borshukov and Daniel Sunwoo, and composited by Tom Proctor (Martin 86). John Gaeta acknowledged, “The coolest part of *The Matrix* was that we could capture the best in nature, shooting reality in the form of locations and sets, then attach our own stylization atop that, transforming real-world Imagery in a way that lent a sense of authenticity to these virtual backgrounds. The techniques used to depict the movie’s defining moments were. In a sense, what the movie was all about” (Martin 89).

As part of the practical component, the information contained in this chapter has resulted in the creation of a time slice that followed similar techniques and fundamentals to that of *The*

Matrix. The practical component has applied these concepts in order to illustrate how they are utilized to amplify dramatic tension, or suspenseful situations in contemporary action films. Please refer to the accompanying discs to this research report for high quality colour images, the short film *Temps Mort* or project files.

Fig. 3.2. Martin, Kevin H. “Jacking Into the Matrix.” *CINEFEX* 79 (1999): 71. Web. 20 July 2012.

Chapter 4 Practical

Temps Mort time slice

This chapter of the research report will present the construction of the practical component, as well as a discussion around the possibility of setting up a low budget version of the time slice process. The methods of the practical component included the following:

- Setting up of equipment that will be listed and storyboard planning.
- Capturing live action footage of a dramatic scene in real time with existing environments using various filming techniques.
- Editing the footage into a coherent montage.
- Adding time slicing at a peak moment in the scene.
- Creating 3D elements to be added in during post-production for spectacle.
- Matching the camera movements via tracking software so that 3D elements will visually match up with the captured footage and not appear out of place.
- The final rendered scene will consist of a time slicing composition inspired by the bullet time effect in *The Matrix* of a slow motion pan between two conflicting individuals using a bullet to drive the footage of the scene from the barrel of one character's gun into the head or chest of the other. Ending with a time slice of the fatal impact resolving the situation or conflict.

The practical component is a culmination of the theories, concepts and findings discussed in the research report and provides a practical application for the body of research. Adobe After Effects and Maxon Cinema 4D were utilised as creation tools, as well as their capabilities but the report does not go into details pertaining to the programming behind the software as much as the tools and settings one can apply in the software to achieve a result of high quality. Adobe After Effects is a widely available compositing package and Maxon Cinema 4D is highly compatible with Adobe After Effects. The practical report concentrates on the use of

Adobe After Effects as it is used in the post-production process of interpolating the captured footage and stills into the time slice sequence effect. Maxon cinema 4D aided in adding in the extra 3D VFX elements for added spectacle, but is not crucial in the creation of a time slice. We could use any other compositing or 3D software because as was stated before, the principles whether it be for commercial or feature film use still apply.

With experience in a multimedia and three-dimensional (3D) animation background, where the study of motion also takes place, the discussions will focus around the aesthetics of the final product and the technology involved, where "one must be able to believe that everything in the scene was photographed at the same time, by the same camera" (Brinkman 2). If the casual movie attendee is unaware that the final composition is a collaboration of different elements, then the goal of creating a quality seamless composition on a budget will be accomplished, making it an invisible art.

A problem with a low budget uncontrolled environment is that when shooting live, the background is there at no cost, whereas with a controlled green screen environment as used in *The Matrix* is added in later during post-production, which increases costs. Another hindrance is that you cannot erect a 360-degree rig with a live background because the rig will become visible in the background of your shot, behind your subject matter. Editing or painting the rig out with a captured background already in the shot is rather difficult and would also increase production costs.

This issue was avoided in *The Matrix* by capturing the actors separate to the background and covering the rig of cameras with sheets of green leaving only the camera lenses exposed to capture the actors' movements as seen in the bottom left image of fig. 3.2. After keying out/removing the green, the lenses would then need to be later removed in every captured frame to leave a clean plate of only the actors which could then be comped into a tracked 3D projected background. Another alternative is that one could possibly set up a 360-degree time slice rig low to the ground with the focal point of the cameras situated higher than the height of

the cameras on the rig eliminating the problem of having the opposite end of the rig being visible behind the actor or subject matter in the time slice.

The short film contains minimal dialogue as focus will be towards visuals and not sound. Sound is included in the form of ambient noise and music which adds to the film and the suspense. It gives a sense of completeness to the film even though it is not the focus. Text and dialogue is in English, because it is universal, most of the information is visually mediated in the film.

Other processes for recording the short film included developing a script, detailing a storyboard, scouting locations, auditioning actors, hiring crew and equipment in order to film the short film. The drafting of the script was particularly fun and challenging as it included many “Easter eggs” (hidden messages or elements from the research report that feature in the short film *Temps Mort*) found throughout the research and having the narrative revolve around the theme of time.

There has to be a background narrative to the film as there cannot be an effect without the cause and vice versa. One cannot simply show the climactic scene without first engaging the audience and building up to it. The “ride” is needed. A gradual acceleration is needed. Spectators would enjoy the climactic spectacle of the time slice, but question why the stand-off occurred in the first place without an informative narrative.

