

SPACE: A NEW FRONTIER

NEW EU GENE

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Saya NEW EU GENE

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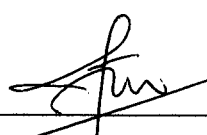
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I hereby declare that this project report entitled

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Is written by me and is my own effort and that no part has been plagiarized without citations.

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DEDICATION

To my beloved parents

ACKNOWLEDGEMENTS

I would like to convey my gratitude towards Dr. Faaizah Shahbodin for mentoring and giving me supervision during the first and second part of the PSM. I would also like to thank her for her patience in giving me advices, comments, suggestions and ideas which are truly remarkable.

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ABSTRACT

This project is about creating a 3D animation regarding space. Space is not a very well understood subject because it extends indefinitely. The purpose of this animation is to stir interest in the public for them to be knowledgeable about space.

The project's scope starts from building the infrastructure to support a launch facility, exchanging knowledge, collaboration with other countries and finally building a space port. The final outcome is hoping that there will one day be a launch from within Malaysia herself. The advantage of creating this animation is that it enables anyone with a computer to view it. However there is a limitation if the user is using a smart phone, since the resolution offered is too low, the movie cannot be viewed in its intended state.

The target user for this animation is secondary school pupils. The purpose for selecting secondary school pupils is that they are more knowledgeable about space compared to primary school pupils. It is hoped that the public will be made aware about space through these students after viewing the 3D animation.

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LIST OF ABBREVIATIONS

3D	-	Three Dimesion
UTeM	-	Universiti Teknikal Malaysia Melaka
FTMK	-	Faculty of Information and Communication Technology
px	-	Pixels
fps	-	Frames per second
dpi	-	Dots per inch
RAM	-	Random access memory
PC	-	Personal Computer
LS	-	Long Shot
MS	-	Medium Shot
CS	-	Close Shot

CHAPTER 1

INTRODUCTION

1.1 Project Background

This project is a three dimension animation showcase. It attempts to showcase a scenario of how Malaysia will develop if the government decided to enter the space industry. This project is a demonstration of the knowledge and skills acquired by students during their time studying in the university. Many elements of this animation are inspired by real world events such as the space race in the 1950's between the United States and the Soviet Union. The moon landing that took place in 1969 also inspired the topic for this project.

Space is vast and holds many mysteries, to unlock its secrets means to break free from the boundaries of this earth, which is essentially what mankind has been trying to do – outdo themselves. Capturing this idea and putting it into a form which the public understands is imperative if the first step is to be taken, hence the reason and motivation behind the creation of this three dimension animation.

1.2 Problem Statement

The main inspiring factor in creating this three dimension animation is the lack a three dimension animation that shows Malaysia going to space. Clearly this issue has to be addressed to give the public a driving factor as well as some insight regarding space. The second factor inspiring this animation is the hidden potential buried within the various industries located in Malaysian if focus is turned to space. The final and perhaps the most important factor is Malaysia as a developing country should have its own independent space port, without relying on other country for launching payload to space.

To achieve space launch capabilities requires a lot of factors such as political stability, a strong economy, high technological level and the necessary infrastructure. Most developing countries meet a number of these criteria but miss out on a few, requiring other county with launch capability for assistance. Looking back at the past, the first Malaysian to be in space did so with the assistance from Russia; it is high time that Malaysia have its own space launch capabilities so that it can be independent.

Building a space launch capable facility requires many resources and expertise. Some of the issues that need to be address are to have high technology industries supporting the space program. Although Malaysia has plenty of high technology industries thriving in its industrial zone, many of these industries are of foreign origin. It goes without saying that a huge amount of money will be wasted if the space program were to rely on foreign expertise. The time of shifting focus of local industries from agricultural to high technology should commence now so that it would be in time to support the space program, therefore lower the cost of material and expertise.

1.3 Objective

- i. To produce a three dimension animation on the conception of the Malaysian space program.
- ii. To use this animation as a medium to spread information about the conception of Malaysian space program to the public.
- iii. To apply some principles from the twelve principles of animation into the project.

