

Virtual Character for Batik's Dress Fashion Show

by

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the requirements for the
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(Information System)

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1) Computer graphics

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CERTIFICATION OF APPROVAL

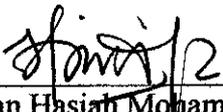
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A project dissertation submitted to the
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Universiti Teknologi PETRONAS
in partial fulfillment of the requirements for the
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Approved by,



(Puan Hasiah Mohamed)

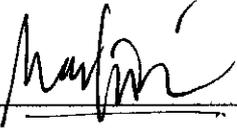
UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

November 2004

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgments, and that the original work contained herein have not been undertaken or done by unspecified sources or person.



MARLINI AHMAD TMIDDIN

ABSTRACT

The promotion of batik over the internet is new alternative of promoting batiks, due to not yet implementation of virtual batik it encourage the development of character that be able help batik's entrepreneur promoting their craft. Thus generating model from VRML for graphic objects makes model construction in simplest way. This study objective was to determine the implication of implementation of virtual batik and their measurement for six criteria of evaluation which is including their movement, position, figure, interface, user interaction and texture. In details, the method are used based on the adaptive software development whereby including also step by step stage flow. At beginning the phase involved are analysis phase whereby the gathering information and problem analysis. Thus the development phase involved which is construction the model from the sketch, image texturing and VRML coding. At last the final product is tested in Testing and Evaluation Phase.

Results from Virtual Character of Batik's Dress Show Fashion questionnaires are distributed over 30 respondents to support few evaluations. User could commend and give feedback based on characters movement, figure, interface, user interaction, position and texture. From the survey itself it shows that 63% agree with this new alternative to be implemented meanwhile the rest are not much agree. So that, it can be said the significant changes in character with the major additional features and tools does influence the implementation of virtual batik over the internet.

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ABBREVIATIONS

3D – Three Dimensional

2D- Two Dimensional

VR – Virtual Reality

RAM – Random Access Memory

IT – Information Technology

Bmp – Bitmap

Jpg – Join Photographic Expert Group

HTML – Hyper Text Markup Language

UNIX – UNiplexed Information and Computing System

NURBS – Non-Uniform Rational B-Spline

GUI – Graphical User Interface

CHAPTER 1

1.0 INTRODUCTION

1.1 BACKGROUND OF STUDY

Three-Dimensional (3D) mean medium, display, or performance, especially a cinematic or graphic medium in three dimensions. There are three measurements for 3D object which is including height, width and depth. Thus, 3D objects based on modeling language for specifying interactive animation are widely use by the programmer in order to finish or test certain design for the certain purpose. Three-dimensional (3D) graphics have been used for numerous applications. In engineering, 3D graphics helps engineers to build, simulate and test their designs before they are produced. It is as an essence in engineering industry creating immersive virtual reality (VR) applications for reducing cost and clearly identifies upcoming risk or potential problem before actual development. The entertainment industry implements 3D graphics technology to create amazing movie special effects and exciting computer games. 3D graphics are also used for medical and scientific purposes, such as helping doctors to study the human anatomy and provide scientific researchers to simulate and test their research findings. These examples are just some of many areas of 3D graphics implementation.

Thus in batik's industry there are a lot of campaign and advertisement in order to promote of wearing batik in an organization. The result of numerous 3D application there are alternative of promoting batik by using VR application instead of in the field of medication, engineering or even entertainment industry. The significant of this alternative might help the batik's entrepreneur to design and promote batik in virtual environment instead of manual process of buying and selling.

In creating 3D graphic objects and environments, these objects must be modeled first. There are many methods of modeling 3D objects. The modelers might use their imagination to build the 3D objects. Some might start by preparing sketches or drawings of the intended design, and then model them into 3D graphic. These

models are built using 3D modeling applications or computer-aided design software, e.g. 3DsMax, 3D Studio Max, Carrara Studio and Amapi3D.

In the case of modeling a real life object, many factors have to be looked upon. Modeling real life objects is harder because the 3D graphic model must precisely match the features of the original object, e.g. measurement and shape. To do so, modelers needs to do comprehensive study on the object. The usual methods of approach used are by physically measuring and taking pictures or videos of the object. The acquired data are used to design the 3D graphics.

In simple term it can say that modeling object with their texture are applicable nowadays with sophisticated development application in the market. Otherwise, an advance in world wide world technology and fasten broadband of internet it capable of download and execute the end product of animation especially in Three-Dimensional easily without any problem during downloading. For those instances, the studies are related to the web programming language that called Virtual Really Mark-up Language (VRML). These languages are understandable by Internet Explorer to perform such 3-D objects or scene via the web to the user. The process of manual modeling and convert to the coding are common used with other graphic tools such as 3D-Max. Otherwise, another technique is by start from the beginning write every coding needed.

1.2 PROBLEM STATEMENT

Basic multimedia application which including objects or scene created for multimedia purposes are required more spaces in hard disk and also used high RAM utilization of computer or personal laptop. Due to those instances, the multi programming language which advances in technology and software availability capable the creation and animation are made in just text form. VRML is common solution applicable in meantime for modeling language for specifying interactive animation. Text descriptions of geometries are downloaded and those geometries are created locally.

In recent study there is not yet implementation of virtual batik in term of promoting, design and also as alternative ways to introduce batik in computing term. Thus, by producing the procedures and guidelines propose per help helping the batik's entrepreneur for introducing batik in 3D. As virtual reality goes thru over the net, by doing this research hopefully will help developer of batik industries to overcome the problem of lack publicity in promoting batik. Beside that, this project also available to give an overview over batik's design, texture and fashion suitability over their specific design.

Thus, the finding result would require to study on how to implement this VRML to batik character, which will be develop from the sketch. In other case, the modeler which application used for creating 3D basically needs to calculate the lengths of the surface of the object and recreate them in 3D space. This method is complicated and would require long time to be completed. By specifying the lengths, the exact calculation of object or image can be creating easily by using VRML tools. In other hand, the challenges to developer are depend on the coding itself which are free from error and bugs.

Based on the findings stated above, the problems that this research project will attempt to solve are identified. The list below shows the summary of the problem statements:

- i) Implementation of virtual batik not yet available. To implement VRML in batik's industry for promoting and helping batik's entrepreneur advertise their product on the net.
- ii) Lacks of promoting the batik advertisement contribute to this promotion effort in advertise the product instead of standard website. So that, the virtual environment can be included to the website to attract the buyer.

1.3 AIMS AND OBJECTIVES

The aim of this project is to develop a simple form of programming language that will be able to create 3D model. This programming language is basically available for supported external application or plug-in that accessible for non-technical person (excluding programmer or IT background) who spending time surfing over the net. General aim is the person looking for a design show in virtual concept.

Objectives of this project are:

a) To study on methods that can be used to generate 3D objects.

- Research the available technologies used in the purpose of 3D model generation from programming language strengths, weaknesses and opportunities for improvements.

b) To study how techniques can be used for texture added in 3D model.

- A texture of model is developing by using different techniques to the model surface. In order to create smooth and reliable texture over a model, the suitable techniques are available in the certain application nowadays. Thus is common use in architecture design as example design of tiles on the floor, wallpaper and home decoration accessories.

c) Evaluation the implementation of 3D environment in fashion show arena.

- Evaluation of the model in terms of significant the final model to the batik's entrepreneur for usage of promotion and advertisement. Thus helping the promotion in computing application instead of manual process. Addition to the evaluation is the distribution of questionnaires in order to evaluate the character itself.

1.4 SCOPE OF STUDY

The scope of the project among other consisted of:

1. Object's and scene created available online instead of stand alone application that commonly available for any browser (recommended Internet Explorer)
2. To study on methods that can be used to generate 3D objects and how information from images (if image in 2D) can be used for 3D model generation.
3. To focus on designing texture for a model those make use of editing tools application that enables show by the human model.

The following scopes are identified for the development of the method to perform 3D image into coding and text information. The texture images are in Windows Bitmap (.bmp) format or even .jpg. The scene of the image must fulfill several criteria, which helpful in designing the image or scene.

In the earlier stages, images of simple human model are simplified created based on geometric allocation for joining each body part. Thus this model is transform to understandable format to projection purpose and stored locally for simply access it.

CHAPTER 2

LITERATURE REVIEW AND THEORY

2.0 Introduction

Upcoming topics including discussion on the topic of this research, information on elements used in the research, supporting data and literatures for other similar or related research, project works and product. The purpose of this section is to allow better understanding of the research field and purpose of the study by providing definitions and references. Another purpose of this section is to feature information on similar or related research and project work done by others.

The topic of this research is “Designing Virtual Character for Dress and Outfits Show”. There are many methods and attempts for performing 3D objects. Before looking into these, it is important that the definition and information of 3D to be understood first. Then the types of image that will be created and tools will be discussed. Finally, the methods and previous attempts, research, and project work by other researchers will be featured. These will be compared to what this research is trying to achieve and the project’s significance compared to the others.