The original strategy was to have a rig constructed that could support around 20 Samsung phones or GoPros through their HD recording functions to record the actor being impacted by a bullet (see fig. 4.1). The process intended on setting up a series of the camera phones or devices on a 6m long arc rig around an actor, ensuring all of the devices were set to the same settings and have them record the scene from different angles. There would be no triggering method insuring all the devices started recording in unison, thus there would have needed to be a reference point so that the footage could be lined up in the post production process. The reference point would have been created through the use of a clapper board by

marking a take that would be easily located in the audio levels of the footage from each device. After trying to gain assistance through various lines of communication, Samsung and Canon were unable to assist or did not reply with regards to assisting in supplying cameras or cellular devices with the original approach. Omnico, who is the official distributor of GoPros in South Africa, were also contacted with no response. Trying to have a rig constructed to support the camera devices was also unsuccessful. Many engineers were initially willing to help, but would continuously delay and ultimately disappoint when it was time to help even if they were offered compensation.

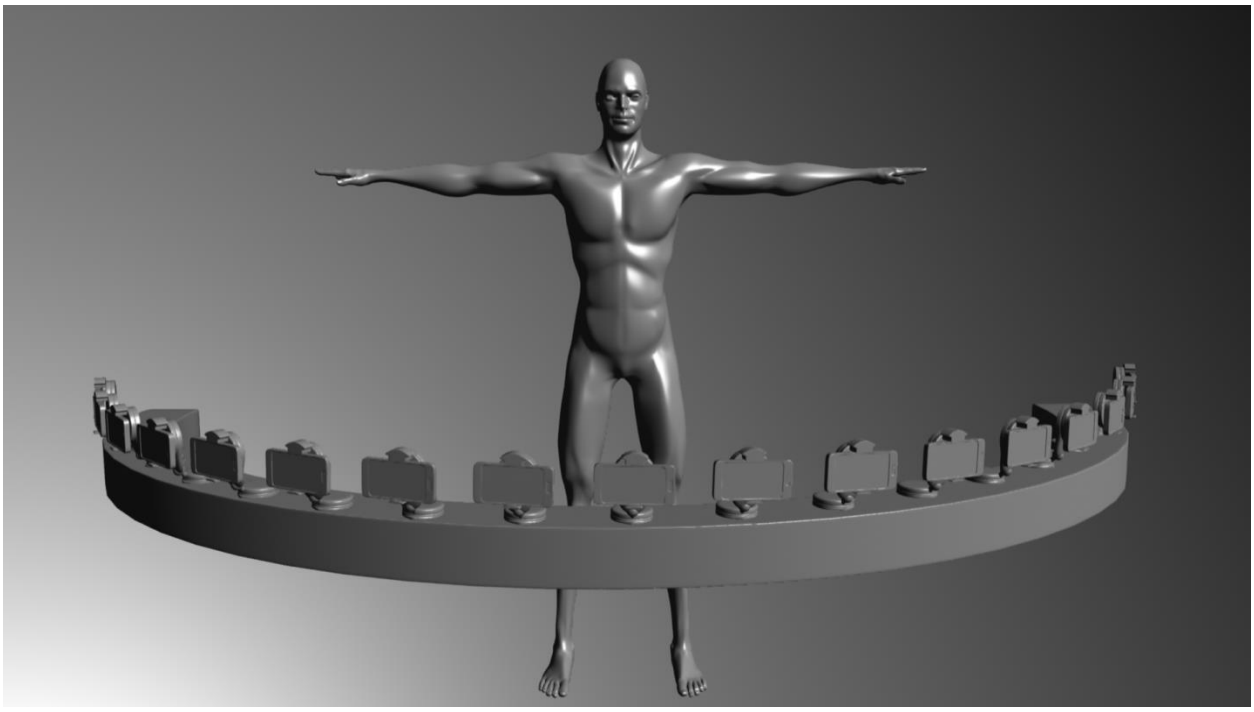

Fig. 4.1. “Originally proposed time slice rig with camera phones.” 2016. Author’s rendering.

Luckily assistance was obtained from a local company, Timeslice Cinematography South Africa that specialises in the traditional application of the time slice effect and was able to come to an arrangement. To hire a professional full 360-degree time slice rig for a day at present (2015) can cost roughly R120, 000.00 which is still rather expensive and not accessible to low budget film makers and students. Timeslice Cinematography South Africa proposed a 10 camera rig that would cost R11, 000.00 including insurance. The rig would still allow me to gain

the effect and aid my research. I was supplied an extra camera body and lens in case any of the arranged 10 had any faults; thankfully they all worked and I was able to include the extra camera onto the rig giving me a total of 11 cameras for capturing stills. Two more cameras were additionally positioned at either end of the arc for capturing footage. A LUMIX GH4, recording 60 fps was positioned at the start of the arc to capture the actor's actions in slow motion and a EOS 550D recording 25 fps was positioned at the end of the arc to exit the time slice. The time slice arc was erected and, supported by 4 combo stands, then secured in place with mafer clamps that were distributed evenly throughout. Refer to fig. 4.5 for schematics to the final arrangement of the time slice rig used in *Temps Mort*.

