

raf

QA76.9.I58 .A36 2004



0000037749

FTMK virtual tour / Afnan Md. Mahyiddeen.

FTMK VIRTUAL TOUR

AFNAN BIN MD. MAHYIDDEEN

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Information Technology (Interactive Media).

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
2004

TESIS APPROVAL STATUS FORM

TITLE : FTMK VIRTUAL TOUR

ACADEMIC SESSION : 2003 / 2004.

I Hereby : AFNAN BIN MD. MAHYIDDEEN


I hereby allow this thesis (PSM/Graduate/PHD) will be kept by Faculty of Information and Communication Technology library under these usage requirements:

1. The thesis are officially owned by KUTKM.
2. The Faculty of Information and Communication Technology library are allowed to distribute the copies of the thesis for educational purpose only.
3. The Faculty of Information and Communication Technology library are allowed to distribute the copy of this thesis as an exchange between higher learning institution.
4. Please Tick (/)

_____ CONFIDENTIAL (Contains information that has security level or the importance of Malaysia, as quote in the ACT of OFFICIAL SECRET 1972).

_____ LIMITED (Contains LIMITED information that had been classified by organization / institution where the research is held).

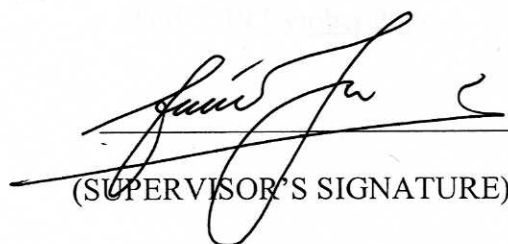
/ UNLIMITED



(AUTHOR'S SIGNATURE)

Lot 1545,
Kg. Surau Kota,
15100, Kota Bharu,
Kelantan.

19 October 2004.



(SUPERVISOR'S SIGNATURE)

Miss Rusnida Bt. Romli

19 October 2004..

ADMISSION

I admitted that this project title name of

FTMK VIRTUAL TOUR

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

STUDENT : 
(AFNAN BIN MD. MAHYIDDEEN)

Date : 19 October 2004.

SUPERVISOR : 
(MISS. RUSMIDA BT ROMLI)

Date : 19 October 2004.

DEDICATION

I would like to dedicate my final project and this thesis to all lectures who had thought me about the ICT (Information Communication Technology) world. It is my honor to appreciate them for what they have given me since the first day I step my feet in KUTKM (Kolej Universiti Kebangsaan Malaysia). Without them, this project and thesis might not been published as there are a lot of researches needed in developing a perfect project that contains all the multimedia elements.

As for my beloved parents, I would like to thanks them for supporting me throughout the development of the FTMK Virtual Tour project. Their supports have given me the courage to keep on moving although it took time to implement all the phases.

And lastly, I would like to thank for each individual and organizations that has contributed time, resources either directly or otherwise toward the completion of this thesis and project.

ACKNOWLEDGEMENTS

**IN THE NAME OF ALLAH, (AL MIGHTY) THE GRACIOUS, THE MOST
MERCIFUL.**

Thanks to God that finally I have completed the Projek Sarjana Muda 2 (PSM 2) successfully. I would like to thank Kolej Universiti Teknologi Kebangsaan Malaysia (KUTKM) for given me their full trust and also gave me the opportunity to improve my self throughout this project. I wanted to thank my parents for given me a support when I needed it most. Special thanks to my project supervisor, Miss Rusnida Bt Romli for her guide and attentions. Thank you for spending times to answer all my e-mail and my questions. Lastly I want to thank everyone who helped me to complete this report and also help me throughout the achievement of this project.

ABSTRAK

Tesis projek 'FTMK(Fakulti Teknologi Maklumat dan Komunikasi) and Virtual Tour' adalah disediakan untuk Projek Sarjana Muda 2 (PSM 2). Ia mengandungi kombinasi keseluruhan aktiviti, kajian dan progress projek yang digabungkan dalam satu laporan akhir. Tesis ini meliputi pengenalan projek, kajian literatur, perancangan dan metodologi projek, kajian analisa, rekebentuk, pelaksanaan, pengujian serta kesimpulan bagi keseluruhan projek. Pelajar telah membuat kajian mengenai *virtual reality (VR)* bagi tujuan projek ini. Kajian adalah berkaitan dengan keperluan yang diperlukan serta kajian terhadap contoh-contoh project yang sudah sedia ada bagi tujuan rujukan pelajar dalam membangunkan projek ini. Skop bagi projek ini adalah lebih tertumpu kepada plan bangunan FTMK. Metodologi yang digunakan adalah seperti *waterfall model dan Multimedia Design Methodology*. Sepanjang pembangunan projek yang dilakukan, pelajar telah memperolehi pelbagai pengalaman dan pengetahuan daripadanya. Sebagai kesimpulan, tesis ini akan memaparkan keseluruhan kajian dan pembangunan yang telah dilaksanakan oleh pelajar sepanjang PSM 2.

