

3D Virtual Tour For TAIPING Zoo

by

THET SAN

Dissertation submitted in partial fulfillment of
the requirements for the
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(Information Communication and Technology)

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Universiti Teknologi PETRONAS

Bandar Seri Iskandar

31750 Tronoh

Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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Universiti Teknologi PETRONAS

In partial fulfillment of the requirement for the

BACHELOR OF TECHNOLOGY (Hons)

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Approved by,

(Ms. Siti Rohkmah Bt M Shukri)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

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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 as except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



THET SAN

ABSTRACT

This project is building the system that would give users to feel virtual world. The main objective of the project is about entertainment, information and educational purposes. At the current situation, the website does not provide the link which directs to view the virtual environment, tour around and entertaining with 3D animals and objects. This project provides user to have more opportunities that they cannot get in the real world like getting closer and discover wild life animals. To provide virtual tour does not require travel but having an experience of moving through the selected areas. The project will really be helpful to users will get information and can think of what is the zoo like before they go to the zoo.

A virtual tour is virtual reality simulation of an actually existing location, usually comprising 2D images, a sequence of hyperlinked 3D objects of the real location, as well as other multimedia elements such as sound effects, music, narration and text. To build virtual tour for the whole TAIPING zoo providing the images and information of all animals is quite big task to get done alone. Therefore, it focuses on 5 cages and information about the animals inside each cage, and zoo environment. It will provide the map for user to choose animal that they desire to see. The expectation of this project is that user would feel satisfied with tour around virtual environment and 3D objects, and get information of the animal. With this project, zoo TAIPING would be more interactive and can attract more visitors' attention.

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TABLE OF CONTENTS

CERTIFICATION OF APPROVAL	i
CERTIFICATION OF ORIGINALITY	ii
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
CHAPTER I: INTRODUCTION	1
1 BACKGROUND OF THE SYSTEM.....	1
2 PROBLEM STATEMENT.....	3
3 OBJECTIVE OF THE SYSTEM	4
4 SCOPE OF THE SYSTEM	4
5 FEASIBILITY OF THE SYSTEM	5
CHAPTER II: LITERATURE REVIEW	6
1 ZOO IN THE WORLD	6
2 ANIMALS IN MALAYSIA	8
3 ZOO IN MALAYSIA	11
CHAPTER III: METHODOLOGY	15
1 SOFTWARE MODEL	15
2 SOFTWARE REQUIREMENTS	16
3 ARCHITECTURE OF THE SYSTEM	20
4 SAMPLE VRML CODING	22

CHAPTER IV:	RESULTS AND DISCUSSION	26
	1 RESULTS	26
	2 DISCUSSION	32
	3 CODING	34
CHAPTER V:	CONCLUSION AND RECOMMENDATION	36
	1 CONCLUSION	36
	2 RECOMMENDATION	37
REFERENCES		38

LIST OF FIGURES

Figure 3.1: System Prototype Diagram.....	21
Figure 4.1: Virtual Tour page-1	26
Figure 4.2: Virtual Tour page-2	27
Figure 4.3: Virtual Tour page-3	28
Figure 4.4: monkey (Virtual Tour page).....	28
Figure 4.5: eagle (Virtual Tour page)	29
Figure 4.6: monkey (Virtual Tour page).....	30
Figure 4.7: Site Map page.....	31
Figure 4.8: Flat Image (monkey).....	32
Figure 4.9: Creating Object in 3D studio max-1.....	33
Figure 4.10: Creating Object in 3D studio max-2.....	33
Figure 4.11: Creating Object in 3D studio max-3.....	34

CHAPTER 1

INTRODUCTION

1 BACKGROUND OF THE SYSTEM

Zoo is a facility in which animals are confined within enclosures and displayed to the public, and in which they may also be bred. About the species of mammals, birds, reptiles and amphibians, fish and invertebrates is in the zoo collection. Wildlife which refers to all non-domesticated plants, animals, and other organisms, can also be found in zoo. Many zoos in the world keep animals in enclosures that attempt to replicate their natural habitats, for the benefit of both resident animals and visitors. There are currently four big zoos in Malaysia. They are located in Ampang, Melaka, Johor Bahru and Taiping. Among of them, zoo TAIPING is placed in Perak Darul Ridzuan. It houses both local and exotic wildlife in excellent surroundings. There are also a host of animals from foreign lands including the African lions and others. The zoo is also opened daily for night safari. The TAIPING Night Safari attempts to display nocturnal animals in natural looking settings. For more information about zoo, the official website is provided, www.zootaiping.gov.my. The official website provides the images and information for animals but 3D Virtual Tour does not exist.

Virtual reality is the simulation of a real or imagined environment that can be experienced visually in 3D that may additionally provide an interactive experience visually in full real-time motion. A virtual tour is simulation of an actually existing location, providing 3D objects as well as other multimedia elements. As opposed to actual tourism, a virtual tour is accessed on a personal computer typically over the Internet.

This project is a virtual web based system which is based on zoo TAIPING to solve out for the lack of providing 3D Virtual Tour and for the purpose of pre-visit. It means virtual reality zoo, by using VRML, is created and set it up to the website. The system provides 3D Virtual Tour that user can tour around the zoo and experience the feeling of wildlife animal virtually. It also provides images and information about the species of mammals, reptiles and birds. To create virtual reality zoo more specific software, that can create 3D objects, virtual reality scenes and can manage for VRML script, are needed. For example, they are the most popular software: VRMLpad, VRML beans, SwirlX3D, 3D studio max and Maya. The last three cannot write VRML coding but it can import and export to VRML files (.wrl). In addition, to create web pages and database other software such as Macromedia Flash and MySQL are needed.

VRML is a standard file format for representing 3-dimensional interactive vector graphics designed particularly with the World Wide Web. VRML is a text file format

where vertices and edges for a 3D polygon can be specified along with the surface color, UV mapped textures, shininess, and transparency and so on. URLs can be associated with graphical components so that a web browser might fetch a web-page or a new VRML file from the Internet when the user clicks on the specific graphical component. Animations, sounds, lighting and other aspects of the virtual world can interact with the user. There are many VRML viewers software such as Cortona VRML, Flux player, Cosmo Player, OpenVRML, Octaga Player and so on. For the VRML coding we can even write in the text editor, Notepad and other specific software like VRMLpad, CosmoVRML and so on. If specific software like VRMLpad is used, it will be time-saving and less errors .The system will give the users not only the pictures and information but also in graphic design area like a game. The purpose of the project is to entertain the users with some graphic, especially for kids and elder people who want to experience tour around zoo virtually, and to give a good perspective of zoo TAIPING interactively.