The following is a brief check list for setting up the time slice rig and the EOS 1100D cameras that captured the stills. For detailed information on the setting up of the cameras, please refer to the Canon EOS 1100D Manual online. A 5 – 6 hours set-up time is required, but this research showed that it is imperative to dedicate an entire day to focus on getting the best results possible for the time slice effect. It is highly important that every single camera on the rig is setup identically to one another. The following was the procedure:

- Check auto lighting optimization off;
- Focus always on manual;
- Picture style neutral;
- Picture quality large JPEG or Raw;
- Adjust the shutter speed and exposure depending on lighting conditions and how crisp or sharp the action is to be captured or recorded;
- F8 – F11 small aperture to capture fast motion;
- Set ISO to no higher than 1600;
- No flash;
- Number or label the SD memory cards to match their respective camera on the rig;

- Focal length 18mm;
- 15% around frame of field of view for action safety;
- Tape the lenses to the focal length of 18mm with gaffer tape so that there is no residue on equipment after removal;
- Assemble the rig first and level everything;
- Lock off the rig with sandbags so that it doesn't move easily during camera adjustments;
- Screw in camera heads at each incremental position along the arced rig and make sure they are locked;
- Attach cameras to each camera head on the rig;
- Look through the view finders to find the subject matter;
- Ideal distance away from the camera for the subject matter is 4 – 6m;
- Mark off subject matter's mark or position with an "x";
- Make sure actor is the same distance away from each camera in the array by marking off a 4 – 6m radius around the actor with chalk or tape;
- Set up two tennis balls that are joined along a length of rope, by hanging them above the actor's mark. The tennis balls are used as a stand-in for the actor while setting up.
- The top tennis ball marks the focal point of the subject matter/actor while the bottom tennis ball will aid in levelling the cameras;
- Keep the tennis balls still while adjusting each camera by securing the bottom of the rope to the ground with tape or a sand bag;
- While focusing the cameras, use the Live View mode with Grid display to center the top tennis ball exactly in the middle of the grid;
- Line up both tennis balls along the center vertical line of the grid in Live View to make sure the cameras are level;
- Use the zoom function in Live View to make sure that the top tennis ball is in focus;

- Once focused, tape off the focus on the lens as well.
- Label each trigger cable to the corresponding camera for easier trouble shooting.
- Make sure the cameras are off before connecting the cameras to the trigger box via the trigger cables to prevent unwanted firing.

Once all of the cameras were connected and switched on, it was time to begin testing. The first trigger of the cameras was used to “tease” the cameras “awake”, the second trigger captured the action after a 2 second delay from the first trigger to make sure all the cameras shot simultaneously, and that there was one unanimous shutter sound. If this was not the case, then the image sequence would have been out of sync with instances of the action appearing at different times and not one frozen moment. Another problem that rose was when a camera misfired. To correct this, visual markers were created to visually align stills in post-production or another solution was to be certain that the cameras were out of the Play Back window and ready to shoot before triggering as some cameras were delayed when triggered to shoot whilst still in the Play Back window. After testing, all of the SD memory cards were formatted, the tennis balls were moved out of the scene and the desired action with the actor could be captured as many times as needed. At this point it would have been beneficial to have someone check the captured images in post-production to see if any further adjustments were needed before de-rigging. But the whole process was rather time consuming and more time should have been invested in making sure that the entire process was performed as best as possible.

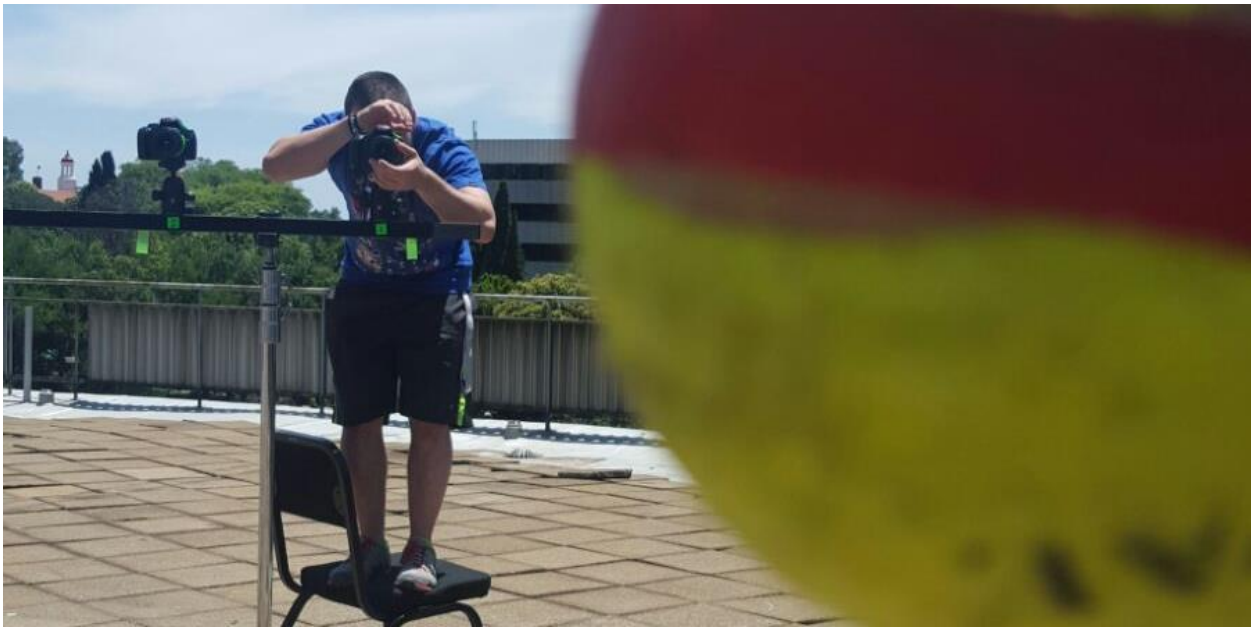

Fig. 4.2. Focusing camera on tennis balls, Johannesburg. Personal photograph by Fisher,M. 29 Nov. 2015.