1.4 Scope

This project is about creating a three dimension animation showcase. The duration is about three minutes in length and will attempt to show space industry and the infrastructure needed to support such an endeavor. This project is targeted at secondary school students but is also suitable for the public regardless of age. In summary:

- i. The animation covers the building of a space port in Malaysia.
- ii. The animation will show the space shuttle launch event from the Malaysian space port after construction.
- iii. The target audience is secondary school students but also suitable to the general public.

1.5 Project Significance

The important part of this project is to bring awareness about the opportunities that exists in the space sector. Besides gaining scientific knowledge in the process, it is also important as part of the “Malaysia Boleh” spirit. This is in accordance to Vision 2020 herald by the fourth Prime Minister Tun Dr Mahathir in advancing Malaysia towards the future. The animation can also be use as a teaching tool to aid students in understanding how space can benefit Malaysia.

1.6 Conclusion

This chapter is essentially about setting the general direction of the project, which angle to tackle and what direction to proceed. From project background to project significance, it explains in great detail as guidance for the rest of the project. Naturally a project of this magnitude needs proper guidance and planning with lots of research.

The next chapter will focus on the importance of literature review and project methodology. This is the planning stage where everything is carefully thought out and formulated.

CHAPTER II

LITERATURE REVIEW & PROJECT METHODOLOGY

2.1 Introduction

In this chapter, the focus is on literature review and the project methodology. First and foremost, planning is important in defining the eventual outcome of something or as in this case, the project. Literature review is focused on bringing out the important points forward and reviewing it, so that costly mistakes can be avoided and work can be done efficiently. Project methodology on the other hand is the approach taken to solve a particular problem. The focus is also on topics such as the animation techniques, comparison of existing systems as well as resources be it hardware or software.

2.2 Domain

The domain of this project is categorized under three dimension animation. As such it makes use of elements from computer graphics to achieve the final product. Three dimension animation refers to the objects used are rendered in three dimensional space for the animation. Three dimension animations has been the preferred choice for many productions such as game cinematic, commercials, movies as well as video clips.

2.2.1 Definition of three dimension animation

Animations are made using a variety of techniques such as modeling in clay and plastering or puppets. Three dimension animations can also be made using computer software to create three dimensional characters and scenery. Some examples of animations like this are “Finding Nemo” and “The Incredibles. Three dimension animation can be known through many definitions, some of the popular ones are as the following.

The chronological presentation of computer-generated material (cf. cinema). Resembles film animation, except that digital technology brings in the third dimension.

The creation of moving pictures in a three-dimensional digital environment. This is done by sequencing consecutive images or frames, which simulate motion by each image showing the next in a gradual progression of steps. Filmed by a virtual camera and then output to video by a rendering engine.

Geometrical descriptions of an object using polygons or solids in three dimensions (x,y,z coordinates) for the purpose of creating the illusion of height, width and depth. The technique of using computers to generate moving pictures. Animation is created one frame at a time and then edited into a continuous sequence.

Table 2.1 shows a list of animation by Pixar.

Film	Year	Budget	Length (minutes)	Awards
Toy Story	1995	\$30,000,000	80	Special Achievement Award Best Original Screenplay Best Original Song Best Original Musical or Comedy Score
A Bug's Life	1998	\$60,000,000	94	Best Original Musical or Comedy Score
Toy Story 2	1999	\$90,000,000	92	Best Original Song
Monsters, Inc.	2001	\$115,000,000	92	Best Original Song Best Original Score Best Sound Editing Best Animated Feature
Finding Nemo	2003	\$94,000,000	100	Best Animated Feature Best Original Screenplay Best Original Score Best Sound Editing
The Incredibles	2004	\$92,000,000	115	Best Animated Feature Best Sound Editing Best Original Screenplay Best Sound Mixing
Cars	2006	\$120,000,000	116	Best Animated Feature Best Original Song
Ratatouille	2007	\$150,000,000	111	Best Animated Feature Best Original Screenplay Best Original Score Best Sound Mixing Best Sound Editing
WALL-E	2008	\$180,000,000	98	Best Animated Feature Best Original Screenplay Best Original Song

				Best Original Score Best Sound Mixing Best Sound Editing
Up	2009	\$175,000,000	96	Best Picture Best Animated Feature Best Original Screenplay Best Original Score Best Sound Editing

(Source: http://www.bcdb.com/cartoons/Other_Studios/P/Pixar_Animation_Studios/)

One of the more popular animation studios is Pixar Animation Studios. Table 2.1 above shows the history of projects that the company undertook with a list of awards for each.