2 PROBLEM STATEMENT

There is no zoo website that provides 3D virtual Tour in Malaysia. Web information on zoo basically does not provide 3D Virtual page for visitors to tour the zoo using online. Thus, this project is focusing on 3D Virtual objects and simple animations. This project will be a good opportunity for the kids and elder people who want to experience touring the zoo virtually. They can gather information about the zoo without visiting in real life.

The system consists of 3D graphics for flash traditional, business application and interactive services.

3 OBJECTIVES OF THE SYSTEM

- To provide a 3D virtual environment of zoo TAIPING
- To provide pre-visit information for visitors by having a 3D virtual world of zoo TAIPING
- To give awareness and exposure on wildlife animals in terms of 3D environment

4 SCOPE OF THE SYSTEM

The system will focus on using 3D Virtual environments. Following will be the scope of the project:

- Provide 3D architecture map of zoo TAIPING
- Provide interactive tour using 3D objects and information on each animals
- Provide the relevant information of the animals and their images from zoo TAIPING

Due to the cost of and limited access to wireless network in Malaysia, the package is built as a stand-alone application without requiring any subscription to a wireless network.

5 FEASIBILITY OF THE SYSTEM

This project mainly provides Virtual Tour link which can direct to tour around the zoo. The website provides two links which is to view simple webpage and 3D virtual tour. If user chooses to view simple webpage, it will provide zoo map which user can click any available spots on the map and then it will direct to the respective page that user clicked. The user can have chance to click the specific animals on the map and also can key in to search for specific animals. If user chooses for virtual tour, user can have moving through virtual zoo like go nearer animals and get information for each animal.

CHAPTER 2

LITERATURE REVIEW

1 ZOO IN THE WORLD

A zoological garden, zoological park, or zoo is a facility in which animals are confined within enclosures and displayed to the public, and in which they may also be bred. About the species of mammals, birds, reptiles and amphibians, fish and invertebrates is in the zoo collection. Many zoos in Europe and North America keep animals in enclosures that attempt to replicate their natural habitats, for the benefit of both resident animals and visitors. A petting zoo (also called children's farms or children's zoos) features a combination of domestic animals and some wild species that are docile enough to touch and feed. Petting zoos are popular with small children. Some zoos have walk-through exhibits where visitors enter enclosures of non-aggressive species, such as lemurs, marmosets, birds, lizards, turtles. Wildlife refers to all non-domesticated plants, animals, and other organisms. Wildlife can be found in all ecosystems, deserts, rainforests, plains and other areas including the most developed urban sites. Especially in Africa and India are rich wildlife.

Familiar African animals such as giraffes, zebras, hippos and rhinos live along riverbanks and water holes. DeBrazza's monkeys and colorful African birds can be also found in the all of African zoos. Most of the wild animals in Africa are kind of mammal (such as African elephant, lion, cheetah, gorilla, camel), reptile (such as leopard tortoise), and bird (such as black footed penguin).

The most famous animals in Australia are Dolphin, Sharks, Kangaroo and Cockatoo (salmon-crested and sulphur-crested Cockatoo). The rich fauna of India includes rhinos, elephants, tigers, cranes, black bucks, lions, peacocks, cobra, white Bengal tiger, peacocks etc.

Animals in South East Asian are from the tropical regions (rainforest & wetlands). Since Malaysia is one of South East Asian countries, Malaysia has almost animals that are from the tropical regions of SEA and Asia. The Malaysian rainforest holds hundred of thousands of animal species, many of which are unique to the region and the world region and world. almost 300 species of mammals live here including tigers, elephants, rhinoceros, black and white tapirs, civet cats (called "musang" in Malay), leopards, honey bears and two kind of deer – the sambar, and the barking deer (called "kijang" in Malay) with its dog-like call. Malaysia is also home to the cat-sized mousedeer (called "kanchil" in Malay) which is technically not a deer at all. There is also the badger-like binturong with its prehensile tail and many kinds of gibbons (small apes) and monkeys

including the quaint loris with its sad eyes and lethargic manner. Sabah and Sarawak is home to the extraordinary Orang-Utan.

2 ANIMALS IN MALAYSIA

The following list includes all mammals which occur in Malaysia and are rated as Critically Endangered, Endangered or Vulnerable. This information are taken from the website.

- Critically Endangered:
 - Black Shrew (Endemic to Malaysia)
 - Horseshoe Bat species
 - Javan Rhinoceros
 - Malayan Roundleaf Bat (Endemic to Malaysia)
 - Malayan Water Shrew (Endemic to Malaysia)

- Endangered:
 - Asian Elephant
 - Banteng
 - Blue Whale

- Bornean Tree Shrew
 - Borneo Water Shrew (Endemic to Malaysia)
 - False Serotine Bat (Endemic to Malaysia)
 - Malayan Shrew (Endemic to Malaysia)
 - Mountain Spiny Rat (Endemic to Malaysia)
 - Orang-utan
 - Proboscis Monkey
 - Sei Whale
 - Small Spiny Rat (Endemic to Malaysia)
 - Summit Rat (Endemic to Malaysia)
 - Tiger
-
- Vulnerable:
 - Asiatic Black Bear
 - Asiatic Golden Cat
 - Bare-backed Rousette (Fruit Bat)
 - Bay Cat
 - Bornean Smooth-tailed Tree Sherw (Endemic to Malaysia)
 - Clouded Leopard

- Coppery Pipistrelle (Bat) (Endemic to Malaysia)
- Cox's Roundleaf Bat (Endemic to Malaysia)
- Dhole
- Dugong
- Eurasian Otter
- Fishing Cat
- Flat-headed Cat
- Four Striped Ground Squirrel (Endemic to Malaysia)
- Gaur
- Hairy-nosed Otter
- Hose's Palm Civet (Endemic to Malaysia)
- Hose's Shrew (Endemic to Malaysia)
- Humpback Whale
- Jentink's Squirrel
- Kinabalu Ferret-badger (Endemic to Malaysia)
- Lesser Raneer Mouse
- Mainland Serow
- Malayan Porcupine
- Malayan Roundleaf Bat (Endemic to Malaysia)