2.1 3D Graphics

Three-dimensional (3D) in computer terms describes images or graphics that provides the perception of depth. It has three dimensions of measurements, which are width, height and depth. In a 3D space, these measurements are represented using the 3D Cartesian coordinates. These coordinates are specified using the X, Y and Z axis.

Two-dimensional (2D) are instead images or graphics that are flat. It has only two dimensions of measurement, width and height. It is represented in 2D Cartesian coordinates, specified by X and Y axis. A 2D image does not provide the perception

of depth. But when perspective is applied, a 2D image or graphic lends the illusion of depth.

Otherwise, the 3D spaces are more interactive and illustrate as same as real object if their texture and specific part are focuses. The dimension of 3D objects can show as objects movement, rotation, walking or even running. Part of creation an object are illustrate in details as tutorial session by developer for new comers in creating 3D environment. That including step by step objects development.

2.2 Virtual Reality Modeling Language (VRML)

According to Hyperdictionary, 2004

“VRML is a draft specification for the design and implementation of a platform-independent language for virtual reality scene description.”

VRML is an acronym for the Virtual Reality Modeling Language. Thus by using VRML we can craft three-dimensional virtual worlds on the internet including build virtual rooms, building, cities, mountains, and planets. In addition, this created model can fill with furniture, cars, people, spacecraft or etc. Most exciting features is that it enables to create dynamic worlds and including ability to animate objects in own worlds, play sounds and movies within, allowing users to interact with created worlds and also control and enhance worlds with scripts.

It also as the technique used to create three-dimensional (3-D) space and 3-D objects in full color with special texture, animation, and lighting effects. This mean objects can be move in the three dimensions on a VRML Web page as similar can do with a video game of flight simulator. The technique used for construction requires many manual calculations and modeling the objects from scratch. With programming tools, some of the process can be automated.

The internet is an international network of computers connecting together universities, companies, research laboratories, homes and government offices. Thus internet as giant, electronic highway system that enable user to browse over network

by using own computer. Otherwise, the browser plays important roles to display the incredible amount of information available in the Web. To view VRML worlds, use a VRML browser, typically configured as a helper application or plug-in for HTML Web browser. Once configured, VRML information received by HTML Web browser is automatically displayed by VRML browser.

In addition, there are capabilities and qualities of VRML such as:

- a) Platform independence. The same VRML code is easily transported to UNIX, Macintosh, and Windows.
- b) Extensibility. Extensions to VRML use objects that have the ability to describe themselves. Objects that are not included in standard VRML can provide a description that VRML can interpret as required.
- c) Efficiency. VRML has the ability to work well over slow-speed connections, because the geometries are downloaded as ordinary text.
- d) Selective refinement. VRML has the ability to add greater detail only to the portion of the scene that requires it.
- e) 3-D hyperlinks. It can be view when the mouse pointer moves over certain VRML objects. The objects become selected and can be activated by clicking. They are similar to text and image hyperlinks in that can link objects in 3-D VRML scenes to other VRML files or Web pages.
- f) Texture mapping. It can be applying images to the surfaces of 3-D objects to give them texture and realistic detail.

2.3 Modeling organic/ character using the box method.

There are a two methods can be used for modeling an image such as by using box method or patch. Somehow, the box method is selected for this project. Box modeling is defined as below by the author of 3Ds Max 4, Kim Lee, 2003

“Box modeling is a polygonal modeling technique that uses a low-resolution model referenced to a higher resolution model that can be interactively edited in real time. Traditionally, Non-Uniform Rational B-Spline (NURBS) was the preferred modeling method for high-resolution models because their resolution could be increased or decreased depending on what mesh

resolution was needed. NURBS is a parametric surface. Box modeling enables the user to increase the resolution of a polygonal object.”

Thus, box modeling enables to make adjustment quickly, this is due to a problem occurs during previous modeling method that takes time and high resolution thus extremely laborious. Furthermore, box modeling also offer other advantages for instance starting with a box, however, it easier to make an object a quadratic-faced polygonal model. Making the most of a model with quadratic faces improves the smoothing values of the mesh, and it makes it easier to edit point.

Planning, in box modeling and in other modeling techniques, saves lots of time. Planning the necessary subdivisions on the initial low-resolution mesh might take a bit of experimenting, depending on the model. Working separately on an individual model can decrease the time involved in the creation of the objects. Beside that this methods can also use a camera's clipping plane to help model with efficiency. Whatever parts of the model extend beyond the clipping plane will not be seen or selected. This also holds true for the near clipping plane.

2.4 3Ds Max 5.0

3ds Max 5.0 software is used for whole modeling development including part of bodies and also texture over an image. This programming tool relied on various features of the software for all the sequences. In addition, the software is reliable to design interactive model thus that can be converted to selected file format for display purpose and etc.

The current changes or improvement features as reported by the author is such enhanced playback controls and time configuration. Whereby, the play button in the Playback Control are now has two fly-out modes that can be accessed by left-clicking and holding down the Play button. This can greatly improve playback speed and allows the animator to concentrate on only the object or objects being worked on at the moment. There are also some new options in the time configuration window. This window is accessed by either right-clicking any of the transport button or left-clicking the Time Configuration window.

Thus with this new features help much developer in order to reduce time and in term of GUI of the interface which much more friendly then before.

2.5 Related Researches, Project Works and Products

There are several methods being used for the purpose generating 3D graphic models. There are an example of previous researches whereby the basic technique is taking 4 sided faces (essentially 2 polygons with the shared edge set to "invisible") and then extruding new faces, welding points and turning and hiding edges such that have a low polygons, 4 sided looking model. In some cases, 3 sided polygons are inevitable, but for meshsmooth it's important to try to keep quadratics.

By using 3Ds Max the tools used are Edit Mesh with:

- a) Sub-object vertex : "weld targeted"
- b) Sub-object edge: "turn edge"
- c) "Visible edge"
- d) Sub-object face: "extrude face"

Also used is Meshsmooth with "quad output", "apply to whole mesh", "smooth result" and an iteration of 2. In addition the "*slice modifier*" is used.

Michael B. Comet, 2001

"It means that stand-alone modifier version, not the version within the editable mesh mod."

In beginning creating an object the first step involved such as create the basic torso object. Create a hard corner spline shape in top view with 8 points. Then extrude this flat polygon up 5 times using the "Extrude Modifier". This should give a basic cylinder type object created out of polygons. Next, adjust the points so they are more torso-like shaped as shown by applying and using and Edit Mesh modifier (Refer Figure: 2.0)

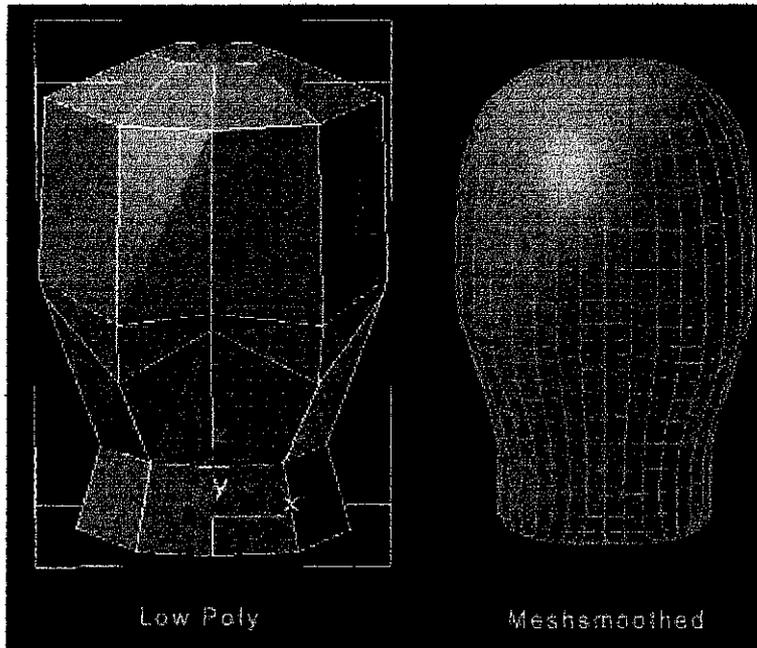


Figure 2.0: Adjusted point for more torso-like shaped.

In addition, to complete the whole part of the body including chest, leg, feet, face and hand, the combination of polygon shape are needed to come out with natural human body part joint.