Fig. 4.3. Trigger cables and trigger box, Johannesburg. Personal photograph by Fisher,M. 29 Nov. 2015.

Fig. 4.4. Assembled time slice rig, Johannesburg. Personal photograph by Fisher,M. 29 Nov. 2015.

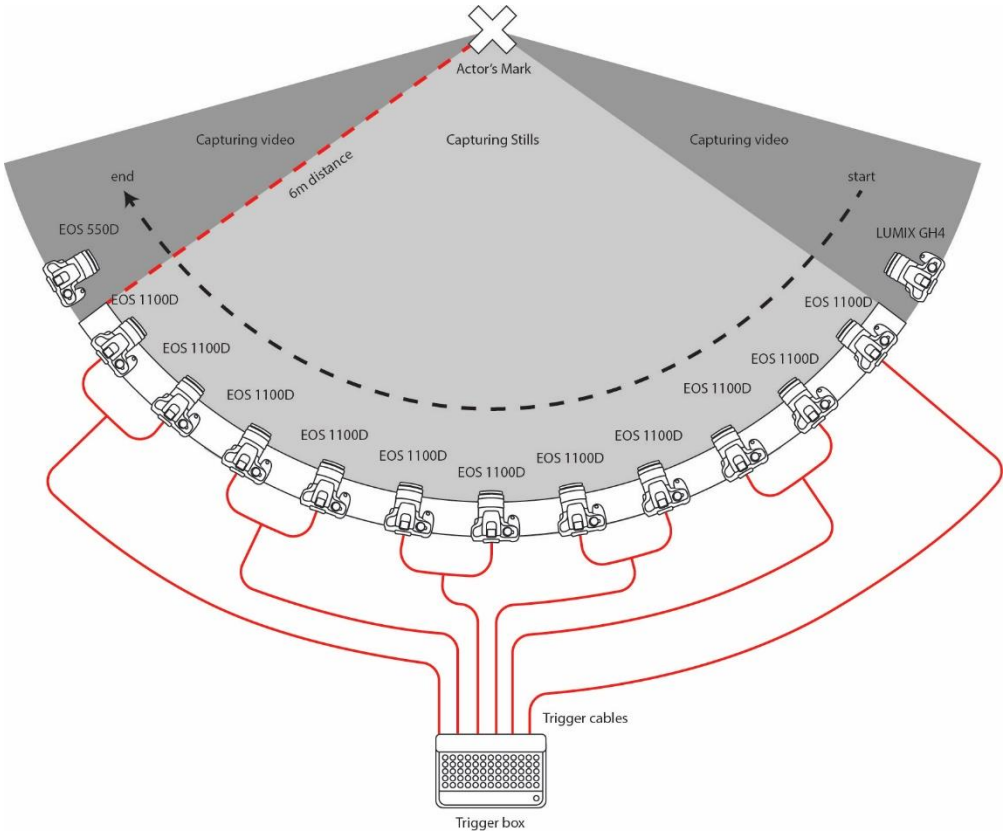

Fig. 4.5. "Diagram of time slice setup in *Temps Mort.*" 2016. Author's diagram.

Once the capturing of the time slice had been completed, individual pictures from the best sequence on each of the SD memory cards were collected into a separate, new folder and renamed in sequence in order for them to be correctly imported into Adobe After Effects. This included the video files of the two end cameras so that the correct sequence was apparent within the After Effects project window.

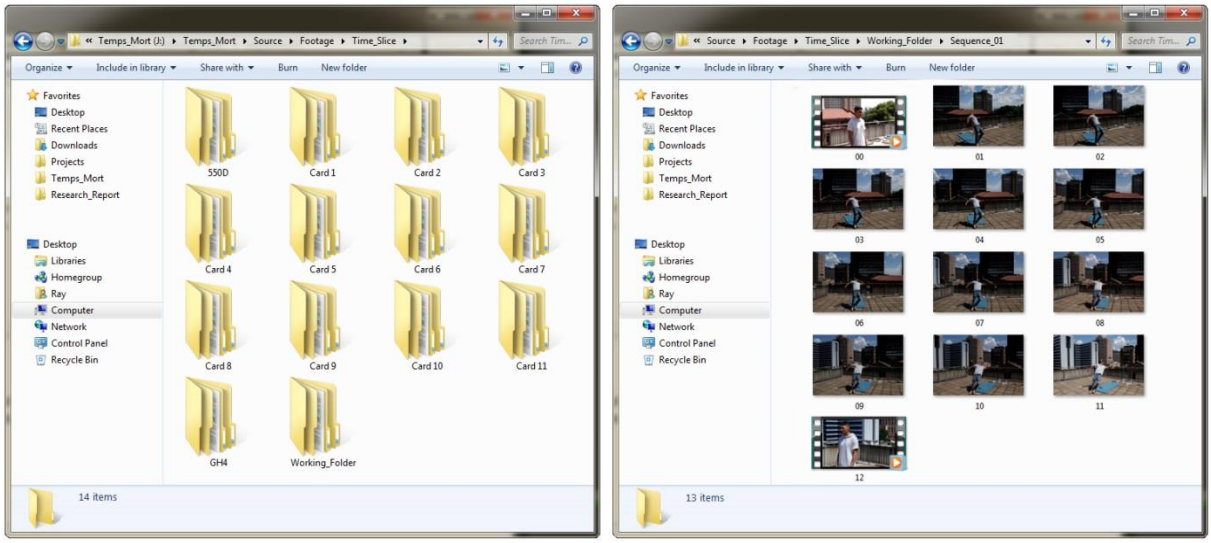

Fig. 4.6. “File organization.” 2016. Author’s screenshot.