- Malayan Tapir
- Marbled Cat
- Northern Pigtail Macaque
- Pig-tailed Macaque
- Rane Mouse
- Ridley's Lear-nosed Bat
- Smooth-coated Otter
- Stumptail Macaque

3 ZOO IN MALAYSIA

There are four big zoos in Malaysia which are:

3.1 Zoo Negara

Zoo Negara was officially opened in 1963 at its current location by Y.T.M Tunku Abdul Rahman Putra Al-Haj, the first Prime Minister of Malaysia. Zoo Negara or the National Zoo was established by founder and first Chairman of MZS, Mr. V.M Hutson (Later known as Tan Sri V.M. Hutson). In the early 1950s, Mr Hutson, an animal lover, took

into his care animals that were abandoned or injured by illegal trappings. He housed them in his 5 acre garden at the Bangsar Estate (now known as Bukit Damansara, Kuala Lumpur). Every weekend, large numbers of people drove out to the 3rd mile, Jalan Damansara where Mr. Hutson lived, and walked around his garden viewing these animals. In the collection was an Indo-Chinese Tiger named Nicky, three Orang Utans named Jacko, Suzan and Jane together with six Estuarine Crocodiles. This collection formed the nucleus for our National Zoo.

3.2 Zoo Melaka

Zoo Melaka is located about 13km from Melaka City. It is the second largest Zoo in the country encompassing 54-acres with more than 1,200 animals of over 200 different species. It is also the first Zoo in the region to exhibit the rare and endangered Sumatran Rhinoceros and Gaur. The Zoo was established in 1963. Since 1979, the Department of Wildlife and National Parks, Peninsular Malaysia took over the management of the Zoo to enhance its operations and upgrade its services for public's benefit. Zoo Melaka is easily accessible by public transportation via the city's bus terminal.

3.3 Zoo Negeri Johor

The Johor Bahru zoo is one of the oldest in the country. It was built in 1928 by Sultan Sir Ibrahim and was handed over to the state government to manage in the 1960s and

open to the public in 1962. There are 100 species of animals in the 5ha compound. The entrance charge is RM2 for adults and RM1 for children. The zoo opens daily from 8am to 6pm and is visited most during public holidays and school holidays.

3.4 Zoo Taiping

It is located at the Taiping Lake Gardens, covers an area of 34 acres it houses both local and exotic wildlife in excellent surroundings, making it a popular spot for family outings. It is also the only zoo in the northern region of Peninsula Malaysia. It is currently home to more than 1200 species of wildlife animals which are the endangered species including the whitehead eagle (Brahmini Kita/Halistur Indus), honey bears, black panthers, Malaysian tigers and elephants, lions, hippopotamus, giraffes, hornbills, orang utans, deer, reptiles, mammals and others can be witnessed in the natural-looking enclosures. There are also a host of animals from foreign lands including the African lions. For a small fee, you are able to treat yourself to the exotic sights and sounds of some of Malaysia's wild animals in an enclave of natural settings with streams, lakes and abundance of flora. It is opened daily from 8 am to 6 pm and 8 pm to 11 for night safari.

3.5 Taiping Night Safari

The TAIPING Night Safari is a first of its kind in Malaysia. Bathed in lighting similar to moonlight, the beauty and splendor of nature is enhanced. In an effort to maintain the experience of a natural environment, the TAIPING Night Safari attempts to display nocturnal animals in natural looking settings. This provides the opportunity for visitors to appreciate the value the treasures of nature while enjoying oneself.

CHAPTER 3

METHODOLOGY

1 SOFTWARE MODEL

Software process model is an abstract representation of a software process. Each process model represents a process from a particular perspective so only provides partial information about that process. There are many ways to categorize methodologies. For this project, using prototyping process model is appropriate because it can give clear picture of what project will look like through prototype. It will give us right away the 3D looks and feel in early project development.

1.1 Prototyping Process Model

A prototype is a software system which is used to demonstrate concepts, try out design options, generally, to find out more about problem and its possible solutions, to perform the analysis, design, and implementation phases concurrently, and all three phases are performed repeatedly in cycle until the system is completed. With these methodologies, the basics of analysis and design are performed, and work immediately begins on a system prototype. The first prototype is usually the first part of the system that the user

will use. The key advantage of a prototyping-based methodology is that it very quickly provides a system for the users to interact with.

1.1.1 Evolutionary Prototyping

Evolutionary Prototyping is now the normal technique used for web-site development and e-commerce applications. The objective of evolutionary prototyping is to deliver a working system to end users. This means that it should be normally started with user requirements which are best understood and which have the highest priority.

2 SOFTWARE REQUIREMENTS

Below is the specific software that is needed for developing the project. They are taken from internet.

2.1 CortonaVRML Viewer

Cortona VRML Client is a fast and highly interactive Web3D viewer that is ideal for viewing 3D models on the Web. A set of optimized 3D renders guaranties the best visual quality on both PCs with the latest video-cards and those with more basic video

card capabilities. Cortona VRML Client works as a VRML plug-in for popular Internet browsers (Internet Explorer, Netscape Browser, Mozilla, Mozilla Firefox, etc.) and office applications (Microsoft PowerPoint, Microsoft Word, etc). But Cortona Client is more than just a plug-in. The powerful Automation Interface allows you to add exciting 3D capabilities to your Web site and standalone applications.

2.2 VRMLpad

VRMLpad is a professional editor for VRML programming. Key time-saving features include powerful editorial abilities and visual support for the scene tree and resource operations.

Key features:

- Smart autocomplete
- Dynamic errors detection
- Visual support for the scene tree operations
- Routing map
- Operations on resources
- Ability to preview the VRML scene
- Automation and scripting
- Publishing wizard

2.3 Macromedia Dreamweaver Mx 2004

Macromedia Dreamweaver MX 2004 is a versatile tool with an interface similar to that of Macromedia's Flash Mx 2004. It can more easily perform many of the tasks and can insert and edit text, as well as create more complex XHTML elements, such as tables, forms, frames and much more.