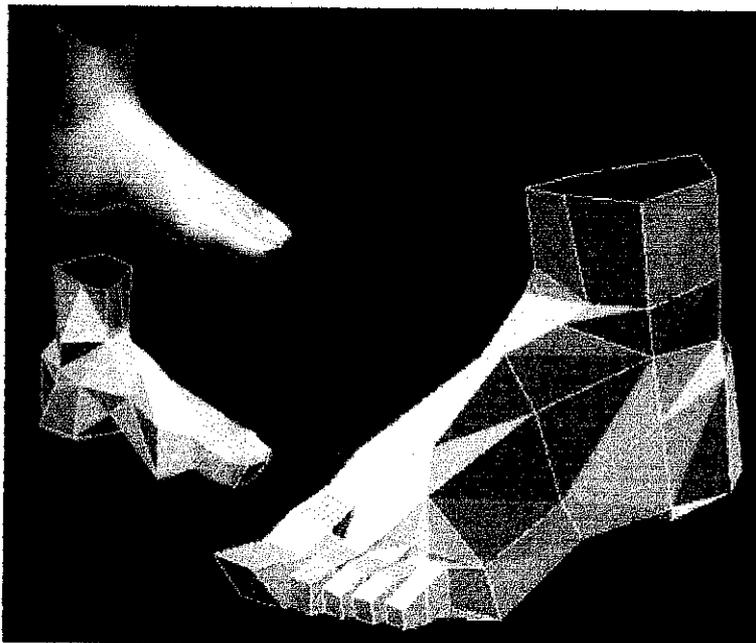


Figure 2.1: Example of feet

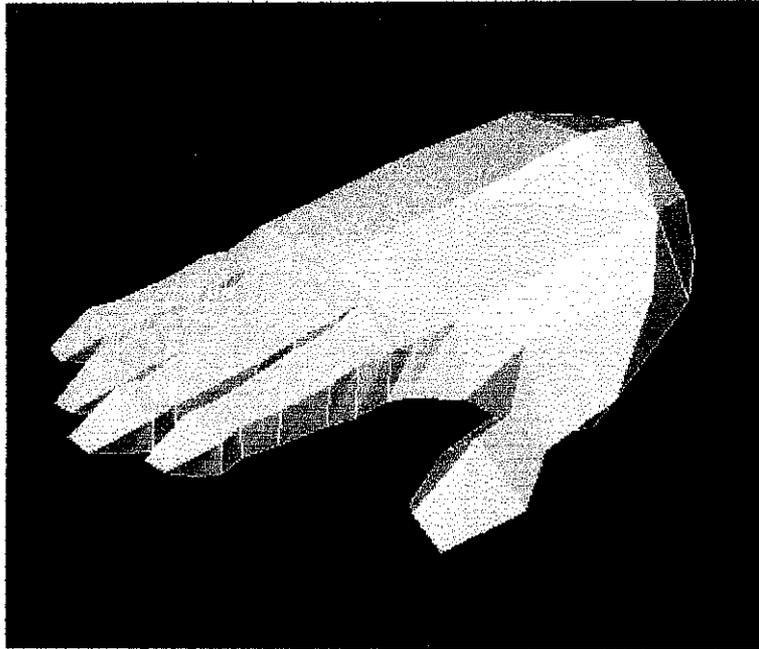


Figure 2.2: Example of hand created by using torso-like shaped.

Furthermore, many 3D artists have a desire to be character animator. Thus character rigging involves more of technical mind and as example the bones is common term used in all of 3D animation. Just like human bones, the bones is defined as follow by Kim Lee, 2003 The linkages between joints (a hierarchy) and the rotations of created character's joint.

A bone object in max has parameter, which are width, height, taper and fin properties. This helps define the shape of the bone to fit the volume of each limb accurately, filling out the volume of the character. This is important because displaying the skin of the character while interacting with the character in real time. Working with just the bones is very fast, but without a volumetric display of the bones, no references of the character's size and shape. Thus the fins also help in visualize and troubleshoot rotation of the bones.

CHAPTER 3

METHODOLOGY AND PROJECT WORK

3.0 INTRODUCTION

A workflow framework has been developed to provide a systematic approach to the project work. This is to ensure that the project will be successful. The framework consists of phases similar to those of basic research and development task.

3.1 PHASES IN GENERAL

In beginning, the first phase involved is the analysis phase. This consists of information gathering and analysis tasks. This phase identifies the problem to be solved, what needs to be researched and previous related research and development. Analysis of this information reveals drawbacks of the previous works and allows identification of potential opportunities for future developments. The information gathering task is also an integral part in order to provide guidance and reference to complete the project. Thus, during this phase the discussion and meeting are important to cope with the procedure and guidance that will be develop and documented. In details, the time duration for each task is proper planning in order to finish during time budget.

The design and development phase will focus on the building the design framework for the development of the product and also the construction of the product. There are two stages in this phase. The first stage is for the development of the image and scene that start from the scratch, and the second for the VRML program.

The third phase is the testing and evaluation phase. The product will be tested with several criteria and experiments. The result of the experiment will be analyzed and evaluated. The analysis will identify problems in the acquired result and the programs are refined to correct them.

After the completion of the programs construction, all the information gathered, development materials and achieved result will be documented in the report. Figure1 shows the graphical representation of the project framework.

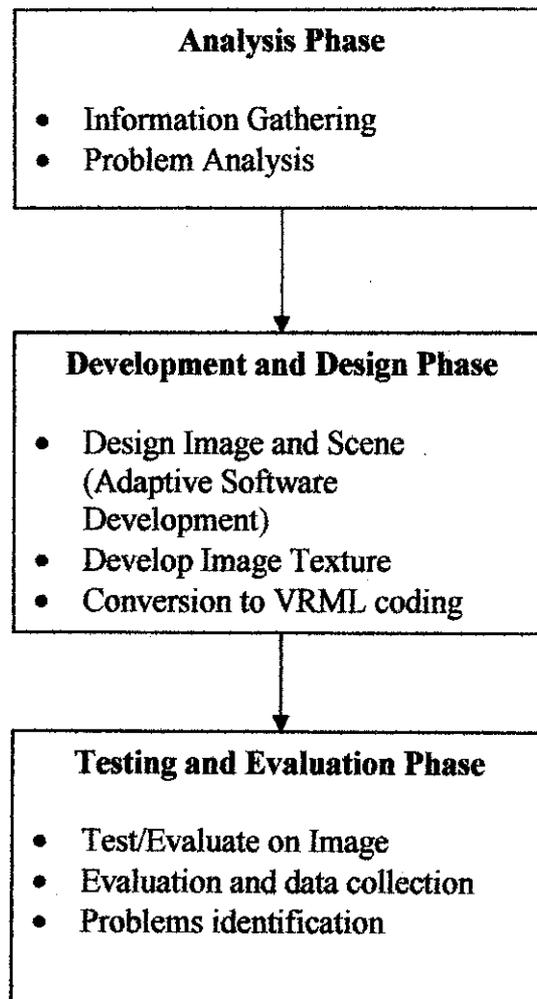


Figure 3.0: Project Framework

3.2 PHASE 1: ANALYSIS PHASE

The analysis phase consist of two main task, information gathering and information analysis. The purpose of information gathering task is to gather related data for reference of the project work. There are two types of information gathered:

- Collection of facts and documentations from books, journals, research documents, software tools and the Internet. The books, journals, research documents and the Internet provide the literatures done by others. Software tools shows what methods are currently used in the market.
- Collection of example from previous development that are taken from outsource, program codes and software samples. These materials provide information to help development of the image, scene and VRML conversion. They are acquired from reference books and source code web pages on the Internet.

The gathered data and information are then analyzed. Facts and documentations shows what other has studied and researched. This helps the author to understand the backgrounds, theories and applications of the study. They also enable the identification of problems and opportunities for improvements. These are useful to provide ideas, guidance and also supporting documents for writing the report. The collected program source codes will be tested to select which can be used in the development of the product. These codes support the development process to be completed rapidly, rather than coding them from scratch

The results of the information gathering are collect and documented in order to make as references in later if any changes occurs. Thus, probably ideas and enhancement (if any) are gather is come out to create model of human character and enable to put cloth on it. Thus the information also gathers for the software available and their tools availability. For that the probably software helps in this project such as Cararra Studio 3.0, Amapi3D, Adobe Photoshop 7.0 and also VRML 2.0

3.3 PHASE 2: DESIGN AND DEVELOPMENT PHASE

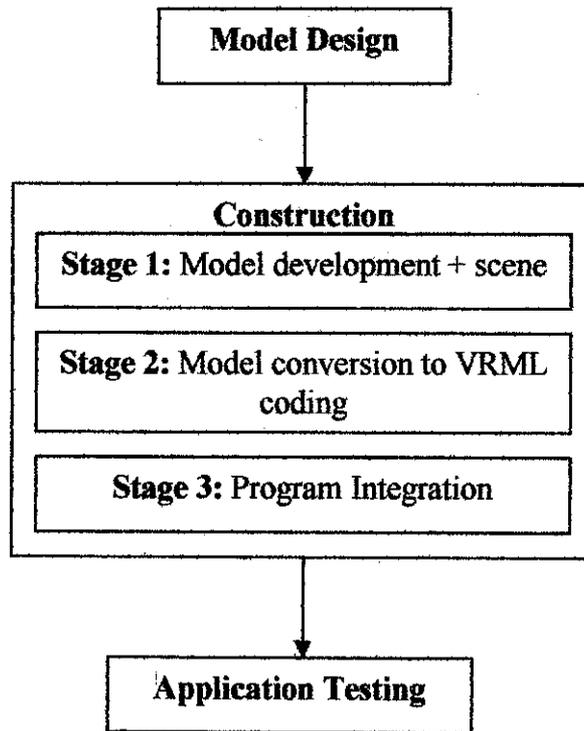


Figure 3.1: Product Development

This phase consist of the product design and the product development. For product design, the specification and development framework is identified. The specification lists the required hardware and software tools. The development framework is the designed approach on how the product development will be done. The development framework includes phases of program design, construction, integration and testing.