ABSTRACT

This FTMK (*Fakulti Teknologi Maklumat dan Komunikasi*) Virtual Tour project thesis was made for the “Projek Sarjana Muda 2” (PSM 2). It contained the student project progress where all activities and researches were combined together as one final thesis. This thesis concluded the introduction of the project, the literature research, project planning and methodology, the analysis research, design, implementation, testing and lastly the project conclusion. For this project, student had done a research on virtual reality (VR). It concludes research on the requirement and on the available project that was used as a guide for the student to develop the project. The scope for this project focuses on FTMK department building plan itself. Methodology that was used in this project is such as the waterfall model and also the Multimedia Design Methodology. Throughout the development of the project, students have achieved many experiences and knowledge from it. As a conclusion, this final thesis showed what the student has achieved from the research and development that was made within the PSM 2 project.

TABLE OF CONTENTS

PROJECT TITLE	I
TESIS APPROVAL STATUS FORM	II
ADMISSION	III
DEDICATION	IV
ACKNOWLEDGEMENTS	V
ABSTRAK	VI
ABSTRACT	VII
TABLE OF CONTENTS	VIII
LIST OF FIGURES	XI
LIST OF TABLES	XIII
LIST OF ABBREVIATION	XIV
CHAPTER I: INTRODUCTION	1
1.0 PREAMBLE	1
1.2 PROBLEM STATEMENT	2
1.3 PROJECT OBJECTIVES	3
1.4 PROJECT SCOPE	3
1.5 CONTRIBUTION	4
1.6 EXPECTED OUTPUT	4
1.7 CONCLUSION	4
CHAPTER II: LITERATURE REVIEW	5
2.1 INTRODUCTION	5
2.2 FACT FINDING	5
2.3 CONCLUSION	12
CHAPTER III: PROJECT PLANNING AND METHODOLOGY	13
3.1 INTRODUCTION	13
3.2 HIGH-LEVEL PROJECT REQUIREMENTS	13
3.2.1 Project Facilities Requirement	14
3.2.2 Software Requirement.	14
3.2.3 Hardware Requirement	16
3.3 SYSTEM DEVELOPMENT APPROACH	17
3.4 PROJECT SCHEDULE AND MILESTONES	20
3.5 CONCLUSION	20
CHAPTER IV: ANALYSIS	21
4.1 INTRODUCTION	21
4.2 BUSINESS RESEARCH	21
4.2.1 Business Analysis	21
4.2.2 Problems Analysis	22
4.2.3 Problems Statement	25

4.3	ANALYSIS OF SYSTEM	26
4.3.1	Business requirement	26
4.3.2	Technical Requirement	26
4.3.2.1	Software Requirement	27
4.3.2.2	Hardware/Firmware Requirement	27
4.3.2.3	Implementation/Deployment Requirement	27
4.4	CONCLUSION	28
CHAPTER V: DESIGN		29
5.1	INTRODUCTION	29
5.2	RAW DATA	30
5.3	SYSTEM ARCHITECTURE	34
5.4	PRELIMINARY DESIGN	36
5.4.1	Storyboard Design	37
5.4.2	Storyline Design	37
5.5	USER INTERFACE DESIGN	37
5.5.1	Navigation Design	40
5.5.2	Input Design	41
5.5.3	Output Design	42
5.6	CONCLUSION	44
CHAPTER VI: IMPLEMENTATION		45
6.1	INTRODUCTION	45
6.2	PRODUCTIONS AND IMPLEMENTATION	46
6.2.1	Production of Texts	46
6.2.2	Production of Graphic	46
6.2.3	Production of Audio	47
6.2.3.1	Installing Adobe Atmosphere Player	48
6.2.3.2	Navigating Atmosphere Environment	48
6.2.4	Production of Video	49
6.2.5	Production of Animation	50
6.2.5.1	Adobe Atmosphere Workflow	50
6.2.6	Process of Integration	52
6.2.6.1	Installing Adobe Atmosphere Player	53
6.2.6.2	Navigating Atmosphere Environment	54
6.3	DEVELOPMENT STATUS	54
6.3.1	Modeling	55
6.3.2	Mapping	60
6.3.3	Interaction	61
6.3.4	Rendering	64
6.3.4.1	Testing the Final Environment	65
6.3.4.2	Publishing an Atmosphere Environment	65
6.4	CONCLUSION	67
CHAPTER VII: TESTING		68
7.1	INTRODUCTION	68
7.2	TESTING PLAN	68
7.2.1	Test Organization	69