2.4 VRML beans

VRML bean is a reusable VRML component that can be used in design/runtime Java Beans environments. For the outside world VRML bean looks like a 3-D object with well defined properties and behaviors. It allows anyone to create 3-D virtual worlds in a matter of minutes. It includes

- 20+ Prebuilt 3-D Objects
- The ability to draw walls, floors, ceilings.
- A Resizable Authoring Interface Support for different sky and ground surfaces.
- Importing of 2-D pictures into scenes.
- Support for background music. Compatibility

2.5 3D Studio (3ds Max)

This application is a full-featured 3D graphics application developed by Autodesk Media and Entertainment such as 3D modeling, animation, rendering, and effects solution is used to produce games and video content. Widely used in the areas of interactive games, visual effects for movies and industrial design models, the software lets you create 2D shapes that become the cross sections of the 3D models. The application includes an animation module that uses inverse kinematics, which links components so that they move together, adding to the effect of bringing a character to life.

2.6 SwirlX3D

SwirlX3D is a powerful X3D and VRML authoring environment that displays scenes as they are being built. X3D is an interactive 3D medium that is designed from communication over the internet. Not only does it contain a rich variety of geometry nodes, but it also supports animation through TimeSensor, interpolator and Script nodes. It also supports user interaction through sensor nodes. The graphical editing interface of SwirlX3D gives full access to the data structures in an X3D file and is able to preview the completed scene. X3D is the language that brings 3D scenes and interactivity to the internet, and to standalone applications. X3D is the open standard for 3D on the internet.

3 ARCHITECTURE OF THE SYSTEM

In every webpage, there are 6 main links which are home, site map, educational activities, enquiry, contact us and feedback. These 6 main links is set up in every web page. User can link each of them anywhere in the website. In the main page, user can have choice either to go to 3D Virtual page or simple webpage. If the user chooses 3D virtual, the Virtual Tour will be activated and user can tour around zoo like going to any cage that they desire. If the user chooses simple webpage, the webpage is providing user a map to specify the animal. On the map, visitors can choose depends on the spots which are monkey, bird, tiger, lion, elephant and hippo. Architecture of the system is shown in diagram below.

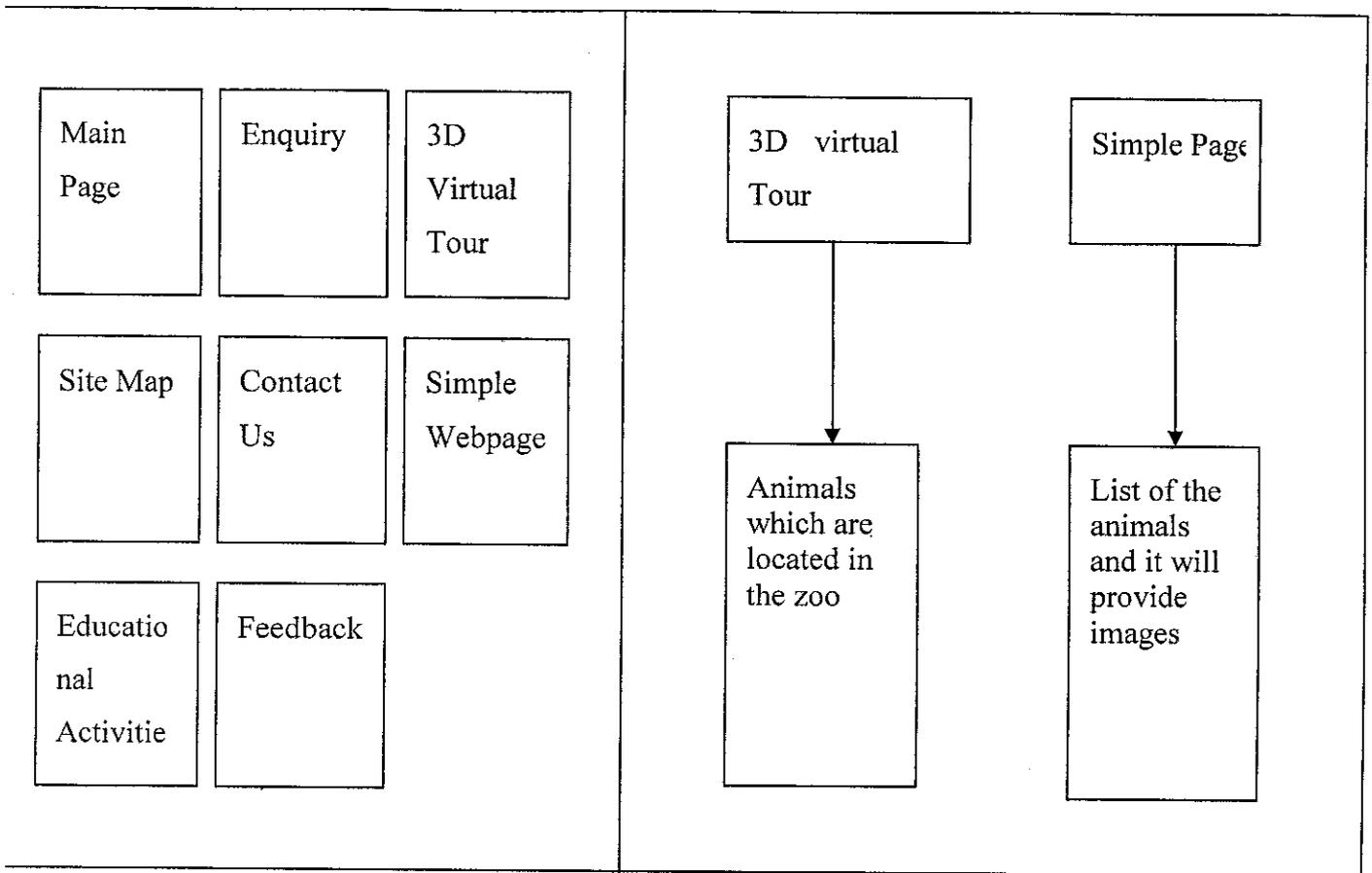


Figure 3.1: System Prototype Diagram

4 SAMPLE VRML CODING

Viewpoint {

position 1 9 15

orientation 1 0 0 -0.5

}

DEF TRANSFORM Transform {

children [

a local for box

DEF BOXTRANSFORM Transform {

children [

Shape {

appearance Appearance {

material Material {

diffuseColor 0 0 1

emissiveColor 1 0 0

}

}

```

        geometry Box{}
    }
]
}

DEF PINTERP PositionInterpolator {
    key [0.0, 0.18, 0.36, 0.5, 0.68, 0.86, 1.0]
    keyValue [0 1 0, 1 1 -1, 1 1 -2, -0.5 2 -5, 2 5 -3, 0 6 -2, -
1.5 1 0]
}

DEF CLOCK TimeSensor {
    cycleInterval 20.0
    stopTime 0
    startTime 1
    loop TRUE
}

DEF OINERP OrientationInterpolator {
    key [ 0.0, 0.33, 0.66, 1.0, 1.5, 0.0, -0.5]
    keyValue [1 0 1 0, -0.5 -3 0 1, 0 1 -2 1, 4 2 -2 1]
}