After all the essential files had been imported into After Effects, a new composition named “time-slice_frames” was created for the individual frames or stills from each of the photographic cameras on the time slice rig to the exact resolution of the final film HD 1080 25 fps. Each still was re-sized, re-positioned (so that each still lined up correctly) and shortened to the duration of two frames to slightly extend the duration of the time slice. In order to quickly position the stills, on each separate layer sequentially on the timeline all the layers were selected by holding down shift, right-clicking over the layers, selecting “Keyframe Assistant” and selecting “Sequence Layers.” Then making sure that “Overlap” was unchecked and selecting “Ok” (see fig. 4.7).

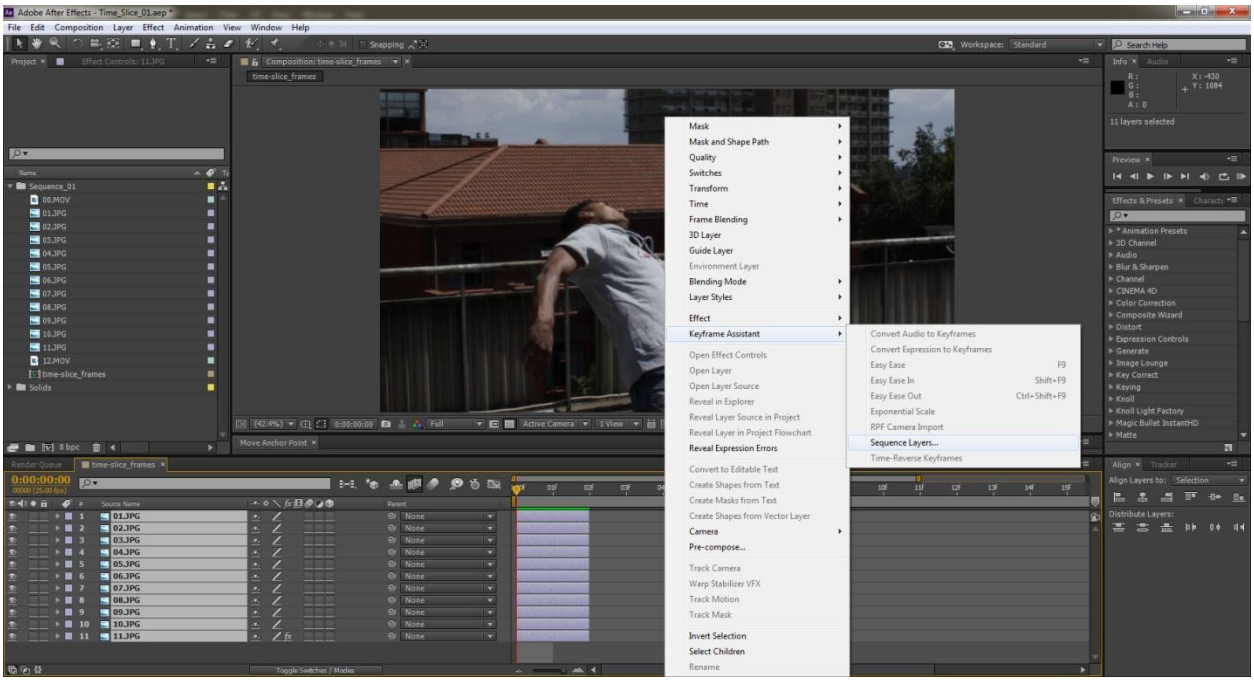

Fig. 4.7. “Importing time slice images into After Effects.” 2016. Author’s screenshot.

Fig. 4.8. “Sequencing images.” 2016. Author’s screenshot.