7.2.2	Test Environment	69
7.2.3	Test Schedule	69
7.3	TEST STRATEGY	70
7.3.1	Classes Of Tests	71
7.4	TEST DESIGN	72
7.4.1	Testing Description	72
7.4.2	Test Data	73
7.5	TEST CASE RESULT	73
7.6	CONCLUSION	74
CHAPTER VIII: CONCLUSION		76
8.1	OBSERVATION ON WEAKNESSES AND STRENGTHS	76
8.2	PROPOSITIONS FOR IMPROVEMENT.	77
8.3	CONCLUSION.	78
BIBLIOGRAPHY		79
APPENDIX		
Appendix I	: Storyboard.	
Appendix II	: Gantt chart for Project Sarjana Muda 2	
Appendix III	: Storyline for FTMK Virtual Tour	
Appendix IV	: User Manual	

LIST OF FIGURES

Figure	Pages
2..1 samples of panorama images that have been stitch and crop	8
2..2 samples of displaying the panorama in QTVR Quick Time Player	8
2..3 VRML Requirement	9
2.4 samples 1 of Virtual Tour using VRML	11
2.5 samples 2 of the Virtual walk-through	11
3.1 waterfall model, the linear sequential model	17
3.2 Multimedia Design Methodology	19
5.1 Sample of raw data (image of the building)	31
5.2 Rough Sketch of the FTMK Building Plan View	32
5.3 Sketch in Adobe Atmosphere (Top view)	33
5.4 Sketch in Adobe Atmosphere (front view)	33
5.5 Sketch in Adobe Atmosphere (right view)	33
5.6 Architecture Context Diagram (ACD) FTMK Virtual Tour	34
5.7 Flow Chart for the FTMK Virtual Tour	35
5.8 The Proposed Design Framework for Reconstruction Process in Virtual Environment	36
5.9 Process of converting Storyboard to Prototype product	38
5.10 Interface Design for FTMK Virtual Tour (the Main Page)	39
5.11 Interface design for FTMK Virtual Tour-requirement	39
5.12 Interface design for FTMK Virtual Tour-intro	39
5.13 Interface design for FTMK Virtual Tour-FTMK walk-through	40
5.14 Display requirement for Output Design-Monitor	42
5.15 Sound Control for Output Design -Speaker	43

5.16	Software requirement for Output Design	43
6.1	Recording sound in Sound Forge	49
6.2	Rendering Video in 3D MAX	49
6.3	The Adobe Atmosphere Installation method	53
6.4	FTMK ground floor bock (without indoor equipment)	56
6.5	FTMK first floor block (without indoor equipment)	56
6.6	FTMK building exit stair	57
6.7	FTMK building landscape	57
6.8	Objects Created in Adobe Atmosphere that will be use in FTMK Virtual Tour	58
6.9	Object Hierarchy for FTMK Virtual Tour	59
6.10	ground floor mapping-mapping floor	60
6.11	first floor mapping- roof mapping	60
6.12	mapping tools in Adobe Atmosphere	61
6.13	Selecting playSound scripting Object Presets to add a sound into the environment	62
6.14	The sound.js script opened in a Notepad	63
6.15	The onClick.js script opened in a Notepad	63
6.16	The opacity.js script opened in Adobe Atmosphere	64
6.17	Publishing Setting for FTMK building	66
6.18	Final Publishing FTMK building1	66
6.19	Final Publishing FTMK building2	66
7.1	Test Cycle	70
7.2	The Testing Form	74

LIST OF TABLES

Tables		Pages
3.1	Hardware requirement	16
5.1	Adobe Atmosphere Player Navigation for mouse motion and keyboard	41
5.2	Adobe Atmosphere Player Toolbar Buttons	42
6.1	Adobe Atmosphere Solid Object Tool	54
6.2	Scripts names' and descriptions	61

LIST OF ABBREVIATION

Short form	Text
KUTKM	Kolej Universiti Teknikal Kebangsaan Malaysia
ICT	Information Communication Technology.
IT	Information Technology.
CPU	Central Processing Unit.
WWW	World Wide Web.
BMP	Bit Map.
WAV	Wave.
AVI	Audio Video Interface.
PSM 1	Projek Sarjana Muda 1
PSM 2	Projek Sarjana Muda 2
HCI	Human Computer Interface.
RAM	Random Access Memory.
FTMK	Fakulti Teknologi Maklumat dan Komunikasi
CDRW	Compact Disc Read Write.
CD-ROM Burner	Compact Disc Read Only Memory Burner.
MDP	Multimedia Development Process
SDLC	System Development Life Cycle
MB	Mega Byte.
GB	Giga Byte.
DPI	Dot Per Image.