```

```

    }
    DEF CLK TimeSensor {
        cycleInterval 8.0
        startTime 1
        stopTime 0
        loop TRUE
    }
]
}

ROUTE CLOCK.fraction_changed TO PINTERP.set_fraction
ROUTE PINTERP.value_changed TO
BOXTRANSFORM.set_translation
ROUTE CLK.fraction_changed TO OINERP.set_fraction
ROUTE OINERP.value_changed TO TRANSFORM.set_rotation

```

This coding is the study of moving box by using virtual reality modeling language programming. In this coding, we can see the capability of moving a local object around the scene by PositionInterpolator. The box will rotate along each axis, one after the other in this sample coding, by OrientationInterpolator.

4.1 PositionInterpolator

The PositionInterpolator node interpolates SFVec3f values that may be used in the translation field of a Transform node for producing smooth motion between two locations in three-dimensional space.

4.2 OrientationInterpolator

The OrientationInterpolator node calculates interpolated values specified in the SFRotation datatype. The OrientationInterpolator node is used to produce rotational values which may be applied to transform nodes to produce smooth rotational animation of objects.

CHAPTER 4

RESULTS AND DISCUSSION

1 RESULTS

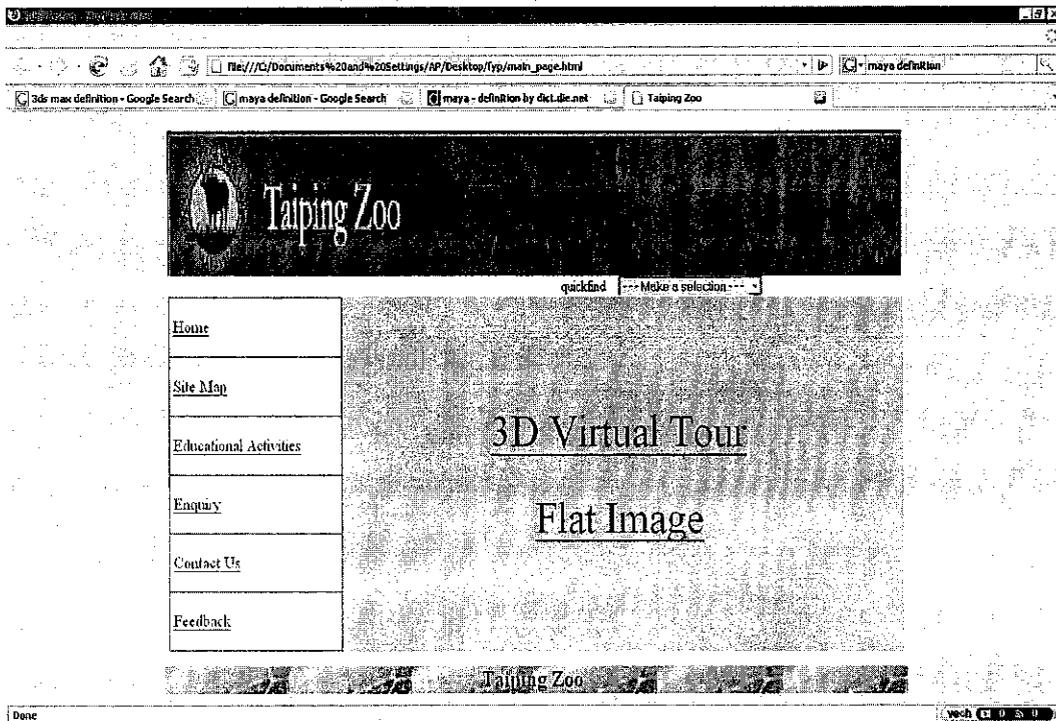


Figure 4.1: Virtual Tour page-1

The figure is showing the main page of the website. Based on the screen, user can have choice either to go for 3D Virtual Tour or Simple Flat Webpage. If user chooses one of them, the webpage will direct to relevant page which is shown in next figure, Figure.4.2.

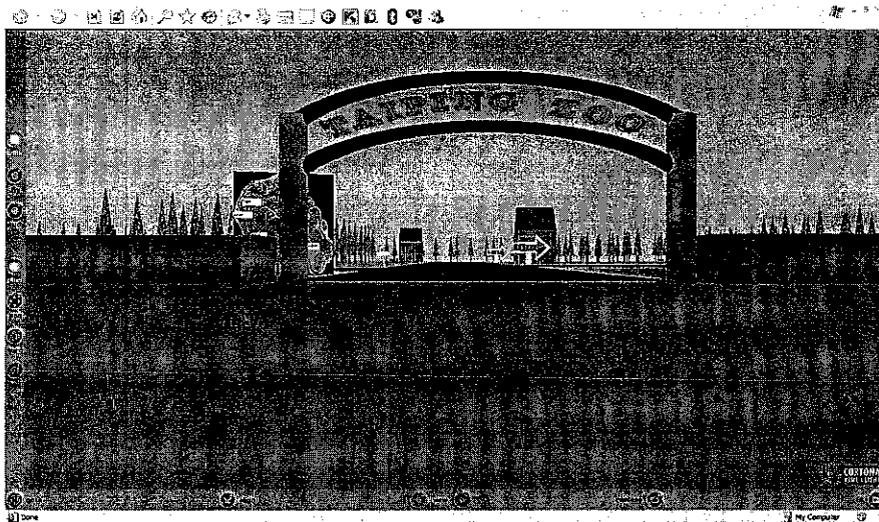


Figure 4.2: Virtual Tour page-2

After user chose 3D Virtual Tour, it direct to virtual tour page which is shown in figure above. It is the entrance of TAIPING zoo and user can go inside and tour around the zoo. The next figure will show the cage nearer.