Model design phase is where the details of the model are designed. These are such as main part of the body, interfaces and scene design. The acquired skill throughout the software in order to come out with appropriate design which finally will be transform into source codes and algorithms which are suitable for the program that will be used later such example as VRML format that applicable for Amira Inventor and also Internet Explorer.

The construction of the product will be done in three stages. The first stage will cover the development of the model that will be exactly from the scratch in format of VR application that are used which is by using 3Ds Max. The next stage will be the conversion of model into VRML coding that will takes the values of coding free error and place them into another supporting application that are available on the market for display purpose including by using VR supportive equipment or basic displaying. The final stage is where both programs are integrated.

The testing phase is different from the testing phase in the project framework. This testing phase only consider test on the constructed program. These tests are to ensure that the program is running properly and are free from bugs. Figure 2 shows the product development framework.

3.4 PHASE 3: TESTING AND EVALUATION PHASE

The final product that including images and scene will be acquired in the display purpose to the end user whom are particularly fashion designer or batik's entrepreneur . The product will be display over the monitor and be able display to the audience such as character's movement, position, figure, texture and also interface, it seem similar with any fashion show on stage. On that purpose, the testing phase are play important roles in order to give the feedback and tick their significant of the multimedia program in order to help the fashion designer or batik's entrepreneur. Thus, percentages of benefits are evaluated in a range of 100%.

The testing phase will cover experiments and tests on the model, equipment and also software integration itself. Furthermore, some changes on the accuracy, texture and display view will be accoutering if errors occur.

The resulting 3D graphic produced by the software will be evaluated based on interactivity and how human perception in order to receive the new era of fashion show that by using VR. Thus, the model will compared with the 2D bitmap image instead of common fashion show that consists of crowded audience, large stage and a glance of show. If problems were encountered, such as the 3D model is more

appropriate and suitable for certain circumstances the model will be refined to produce a better resulting 3D model.

3.5 PHASE 4: RESULTS

The results of the project are the project developed product whereby including development of characters that be able to move, animated at certain part of the body, texturing over the figure, and figure it self. Thus after the entire prototype product are finished develop the evaluation are takes part. The evaluation criteria included their movement, position, figure, texture, interface and user interaction. The questionnaires are distributed over 30 respondents and the results are discussed later in details. After all, the documented and development of this project are gathered including their information itself, project findings, product descriptions and supporting information are properly compiled and written into the final report. The product is the completed multimedia developed is used to demonstrate the project's finding and results.

3.6 REQUIRED SOFTWARE AND HARDWARE TOOLS

These are the software used:

- Carrara Studio 3.0
- Amapi 3D
- VRMLPad 2.0

These are the hardware used:

- Personal Computer

Specification of the computer used for this project:

- AMD Athlon XP 2000+ processor
- 256 Megabytes RAM
- Microsoft Windows XP operating system
- 56kbps Modem or Leased-Line connection
- Internet Explorer 5.5 or above

These software tools were selected because of its availability and the proficiency of using them. Thus, these adaptive software developments are fully depend on the software for development purpose. In order to creating interactive 3D image and scene the most powerful software are used. This software can create image based on geometrical base plus some technique added on the object such example mash technique to come out with smooth surface.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 RESULT AND DISCUSSION OF PROTOTYPE DEVELOPMENT

The result of the Design and Development phase of the project are including 3D model including the stage lighting scene, batik cloth and batik texture for displaying with the model created. Thus, the VRML coding are exported after all the construction phase done. This programming coding is used with Internet Explorer in purpose to make display faster over the internet. Both program's functions and source codes are explained in detail. Problems that occurred and the solutions to them are also discussed.

4.1.1 Product Development

Development of the image and scene are based on program is done using Cararra Studio 3.0 and Amapi 3D. The design of the model is based on several ideas that are acquired during the analysis phase. The approach of designing the model is done by developing the model from the sketch and basic geometry such as cubes and sphere. These are the three functions of the model:

- Loading the required image to the main programming language
- Adding texture of batik over the model
- Camera and lighting insertion to the model
- Conversion to the coding for integration part.

The require cloth model are develop from the assistant software which finally make a final touch over the main program. Thus the firm shape is made from the first software that finally import to the main software. In addition the textures are load into the create image as a texture to the image. All this are made by using the main software thus in order to adding some lighting and also camera to the model after all. In addition, the final touch is made to display over the internet by using simple programming language which is VRML.

4.1.2 Amapi 3D Program

This is a multimedia program that uses the concept of 3D screen displays a working scene around which the user moves freely to create his or her models. Amapi 3D provides a rich set of tools to create and modify these models. In order to come out with an outfits of female cloth the basic geometry used are cube. The figure 1 shows that the combination of cubes in order to come out with the rough shape of cloth. Thus this cloth are made one side first before 3D mirror take an action to put on symmetry part joint together as one meaningful shape.

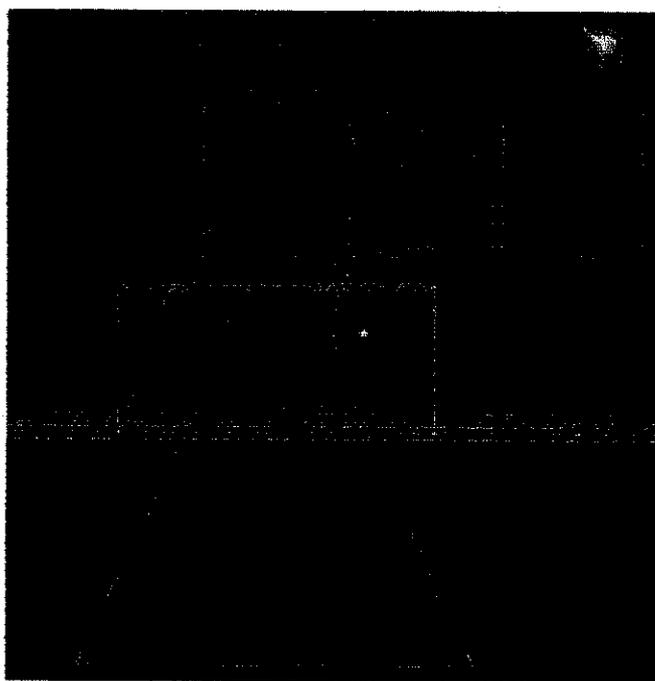


Figure 4.0: Rough shape of women outfits before symmetrical joining.

As continuation from the Figure 4.0, the meaningful shape now joint in other side of cloth also known as symmetrical part of overall cloth. Thus the shape of cloth can be shown as Figure 4.1. In order to delete the inner faces of the cloth the 'Delete Faces' tools to are use to click and delete the required opening at the top (neck), the right side (hand opening) and the bottom (waist area), and also the left side where the other mirror copy half will be needed.(See Figure: 4.2)

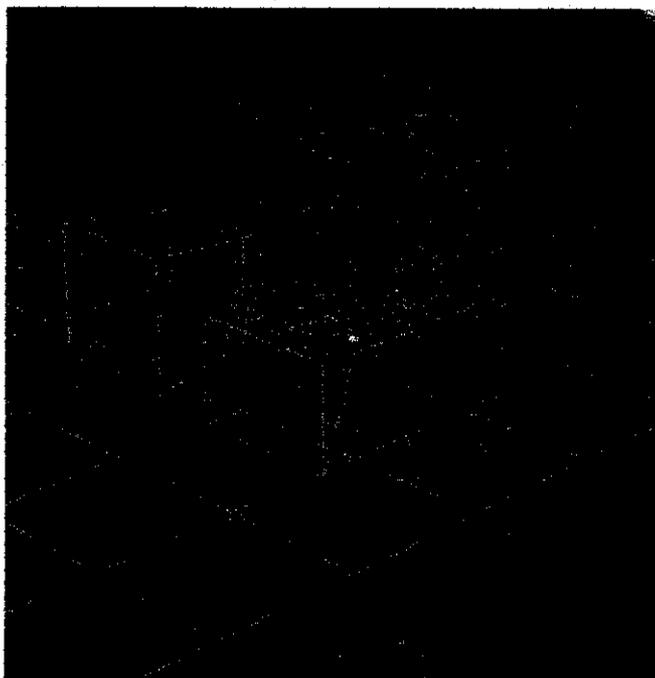


Figure 4.1: Symmetrical joining of left side to another symmetry part which is right side.