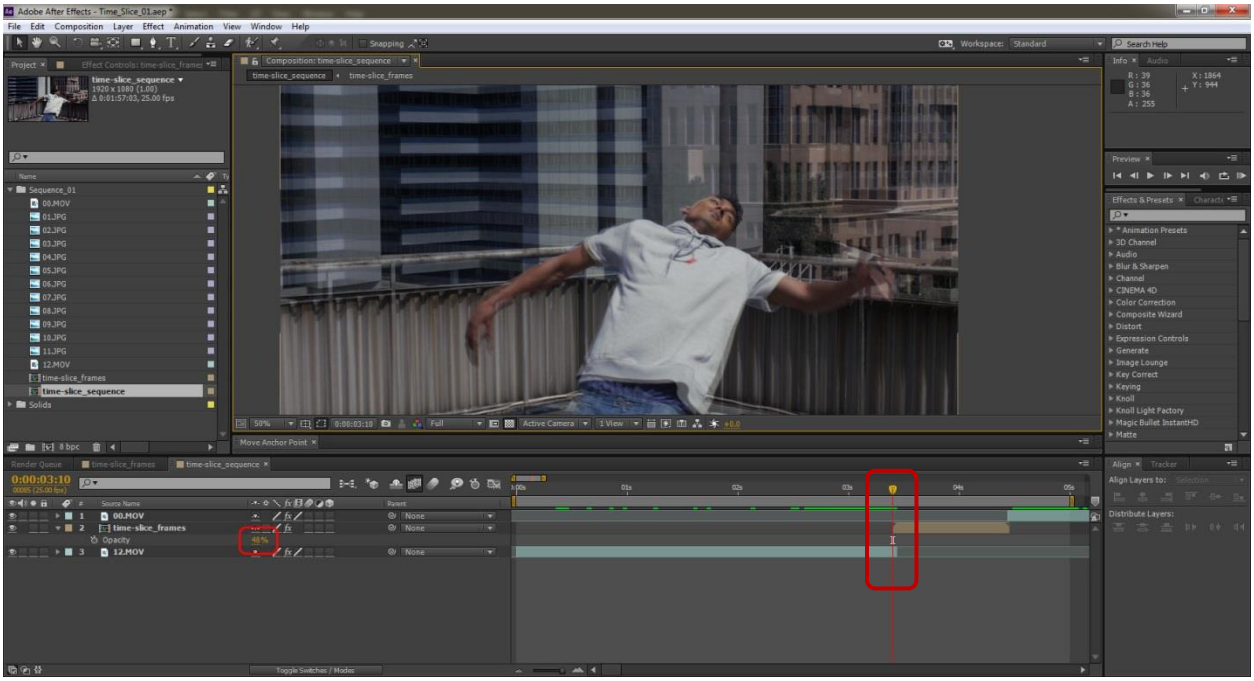

Fig. 4.9. “Lining up footage.” 2016. Author’s screenshot.

The “time-slice_frames” composition was trimmed down to the duration of the time slice sequence once the still photographs were arranged correctly and played-back sequentially. The “time-slice_frames” composition was then inserted into a new composition named “time-slice_sequence,” between the video recorded footage of the exact same take that the stills were captured in. This was done in a similar fashion to the photosonic motion picture cameras used on either end of *The Matrix* bullet time rig arc. This was performed in order to transition spectators in and out of the time slice and blend it into the rest of the *Temps Mort* short film. The slow motion footage from the LUMIX GH4 was lined up by lowering the opacity of the “time-slice_frames” composition and locating the corresponding frame visually, by dragging the LUMIX GH4 footage left and right in the time line before finding a frame that matched the starting frame of the ‘time-slice_frames” composition. The same process was performed to the EOS 550D footage in order to find the corresponding frames exiting the time slice sequence. I was also able to find the point at which the action was captured by the time slice rig by referring to the audio levels of the footage from the LUMIX GH4 or EOS 550D and locating the peak in

the audio levels representing the sound of all the cameras in the time slice rig firing at the same time.

The “time-slice_sequence” was pre-composited into a new comp named “time-slice_comp” so as to apply the effect “Warp Stabilizer VFX” to the “time-slice_sequence” composition. This effect aided in interpolating between the existing frames creating a smoother transition particularly between the frames in the “time-slice_frames” composition.

Fig. 4.10. “Applying the Warp Stabilizer VFX.” 2016. Author’s screenshot.

Once the time slice had been created, the scene was tracked and additional elements such as blood splatter, a 3D bullet and the bullet hole in Khron’s shirt were composited over the footage to create a much more visually spectacular death for Khron a seen in fig. 4.11. Refer to a bullet time inspired tutorial titled *The Bullet* by Video Co-Pilot.net’s After Effects artist Andrew Cramer for reference on how to include added VFX elements for spectacle such as the 3D bullet. The outcomes of this practical component will be discussed in the chapter that follows.

Fig. 4.11. “*Temps Mort*, Khron’s death VFX.” 2016. Author’s screenshot.

Fig. 5. “*Temps Mort*, Khron’s death.” 2016. Author’s image sequence.

Chapter 5 Conclusion

Analysis and outcomes

This section is comprised of discussions and an analysis of the outcomes from the practical component and the literary investigation and provides a conclusion to the research. The findings appear throughout the written component to identify the relationship between time slicing and suspenseful situations in contemporary action cinema and finally, if it is possible to achieve a high quality time slice composition on a budget. For a detailed description of the technical aspects and procedures undertaken, please refer to the previous Chapter 4 covering the practical component of the report.

Before embarking on the theory of suspense, slow motion and the action film genre, the author recreated a time slice that could be compared to that of the roof top scene in *The Matrix*. This was accomplished through the help of Timeslice Cinematography South Africa, Jono O'Connell and Nicole Phillips, who were graciously willing to share their knowledge of the technique and processes involved to ensure that the methods were correct and corresponded with industry standards.

The theories of film covered throughout Chapter 2 of this paper will be used as a lens within which to compare and contrast *The Matrix* and *Temps Mort* to identify the effect and relationship that time slicing has on: mise-en-scène, montage, professionalism, spectacle and ultimately suspense.