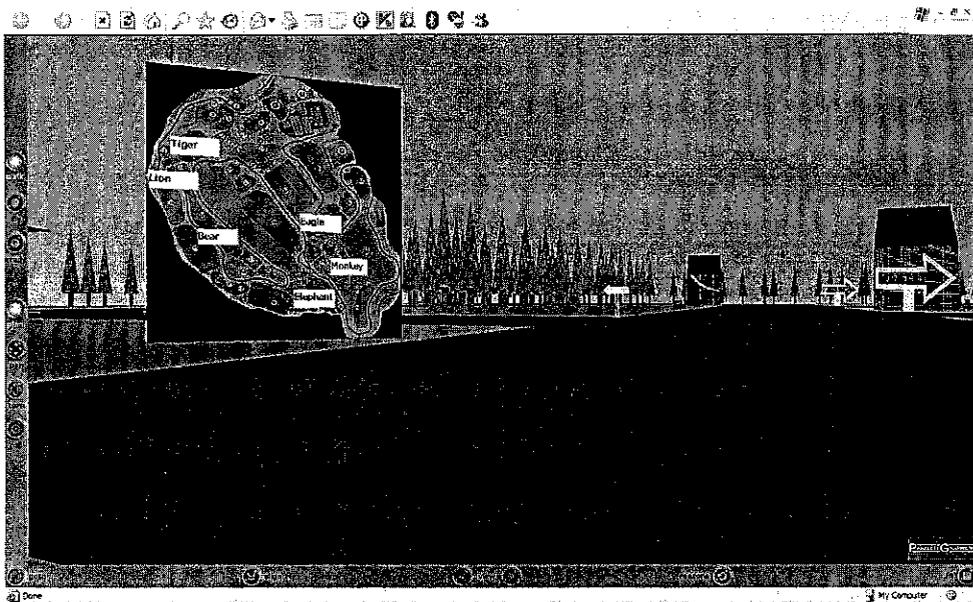


Figure 4.3: Virtual Tour page-3

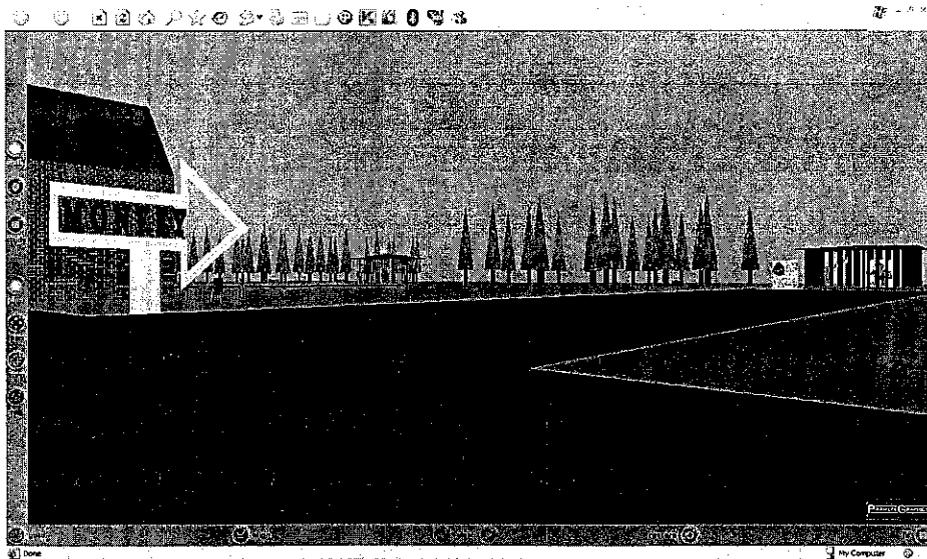


Figure 4.4: monkey (Virtual Tour page)

Figure 4.4 is showing the map of the zoo and it states the places of each animals. User can see the map from any view which is 360 degree by using Billboard group nodes in VRML programming. Figure 4.5 is showing the monkey signboard which is pointing out to monkey cage.

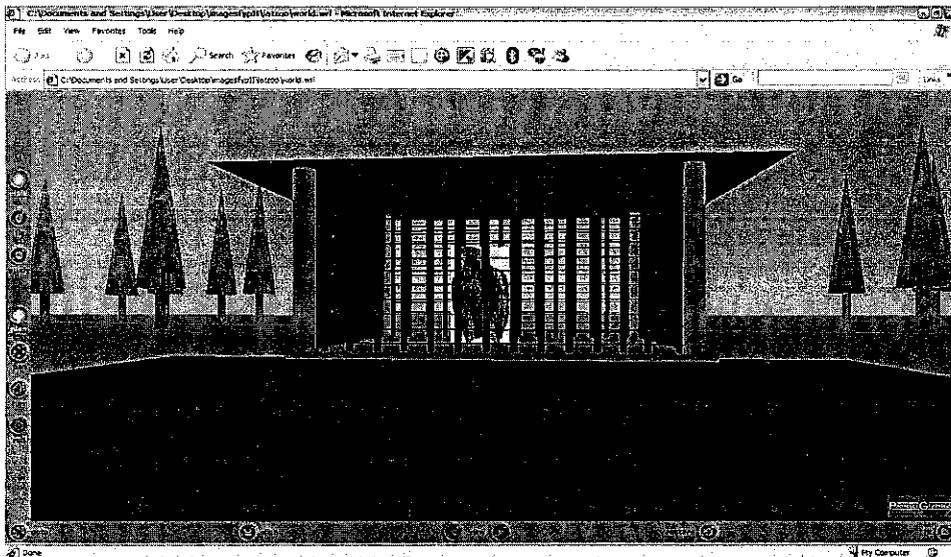


Figure 4.5: eagle (Virtual Tour page)