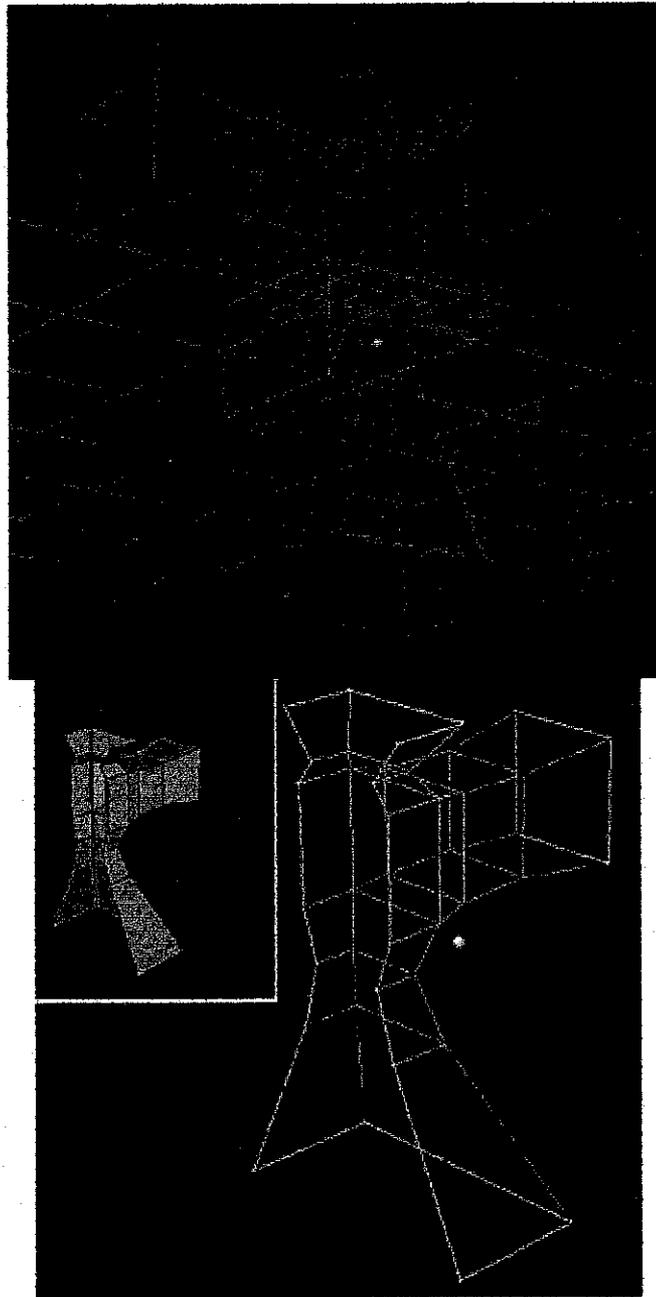


Figure 4.2: Cloth sketch after delete the inner faces.

In details the some wrinkles are added to the rough figure in order to come out with nature enhancement to the figure. The wrinkles total can be set by using tools available. Thus finally the figure are put some smoothing methods before the rendering process. This smooth method can be control, thus the smooth value added are 45% over the original figure. (See Figure 4.4)

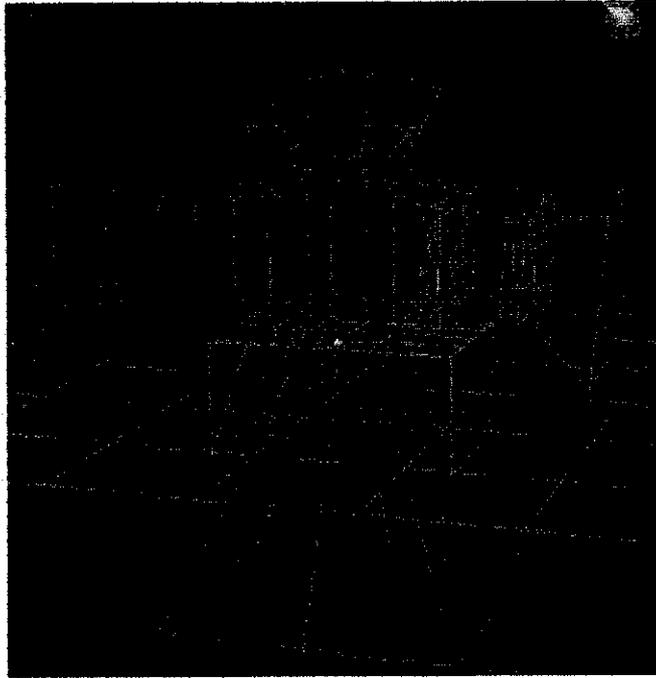


Figure 4.3: Some wrinkles especially in the elbow area.

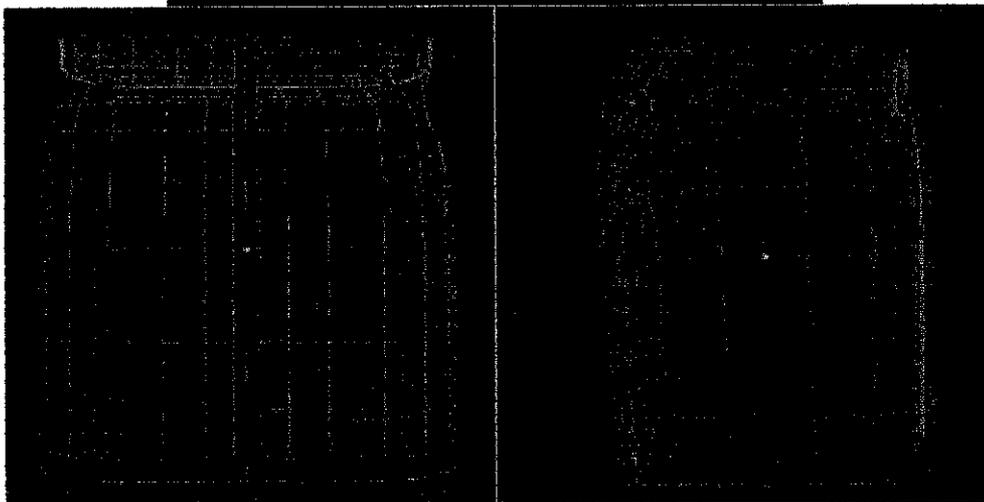
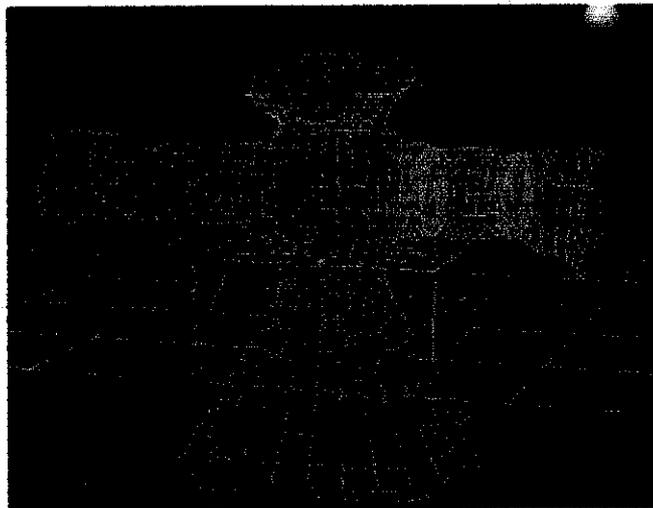


Figure 4.4: Insertion of smoothing methods in making it look organic and smooth.

4.1.3 Carrara Studio 3.0

The scene and final touch are made using Carrara Studio 3.0 which are the powerful 3D application for developing the products. It also includes the variety of scene and tools available for the purpose of 3D development. Thus the scene and lighting are made by using this powerful 3D application. Figure below show the 4 angles of cloth display. Thus the lighting is added in order to come out with stage view from user perspective. Beside that it also help batik's entrepreneur to look at different angle of the products.