2.2.2 The principle of animation

Animation is an art of bring life to two dimension or three dimension objects on the screen. Hence the needs for those objects to behave like the real world counterpart. There are a total of twelve principles of animation that can be incorporated into any animation to make it look convincing. These twelve principles are:

i. Squash and stretch

The objective of this technique is to give the audience a sense of weight and volume to an object while it is moving. An object's volume does not change when squashed or stretched, although its shape changes slightly to balance the change in volume. It can be used realistically or for exaggeration. Used realistically, objects such as a rubber ball will tend to squash horizontally when hitting a surface and stretch vertically when bouncing back up. However, this technique is traditionally used in two dimension animation to provide comical exaggeration of characters.

ii. Anticipation

This technique heavily builds on the moment before an action connects. Normally momentum is build up and the audience waits in eager anticipation for the follow up move, which is typically something of huge magnitude. An example of this is the act of punching, the character first draw the fist back in preparation to punch something. Anticipation can be related to everyday activities where it happens naturally.

Anticipation is used in the animation during liftoff. At the moment the engine ignites, the shuttle builds up enough momentum to overcome gravity for a few seconds before leaving the launch pad.

iii. Staging

Communicating to the audience the way it was intended is important to get the message across, which is why a pose or action must correspond to how a character relates to the story. Each scene that makes up a story must have an inherent connection between them as the flow of story is essential. The clever use of shots such as long, medium, short as well as a few others can very well get the idea across. Audience should not be burdened with too many actions at any given time. Subtle environment that blends well with the scene is normally used so it doesn't attract too much attention from the main action happening. Staging helps audience by directing them to understand the story the director intended it to be.

Staging is use throughout the animation, as each scene is related with the environment and the objects that it contains. Staging itself is used to give the audience the relation of space with this animation.

iv. Straight ahead action and pose to pose

As the title suggest, there are two approaches to this technique. The first “straight ahead action” is achieved by drawing scene frame by frame from the beginning to the end. This gives the advantage of producing realistic action sequence as oppose to “pose to pose”. While pose to pose is useful when sketching because of speed advantage, it is very difficult to retain the character proportions between frames.

v. Follow-through and overlapping action

The concept of this is that an object has inertia. Once it comes to a stop any attached object will inherently try to move forward before stopping. The opposite is also true when the object starts to move, its attach surface won't start following immediately until sometime later. An example of this can be illustrated by a character wearing a rigid ball gown, when the character starts moving, the ball gown will follow after a moment because it is rigid.

vi. Slow-in and slow-out

To prevent rigid movement each frame has to have different timing for the character. Take a running scene for example, the character starts to run from a standstill and accelerates until finally stopping. To achieve this, more drawings are use for slow action and starts decreasing as the speed increases.

This technique is used the most often in the animation. This consists of camera movement that slowly pans out and gradually increase speed as the distance increase. It can also be witnessed on the shuttle as the speed starts to increase as time passes after the launch sequence.

vii. Arcs

Arcs are used to simulate natural movements based on the human anatomy. All movements are based around joints in the skeletal structure of the human body and are constricted to the socket, hence the arcing motion. This technique works best if an object is attached to something.

viii. Secondary action

Secondary action is useful to augment the primary action. To illustrate this point, if a character is running a marathon, instead of a steady run the character may be panting a lot, with labored breathing and lots of sweat dripping. Irregular footing and uneven pace also helps to show that the character is really tired. Secondary action has to be subtly else it will override the primary action and convey the wrong meaning.

Secondary action is incorporated in the effects in the animation. The effect can be seen as smoke trailing the shuttle when it is in motion. To reinforce the view of the object moving, the movement of the object has to be accompanied with a visual cue.

ix. Timing

Timing can alter perception of a character in any given situation. Slow timing can communicate sadness, calming effects whereas fast paced action implies emergencies and tense atmosphere. Where to use either one is solely dependent on how the story is to pan out. To create a fast action, less number of drawings is used compared to slower actions. Timing is usually used to convey emotion, mood and other reaction to another character in accordance to a situation. Naturally, the best reference is available from live action performance or by viewing everyday human interaction with the world.