5.1 Mise-en-scène

The Matrix rooftop bullet time scene was syntagmatically captured as a continuous, slowly progressing, 360-degree shot achieved by slightly delaying each individual digital still camera in the series resulting in Keanu Reeves' slow movement while dodging bullets. The bullet time is initiated with a wide angle of a roof top with the camera positioned behind Neo as a Matrix agent tries to shoot him. The bullet time gradually arcs around him in a downward, spiralling revolution that ends with Neo dominating the frame as he performs his bullet dodging

acrobatics. The sequence works well at directing the gaze/focus of the spectator towards Neo; the audience is not aware of the guns which were previously there, as well as Trinity and guards who were disposed of, who are now not present in the bullet time sequence.

By comparison, in *Temps Mort,* all the cameras were triggered at once resulting in a track around a frozen moment of Khron being shot. *Temps Mort's* time slice was not as smooth and much shorter due to the limited level of interpolation between the photographed frames and limited amount of digital still cameras in the time slice array. Just 13 cameras in *Temps Mort* compared to *The Matrix's* 122 cameras.

Khron's death was deliberately framed on a rooftop, not only to relate to the rooftop scene in *The Matrix*, but the rooftop is open (without many distractions in view) and Khron dominates most of the frame. This helps by guiding the spectators to focus on the time slice of Khron's death in order to induce emotions of awe and shock as Ari murders her only sibling (see fig. 5). The induced emotions are specifically linked to the spectacle of the time slice and additional VFX of blood splatter.

5.2 Montage

Solnit mentions that, "[annihilating] time and space most directly means accelerating communications and transportation ... new communications, reproduction, and transportation technologies only continue the process" (Solnit 11). The purpose of a film is to mediate a message in a certain amount of time and montage is the means of modifying that time. Time slicing in this case study visually encapsulates information that is delivered in a visually pleasing, emotive and provoking manner. At the same time it captivates spectators and retains their attention which is an opportune moment to deliver information that influences the narrative of the film.

In the case of *The Matrix,* bullet time was paradigmatically included during the roof top scene to illustrate that Neo could potentially be "the One" even after he had been told otherwise by the Oracle (Gloria Foster). This is echoed by Trinity when she remarked, "I have never seen

anyone move that fast," after witnessing Neo dodge the barrage of bullets fired by a Matrix agent (see fig. 3.1).

The time slice in *Temps Mort* is the first pause in the film; there are slow motion moments throughout the short film but spectators had become accustomed to continuous, variably moving montage/pace up until this scene. The combination of slow motion and time slicing during Khron's death in *Temps Mort*, gives the audience time to reflect on what they observe. "There is something magical and intoxicating about the frozen moment" (Monaco 26). It was chosen to be done here specifically, to highlight the moment to spectators. To have Khron's death play back in real time would lessen the significance of the event and not allow a lengthier enjoyment of spectacle. Khron would be witnessed as merely dropping without being entirely aware of his flailing movements involved and spectators would not be able to appreciate the spectacle of the bullet impacting Khron.

One must take into consideration that both *The Matrix* and *Temps Mort* are motion pictures which are constrained by time. Within their allotted time, they are expected to tell a story, engage and entertain an audience. If they were to unfold the narrative simply through narration or character dialogue, these actions would draw out the storytelling process further as well as not necessarily immerse the audience. As discussed, in both of these motion pictures, the time slicing effect manages to convey narrative elements to drive the plot forward. While both of the time slicing scenes were relatively short, they manage to tell a large portion of story through this visual effect which ordinarily would have taken longer should other narrative techniques been used.

5.3 Professionalism

The time slice effect was attained in *Temps Mort* but not to the degree of quality as the bullet time of *The Matrix* roof top scene. With limited experience, limited budget, limited equipment, limited crew and limited time, these factors hindered the final product. Nevertheless, a basic example of the effect was achieved, gaining a great deal of knowledge and having the

opportunity to perform the technique in its traditional form. Prior experience, better planning and a better understanding of the post-production procedures would have benefited the final result.

Ultimately time slicing and slow motion are utilized in order to heighten emotions of suspense, and in addition evoke examination through montage and mise-en-scène. It is a culmination of techniques and theories discussed throughout the body of this research report with the aim to entertain through spectacle.

Improvements to the research could be attained by being involved in a project requiring the full 360-degree rig and documenting the processes of experienced professionals with time slicing, especially paying close attention to the interpolation software and methods used for accomplishing smoother movements in time slices.

Opening up a line of communication and interviewing John Gaeta would also give valuable insight into bullet time and discovering if there has been any further innovation since *The Matrix*. Scientific investigation into the effects slow motion and time slicing have on spectators' psyche could also be performed.

5.4 Spectacle

Gunning stated that attractions "'can be defined as an immediate presence.' In other words, he comments elsewhere, that an attraction is 'an element which surges up, attracts our attention, and then disappears without developing a narrative trajectory or a coherent diegetic universe'" (cited in Gaudreault 95-96). In response to the above statement, time slicing which in essence is an attraction/spectacle, in the case of this report shows that attractions can be a key component of narratives. Therefore, working hand in hand with narrative to enhance film progression. Examples of what the spectacles have done to impact and drive the story. Disproving Gunning's statement. McClean in addition believes that visual effects or spectacles are derived from the story in order to actually enhance narrative and it is in fact poor narrative that is to blame and not the over-powering imagery. "To make the accusation that 'technology swamps storytelling' – perhaps meaning that the effects are more interesting than the story – is

more a comment on the story than it is upon the technology" (McClean 3). Thus the attraction of time slicing either occurs as a result of narrative creating the opportunity for spectacle or it can be used as a plot building device.