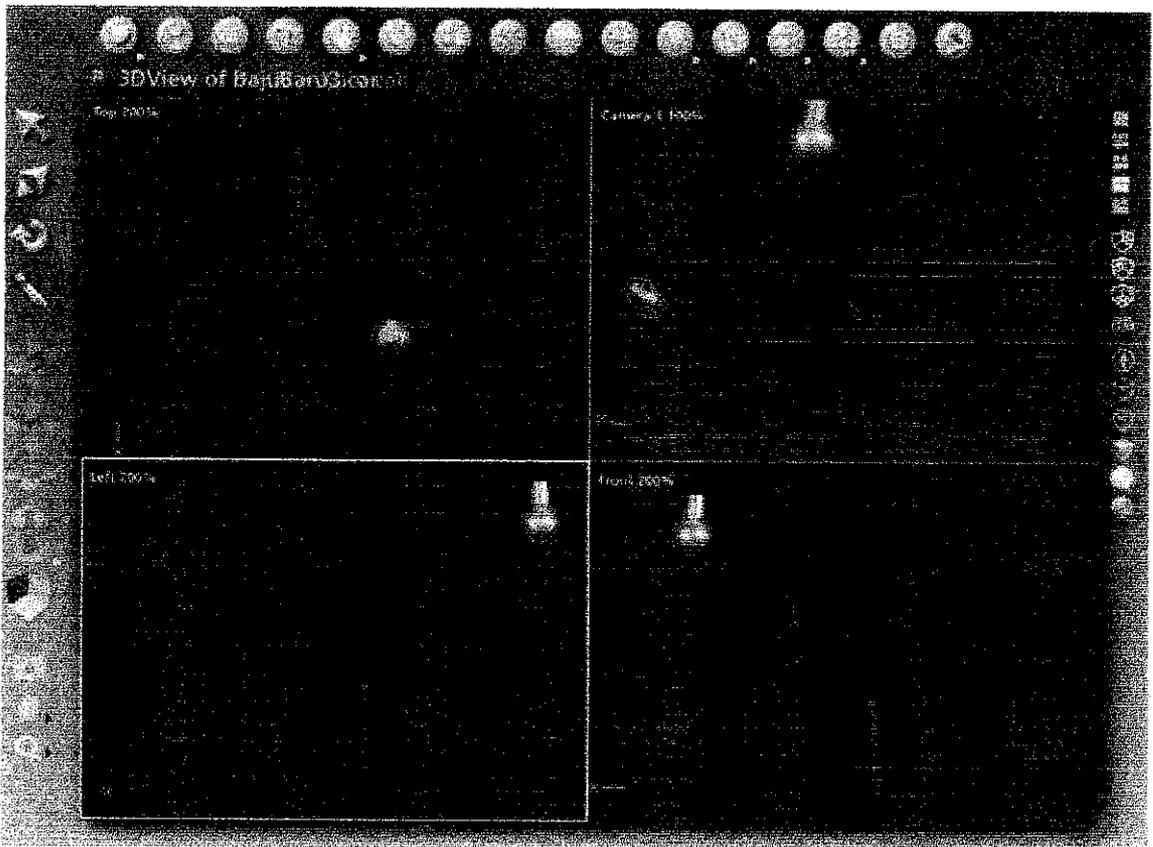


Figure 4.5: Different angle of outfits' model which including from left, right, top and camera view.

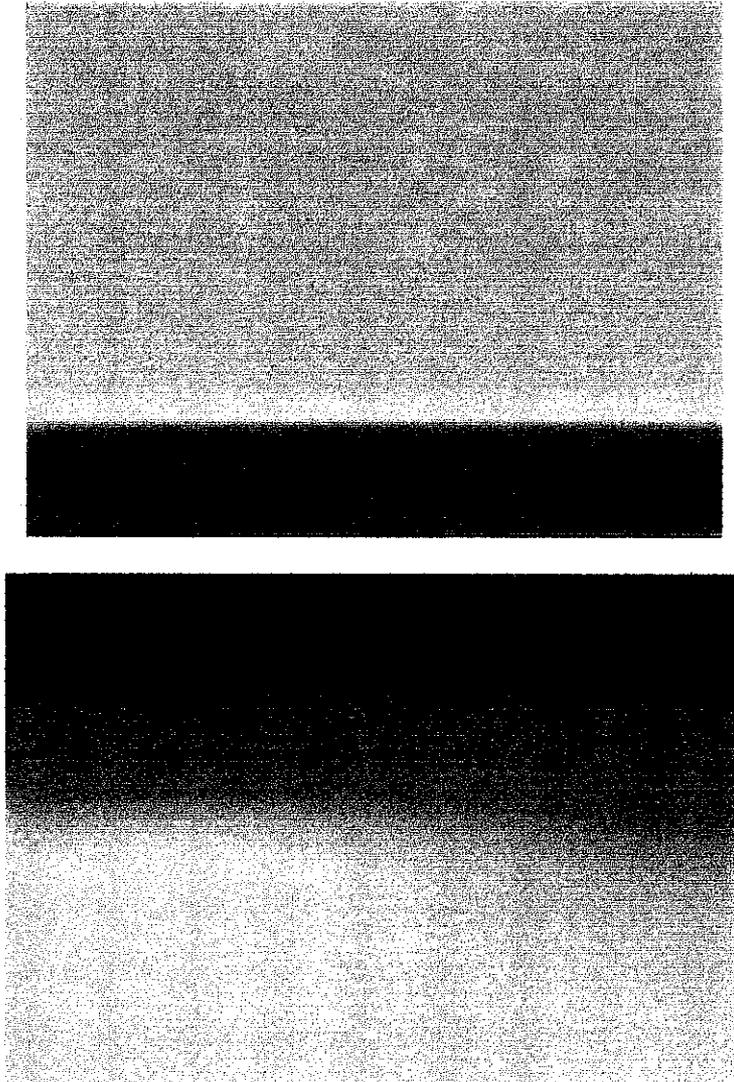


Figure 4.6: Background that is set as scene for the outfit's show and also camera and lighting effects.

Thus, the final part of the character construction is the make up the character with some texture of batik in order to generate character with batik mood. For that reason the batik picture in format of JPEG (RD) are mapping to the image in order to come out with texture character. Thus the final output of the character after do additional environment such as lighting, add some wizard for background and shining percent control the character now available for display after high rendering process.