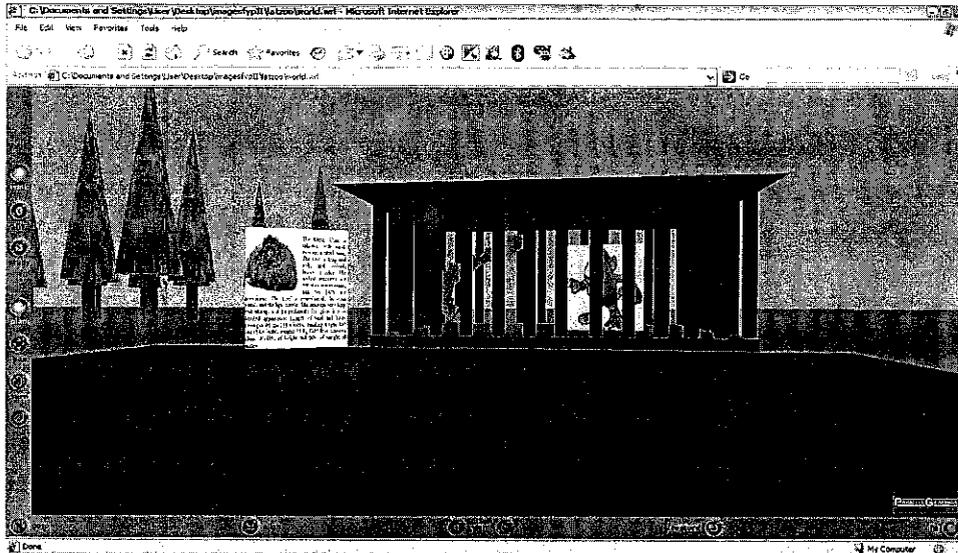


Figure 4.6: monkey (Virtual Tour page)

Figure 4.6 is showing a bird cage. These cages are created by using 3D studio max software. Figure 4.7 is showing a monkey cage and information about monkey, for example, details about what kind of monkey and where does monkey come from.

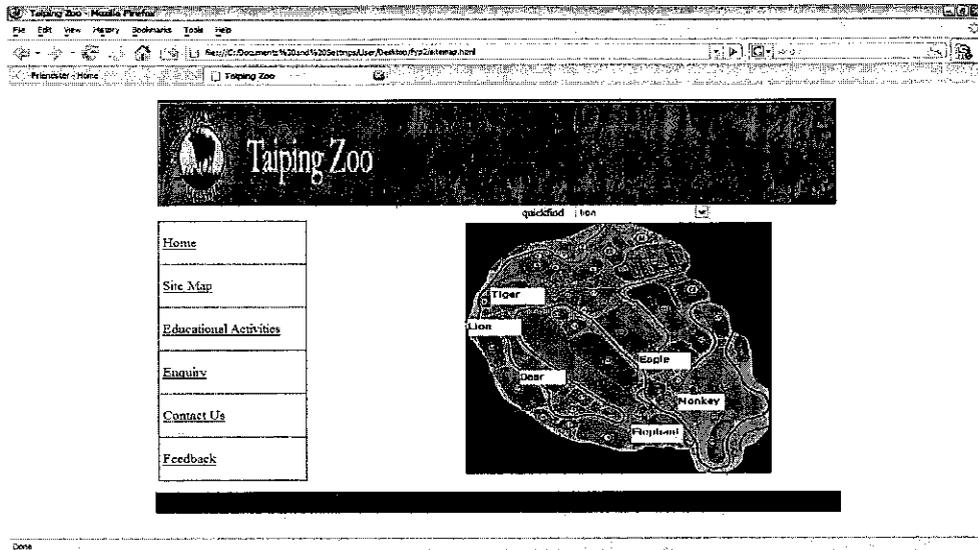


Figure 4.7: Site Map page

The figure is showing the site map of website based on the users selected. The user can link spots which are marked on the map. If the user choose simple webpage and choose the monkey on the map for instant, the relevant webpage will be displayed which is shown in Figure.4.9.

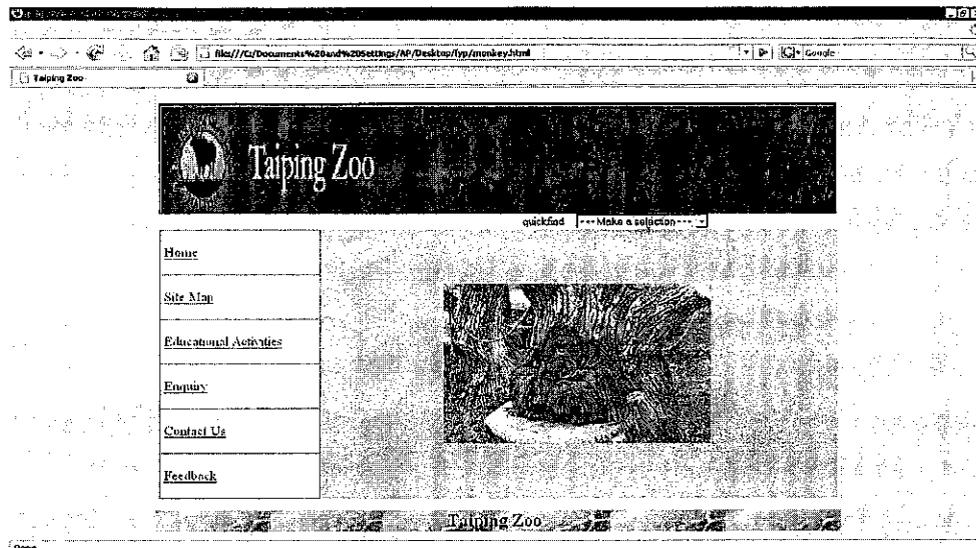


Figure 4.8: Flat Image (monkey)

2 DISCUSSION

This project would be an interesting project to work with as there is involvement in 3D modeling objects and animation. The project requires expertise in VRML and a few 3D software tools such as 3D Studio Max. 3D objects (cages) that are shown in figure 4.10 and 4.11 Virtual Tour Page, are created in 3D Studio Max. First, the foundation of the cage needs to be created and then need to build iron stick surroundings and its roof. Below is the figure showing the creation of an object in 3D Studio Max.