5.5 Spectatorship

How does the audience react or how do the directors wish the audience to react? The short film contains minimal dialogue as the main focus of the film is on the visuals, which will be used as a narrative technique. As discussed earlier under the heading montage of this chapter, it is shown how the time slicing technique allows for the audience to experience the narrative through these time sliced spectacles. The spectacles in these motion pictures have unfolded the narrative in *The Matrix* as well as *Temps Mort*. By examining the visuals of both *The Matrix* and *Temps Mort,* this report proves that VFX and specifically time slicing are visual ways in which to build narrative.

The actual inclusion of spectacles in each motion picture indicates that the spectators' presence is being acknowledged as film not only mediates a message but also aims to entertain.

The time slice in *Temps Mort* was capable of briefly suspending the outcome of Khron's death. "[We] see slow motion shots inserted in the action to emphasize a small detail or elongate a particularly graceful trajectory of movement" (Sobchack 342). Suspense and death were converted into an appealing attraction while the twist in the plot results in the time slice twisting the audience around Khron at the moment his death. This was created in order to develop similar reactions in spectators as Peckinpah's slow motions, "to take our breath away with its beauty, but also to give us time to reflect on its allure, and turn exhilaration into examination" (cited in Peebles 48).

5.6 Suspense

The original premise of the practical component was to simply recreate the bullet time effect, but through research and findings in suspense theory, it became apparent that there

needed to be more narrative (a back story) included in the short film, *Temps Mort*. The back story of the characters and the building up of suspense was not the focus of this research, but as stated this needed to be included to build up to the time slice effect, setting out the roles of the characters in the narrative and why the standoff between them occurred.

As a starting point, a suspenseful scene that would lay the foundation of the time slice effect needed to be created for *Temps Mort*. This was achieved through a typical action genre film standoff between two opposing characters in a life-threatening situation, as this is one of the main requirements for suspense as stated by Røssaak: “The effect is used in scenes where the action is fast, extreme and involves life-threatening interactions between the characters” (324).

In the case of the practical component *Temps Mort*, this occurred between characters Ari (Kelly Gossmann) and Khron (Lamar Bonhomme) who despite being siblings, confront one another and risk their lives to assert ownership over a mystical relic (The Wheel of Ananke), which is linked to recent deaths happening in and around Johannesburg in the short film.

According to the desire-frustration theory, narratives are extremely effective at creating suspense because, unlike real life, where we can actively work towards the satisfaction of a desire, we are completely powerless over a narrative. “Our inability to affect narratives is often something we are aware of - and something that masters of suspense frequently exploit” (Smuts 285).

In order for there to be suspense in *Temps Mort*, a narrative was created to build up an audience to this moment of the standoff between the two characters. The audience was introduced to the characters and developed a connection so that they would either “feel” for the characters or fear for their lives, thereby creating suspense in the standoff where the audience would either fear the outcome or desire a particular outcome.

People feel suspense when they fear a bad outcome, hope for a good outcome, and are uncertain about which outcome will come to pass. “If there is no uncertainty, there can be no

suspense. Similarly, if nothing is at stake, there can be no desirable or undesirable outcome, hence no fear or hope, and consequently no suspense" (Smuts 282).

By comparison, suspense in *The Matrix* is also obtained through a "stand-off." Although the stakes in terms of *The Matrix* roof top scene are higher, as spectators have been introduced to the Matrix agents as powerful, seemingly indestructible programs on numerous occasions. The Matrix agents relentlessly seek out Neo and the rebels, by taking control of other humans who are still subdued within the Matrix. When Neo or one of the protagonists seem to have dispatched one of the agents, they have only in fact killed the host, one of the countless numbers of humans that they wish to free from the Matrix. The agent then simply reincarnates itself by inhabiting another host nearby and continues the pursuit. Thus when Neo faces off with the agent on the roof top, the audience fears more for Neo's demise, but is surprised when he is able to spectacularly dodge the agent's attempts at killing him during the bullet time sequence.

This research report has examined the effect of time slicing on narrative. It has looked at the early beginnings of time slicing and traced its progression into the format that it has become in modern day motion pictures. It has established a firm theoretical ground work in film theory techniques. By using the standards of mise-en-scène, montage, professionalism, spectacle and suspense, it has created a benchmark within which to compare two motion pictures (*The Matrix* and the practical film created specifically for this research paper, *Temps Mort*).

By examining the use of time slicing in these motion pictures and unpacking the effects of this VFX technique on narrative, mise-en-scène, montage, spectacle and suspense, it can be seen how it is not simply a visual technique used solely for its entertainment value, but rather a key narrative component, which plays a central role in the way in which the narrative unfolds and the way in which it is experienced by the audience.

Through the use of this case study which compares a high budget feature film and a low budget student short film, it has shown how this low budget approach to time slicing is possible to an extent. It also demonstrates how time slicing and slow motion are utilized in order to

heighten emotions of suspense, and in addition evoke examination through montage and mise-en-scène.

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