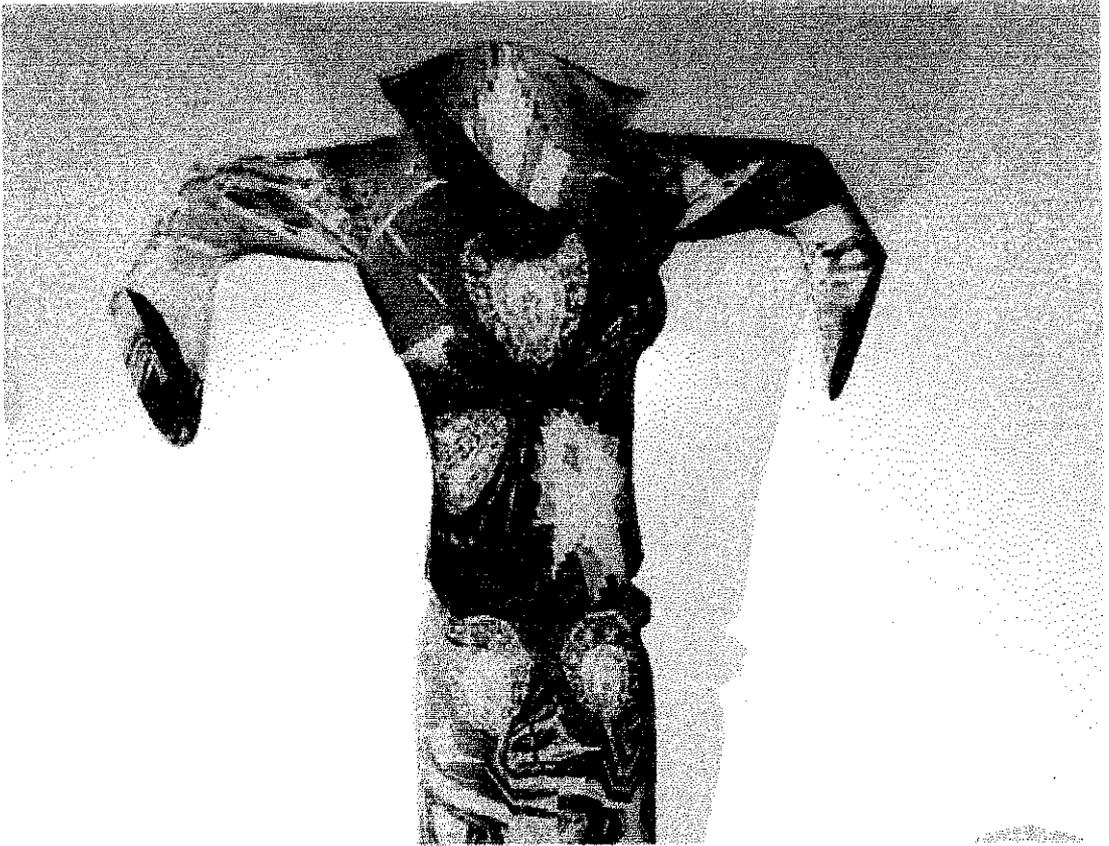


Figure 4.7: An outfit with lighting effect

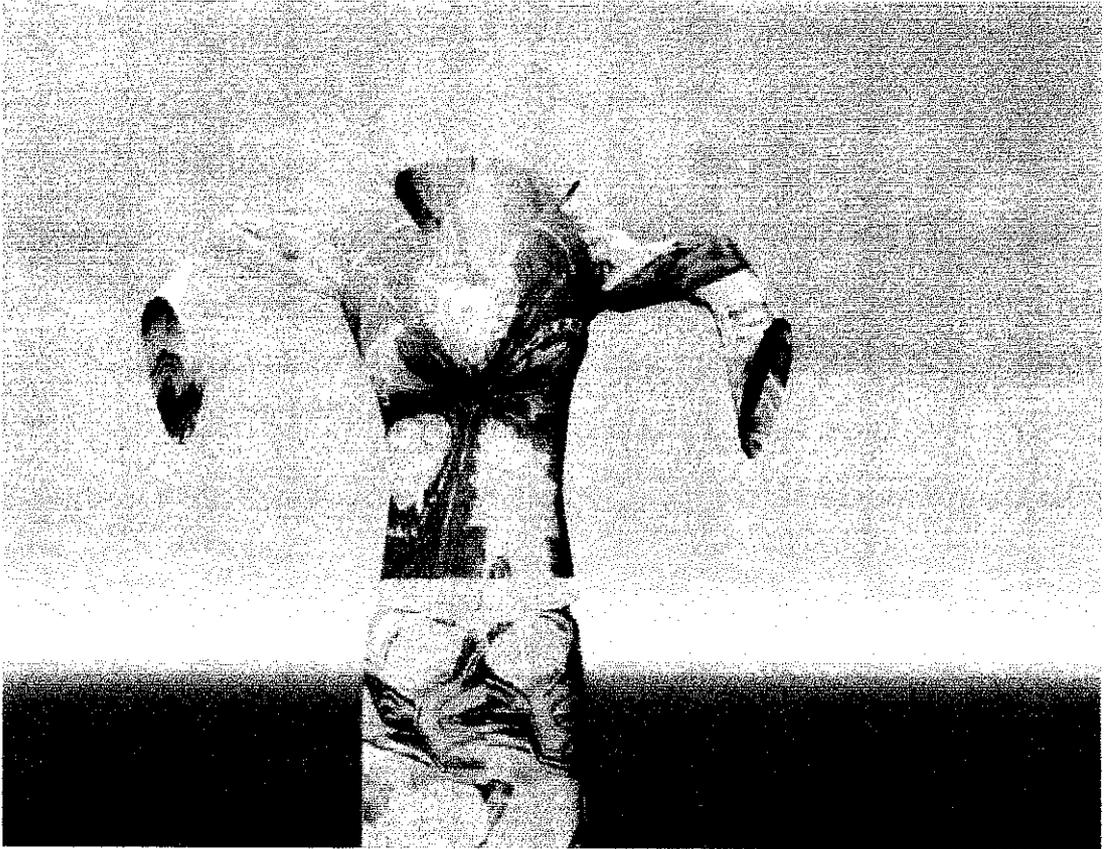


Figure 4.8: An outfit with blue scene and lighting effect from the top.

4.1.4 Editing texture using Adobe Photoshop

Simple software application where can make an editing for the texture of the batik to be simplified over an image. Thus the model is fits with the batik texture and the editing tools use for edits their suitability and colors after fits with the model. Adobe Photoshop requires the format of .jpg or .bmp to be loaded to the application, thus there are many extensions files supported also.



Figure 4.9 : The figure before and after texture mapping.

4.1.5 Conversion to VRML coding

The location of the VRML:

file://localhost/D:/Carrara/Batik_Fasion.wrl

```
#VRML V2.0 utf8
```

```
#Created By Carrara 1.0
```

```
Group {
```

```
  children [
```

```
    Shape {
```

```
      appearance Appearance {
```

```
        texture ImageTexture {
```

```
          url "Shader_11.jpg"
```

```
        }
```

```
      material Material {
```

```
        diffuseColor 0.0902 0.04314 0.05882
```

```
        ambientIntensity 0.2
```

```
        specularColor 0.93439 0.96706 0.82239
```

```
        emissiveColor 0 0 0
```

```
        shininess 0.32479
```

```
        transparency 0
```

```
      }
```

```
    }
```

```
  geometry IndexedFaceSet {
```

```
    solid FALSE
```

```
    coord DEF lastCoordinates0 Coordinate {
```

```
      point [
```

```
        7.42976 19.73347 8.70874,
```

```
        7.60451 20.20107 8.83626,
```

```
        7.27784 19.83921 9.09197,
```

```
        7.3998 20.36021 9.15632,
```

```
        8.41725 18.94496 7.80383,
```

```
        8.42571 18.97341 7.66369,
```

```
        9.14384 18.88972 7.92957,
```

```
        9.13542 18.90625 7.77835,
```


4.2 RESULT AND DISCUSSION OF TESTING AND EVALUATION PHASE OF PROTOTYPE

The implementation of the Virtual Character of Batik's Dress Fashion are not yet available in the current situation, thus I come out with the evaluation of this problem statement in order to make clear the objective and methodology of the character development and implementation. For that reason before the actual implementation are taken to the real situation, the evaluation on product it self need to be firm first before the evaluation including 3D environment in different area of used such as in fashion show. So that, the criteria are taken into consideration over the character such as movement, figure, texture, position and interface itself and also user interaction.

After the product is delivered to the certain target user the evaluation takes part. To discuss in further the results of the Testing and Evaluation Phase the questionnaire and random question are ask to about 30 person who is have and doesn't have a basic of 3D application background. This is because to gain as much as possible feedback related to others expectation and gather ideas also.

From the question ask, certain people comments on figure of the model which kind of out of shape and also colors over the texture. Some say nice in condition of display outfits which attract them to discover more on the figure instead of the texture itself. Beside that, they also comment on position of and model's outfits which is not position enough to user eyes point of view. As simple example such as they can't see the position of exact 60 degree from the left. Thus in order to come out with the solution of the satisfy products, the time frame can be use to position the product for certain single second each position.

Over the texture, the motif to deliver the batik fashion show to the selected user is satisfied. The user can see the batik texture cover the model figure. Thus there are still many corrections that must be to make the 3D model appearance to be more users interactive. As shown in the pie chart below the chart indicates that the users are more focus on movement before looking at other aspects. In details the movement aspect taking 35% from user's evaluation and their intention less than

'nice'. Thus another aspect in comment is 24% due to character's texture it self and 16% for user interaction meanwhile 10% for both interface and figure, and last but not lease 5% are take into account of position of the character over their position on stage and character's position. So that, the chart indicates that the some correction are need to be done in order to balance the percentage for each aspect.

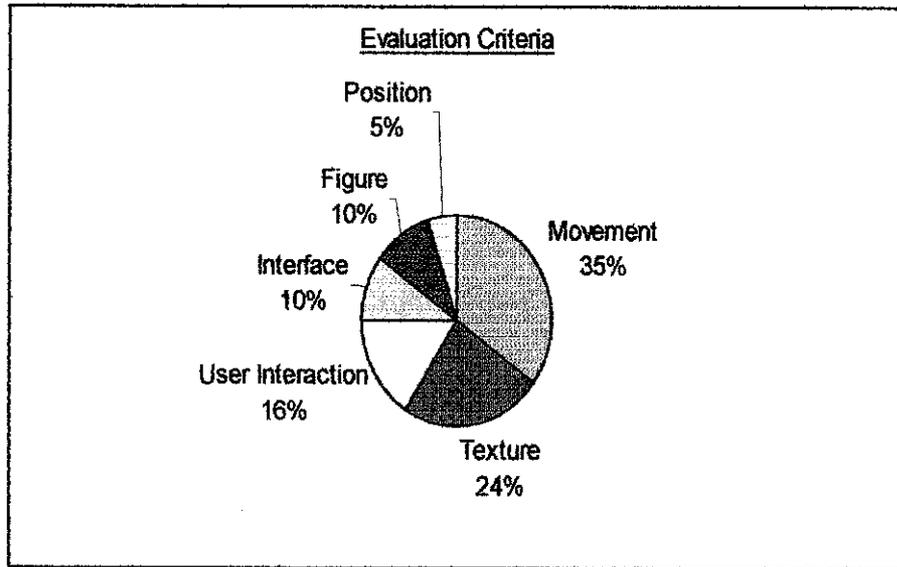
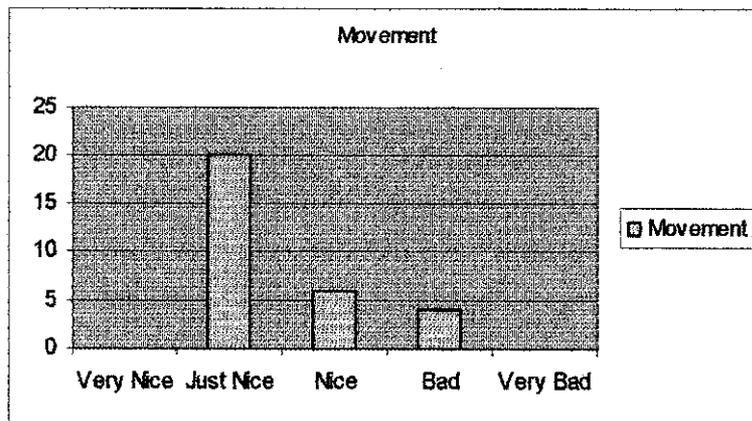


Chart 4.0: Evaluation criteria percentage over the character's movement, texture, user interaction, interface, figure and position.

Below are the charts that indicate the percentage of each criterion that can differentiate from each element.