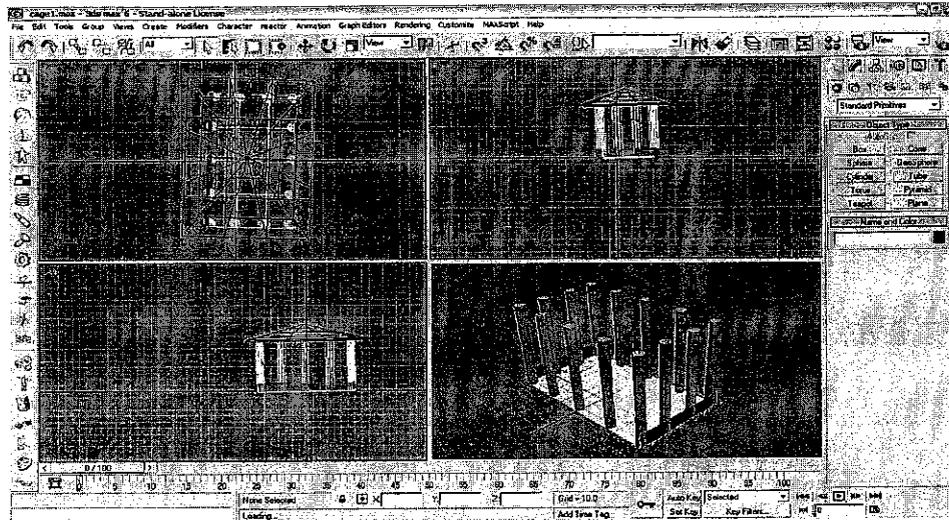


Figure 4.9: Creating Object in 3D studio max-1

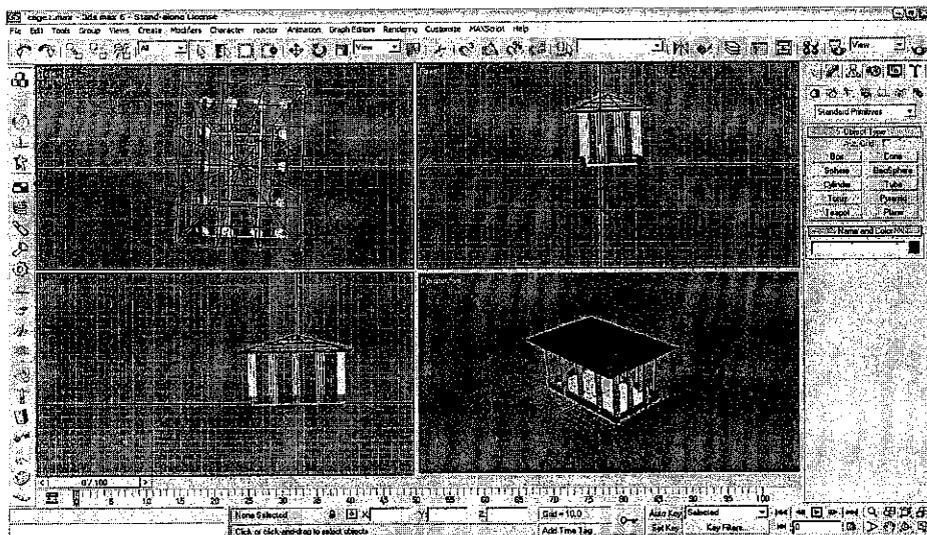


Figure 4.10: Creating Object in 3D studio max-2

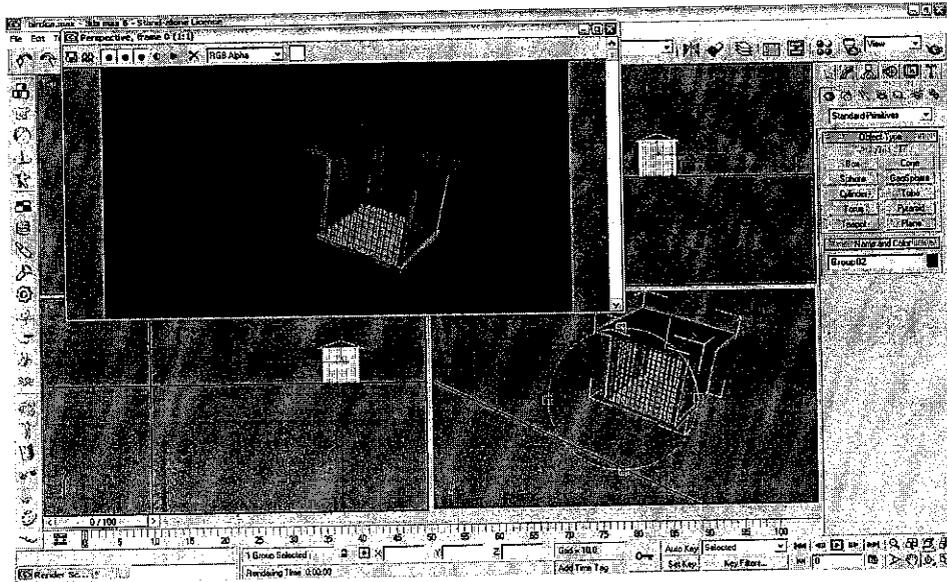


Figure 4.11: Creating Object in 3D studio max-3

3 CODING

```

Transform {
  children [
  Viewpoint {
    position -2.12252879142761 0.5 55.8181374073029
    orientation 0 1 0 0
    description "Starting Point"
  }
  ]
}
  
```

}

This coding is for starting point which means first view of the system and first point to start to tour around zoo. It can be changed to other view also to set starting point. The coding is only about starting point because it is too much line to show even for entrance object in VRML programming. In the coding, Transform is a group node which can be assessed many children. This is the sample coding of the system. There are hundreds of line of code of the system that is why cannot include in this report and only show the samples.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

1 CONCLUSION

3D Virtual Tour is a good opportunity for virtual interactive touring. It is worth to enjoy one's leisure time because it provides 3D objects, information about animals and zoo. It can be a mode of refreshing and relaxing from stressed. It also shows good perspective of zoo TAIPING. The project will help users to gain pre-visit information before going to the zoo. They will have a better clear idea of zoo TAIPING without even visiting it in real life. The project is basically aim to introduce the virtual reality interactive world to zoo websites. Besides, people will get more attention on wildlife animals and be aware of. This kind of project could encourage Malaysia's official zoo websites to provide virtual tour to make it more interactively rather than only flat images and information of animals. Furthermore, the project entertains especially for kids and elder people who want to experience touring around zoo virtually. By doing this project, hopes that people will start to become more interested and appreciate the wild life nature in Malaysia. The expectation of the project is that satisfied people using virtual reality simulation of real location of zoo TAIPING.

2 RECOMMENDATIONS

There are more steps to be covered in this project. In future, more objects (animals, signboard, and information board for animals) can be created and set it up on Virtual Tour. Gathering details information on:

- **Architecture of zoo TAIPING in 3D**

The architecture of the system would be developed more in 3D in order to fulfill the objectives of this project. The map and the objects in this system are needed to enhance in 3D form to entertain interactively.

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