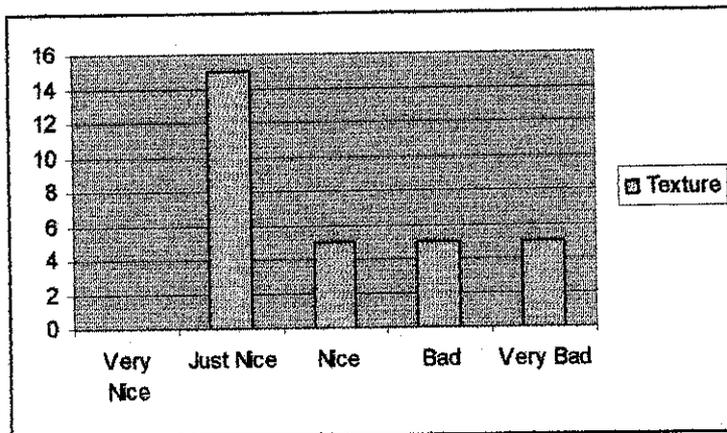
a. Movement.



Each movement of characters indicates the character is being able to turn right and left. So that, 20 person said there are have the movement which show in range of

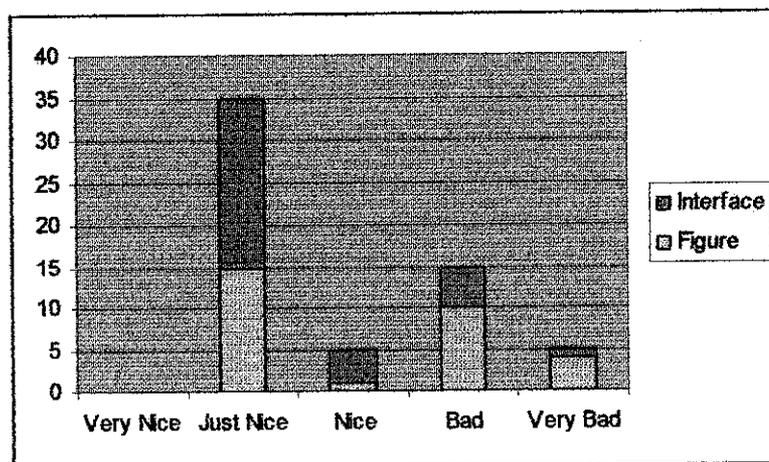
just nice movement that are suitable for the fashion show. Meanwhile 4 people commend on movement, they said the movement too slow and out of direction.

b. Texture



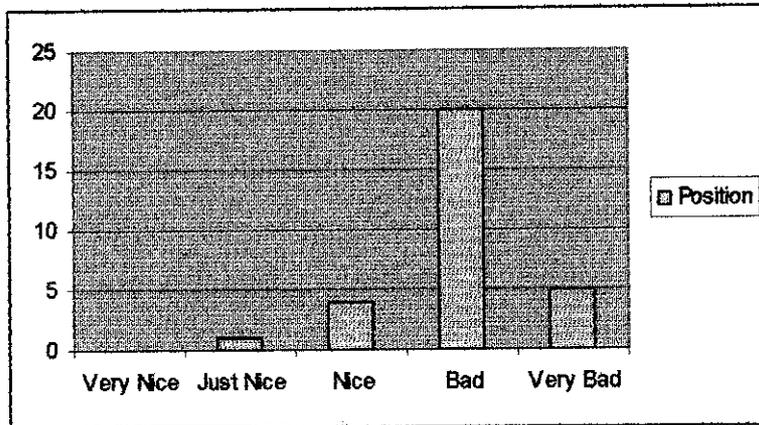
The chart above shows that batik textures over the character are quite conflict criteria among respondent. Few respondents commend that the texture very bad, it's because of can't clearly see the batik. This is actually the problem might occur during rendering and texturing process. For that reason the different batik texture are added to the character in order to come out with variety of design.

c. Interface and Figure



Interface and figure indicate 10% of overall evaluation whereby the interface and figure in just nice score, from 20, 15 people respectively, meanwhile quite a lot comment on bad score.

d. Position



The position can be defined as the position of character on the display mood that enable user see full of characters movement, figure, and texture.

Due to time constraint, these corrections could not be made within the project timeline. The next section will discuss on the recommended steps for the future enhancement of the project.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 PROBLEM ENCOUNTERED

Discussion on problem encountered show that several problems occur during the development and implementation of this virtual batik's character which is can be specified as minor problem. During the development, the problem encountered and alternative solution taken are including the problem due to unavailability of 3D application (including tools, plug-in and license), texturing and source code coding. Thus alternative for the problem encounter such lack of development application available make the developer moderate to other software. This migration due to trial version of software and also facilities available are not supported.

Meanwhile during the development phase, the problem of making texture available as real seems encountered a problem. This is due to the positioning image or textures in form of picture format over the character are specified as drag and drop tools. So that, the texture cannot be position to the make sense area such example in arms area or wrinkles areas. Furthermore, the image or texture just can be seen as rough texture over the character.

Other major issues is due to the implementation of coding source code where encounter the error while previewing the image over the display pad of VRML. Thus this problem slightly recover by add some more research to the problem encountered with referring correct coding and do the implementation evaluation.

5.2 RECOMMENDATIONS FOR FUTURE WORK

There are many recommendations that can be made to improve the product. These are useful in guiding the future enhancement of the project. The recommendations are as follows:

- 1) Improvements of the 3D models created by the 3D application program. There are many solutions that can enhance the outcome of the modeling process. Some 3D application such as Amapi3D, Carrara, 3DMaxs and also The OpenGL program can be embedded with computational formulas to map the coordinates of the object surface accurately. These formulas will adjust the range of the light intensity values so that the exact depth is emulated and the correct shape is produced.
- 2) Thus, enables the simulation of dressed character with different motion behaviors. There are tools for construction motion behaviors, designing garments and animation of cloth. In addition it provides a set of tools for users to design different motion behaviors and to animate character.
- 3) Instead of normal display, probably next project will use some virtual reality equipment in order to come out with real life display for better viewing. Some equipment such as Dual Projector for VR, active and passive glass or even data glove. Thus, in future hoping that the texture of the cloth can be touch and feel by using data glove for example. By using this way, probably helps more users and batik's entrepreneur before buy the products.
- 4) For further step also can be included improvement for classifying cloth into types and to apply collision detection and response according to the cloth type.

This project has brought attention upon the various aspects of 3-Dimension and also computer graphics field. Significant knowledge has been acquired on the applications of 3D graphics programming. The knowledge and experience gained

proved to be very useful. Hopefully in the future, the project can be improved based on the recommendations explained earlier.

5.3 CONCLUSION OF PROJECT

This project had managed to achieve the initial aims and objectives as specified earlier in the report. Many valuable knowledge and experience has been gain in studying the methods that can be used to generate 3D objects and scene including various texture and colors. Beside that, focus study on implementation of this 3D environment to the real life also stated that percentage of each element is varied. Thus findings introduce many concepts of 3D development, available software tools and 3D manipulations for adaptation to the real life especially in this case for helping batik's entrepreneurs in promoting batik.

The results of the research show that the theory of creating 3D model for purpose of commercial in various industries is commonly used nowadays. It can be seen as grows of number of 3D usage in different areas. For engineering as example it was use in simulation and restructuring building before the actual construction begin. In details, 3D environment also can be use in fashion show whereby as initial for promoting fashion over the internet in virtual environment. Thus, as recommendation for the batik's entrepreneurs of promoting batik, there are now available of alternative instead of 2D or manual process of promoting batik

The method provides used an easy way to generate 3D models without use of high technology and expensive tools. But more work need to be done to make this method of 3D modeling to become more convincing. At this point, simple object model can be generated by the product. But complex models such as the human face need more refined calculations do determined the correct shapes.

In simple terms, the creation of model in 3D are not too difficult, but the creative imagination and understanding approach use much help developer to master the 3D concepts. Thus by using approaches discuss earlier hopefully will give an ideas and

open an eyes of new comers or as an alternative for certain people to make changes in promoting, advertising or event studying the approaches.

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APPENDICES

[Instruction : Respondent are given PC and need to evaluate character]

The questions below ask about how you evaluate the Virtual Character of Batik's Dress Fashion Show. The question including the character's movement, figure, position, texture and also application evaluation including interface. Put the most appropriate response number for you on the side of each term, using the scale below.

Year / Semester :

Program :

Please rate your answer between the given ranges:

1	2	3	4	5
Very Nice	Just Nice	Nice	Bad	Very Bad

1. Do you think that character position is suitable enough for you to view the character? 1 2 3 4 5
2. Does the character movement satisfy you? 1 2 3 4 5
3. Does the size of character are appropriate and clear to show the batik's fashion show to you? 1 2 3 4 5
4. Does the character figure indicate the meaning of promoting batik to you? 1 2 3 4 5
5. Does the texture over the character show the batik sensation to you? 1 2 3 4 5
6. Does this Virtual Character of Batik's Fashion show application are easy to use? 1 2 3 4 5

7. How do you define implementation of 3D environment to this batik's promotion over internet are good? (i.e. by using VRML)

- Agree
- Neutral
- Disagree

Reason(s) / Other(s):

8. Do you think implementation of virtual batik promotion is moderate to current technology?

- Clear
- Not so clear
- Cannot see at all

Reason(s) / Other(s):