GHz	Giga Hertz.
3D	3 Dimensions
VR	Virtual Reality
FLA	Flash file.
QTVR	Quick Time Virtual Reality

CHAPTER 1

INTRODUCTION

CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

1.1 Preamble

Project that was built by the developer is 'FTMK Virtual Tour'. This project is about the FTMK faculty itself and will contain a 3D building plan and also Virtual Tour. The project is built for PSM (Projek Sarjana Muda). The project is in hope of creating a 3D environment for FTMK and in the same time providing information about the building for a new user (such as student, staff and visitor). 'Fakulti Teknologi Maklumat dan Komunikasi' (FTMK) at KUTKM is offering an excellent hands-on oriented education programs in Information and Communication Technology (ICT). The main goal of FTMK is to produce competent and industrially relevant ICT professionals with not only adequate theoretical knowledge and foundation but also more importantly the skills and the ability to practice. The faculty, in line with its vision to be one of the world's leading centre of excellence in ICT, is also offering opportunities for application-oriented and industrially research and development.

KUTKM is a new university, and as for this many promotion have been done. One promotion that have not been yet explore is to create a 3D or virtual tour to promote the FTMK faculty. By using this project, the promotion will increase the understanding level of the new user.

As for this project, the developer will use the Waterfall Methodology. This methodology consists of four main phases such as Problems Analysis Phase, Design Phase, Implementation Phase, and lastly the Testing Phases toward the completion of the project.

1.2 Problem Statement

This project was built for KUTKM in hope of promoting the university itself by creating a Virtual Tour. FTMK was chose as the starting point for the developer to achieve the goal of developing this project. By focusing on FTMK the scope for this project has been minimize. This have gave the developer the opportunity to develop the project and in the same make a research on virtual reality application.

The problem statement for this project is defined by looking at the used of virtual reality in KUTKM. There is still no product involving virtual reality that was used for commercial purpose in KUTKM. Virtual reality needed of a specific requirement for navigating through its environment. The virtual reality devise are not yet been used in KUTKM but non-immersive devise such as keyboard and mouse can still be used for this project.

It is hoped that one day that KUTKM will also has it own virtual reality campus environment. A lot of research must be done to insure the best result in creating a complete VR but in the end, the research might come handy, as the KUTKM will realize that it also can be used as a commercial value to promote the university.

1.3 Project Objectives

The objectives of FTMK Virtual Tour are listed as below.

- FTMK Virtual Tour is build as one step of given an interactive information package in introducing FTMK by using the electronic media way.
- FTMK Virtual Tour is build as a target of creating a 3D and Virtual Tour for the FTMK building plan in hoping to give guide for the new user.
- FTMK Virtual Tour is provided an interactive interaction using multimedia as a supplementary tool for the purpose of user-friendly facilities.
- FTMK Virtual Tour is in hope of exposing the user to the real environment of FTMK building.

1.4 Project Scope

The scope for this project focuses on FTMK department building plan. It can be used by the KUTKM (Kolej Universiti Teknikal Kebangsaan Malaysia) staff, developers and also for a new visitor. It contained information that is needed by the user to get to know FTMK building in interactive way. The project main focused is to build 3D environment for FTMK and in the same try to implement the VRML (Virtual Reality Modeling Language) in order to create virtual tour for the FTMK. Researches are based on how to use Adobe Atmosphere as a platform to build a walk-through environment.

The project scope for this project is based on two main floor of FTMK building such as the ground floor and lastly the first floor of the building. Although the scope is not too big, the task of creating the walk-through is not as easy as it see.

A good walkthrough is where the users can navigate easily and in the same time the user can immerse with the environment.

1.5 Contribution

This project was developed for the 'Fakulti Teknologi Maklumat dan Komunikasi' (FTMK). It was hoped by implementing this project, the ICT aspect can be achieved through the creation of the FTMK virtual environment. This project also will gave the chance for the developer to contribute some ideas toward promoting the KUTKM as one university which focused on hands-on application

1.6 Expected Output

The important thing that the project can give is the commercial value for the KUTKM, especially the FTMK faculty itself. Nowadays, most universities have already created it own Virtual Tour. The FTMK Virtual Tour was developed for the purpose of creating a walk-through environment for the FTMK building. By implemented this project, it will surely give the opportunity for KUTKM to prove that this university can also produce FTMK Virtual Tour for faculty department. This will also give the chance for the developer to contribute some idea toward the promotion of KUTKM.

1.7 Conclusion

The FTMK Virtual Tour project is built for PSM (Projek Sarjana Muda). This chapter explained the problem statement, project objective, project scope, contribution aspect and lastly the expected output for this project.

CHAPTER II

LITERATURE REVIEW

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

In developing the project, a lot of information is needed. The solution for this kind of matter is by searching the Internet and makes a reference from books. Internet provides a lot of information about Virtual Reality (VR), Virtual Reality Modeling Language (VRML) and other kind of information. The information that was needed by the developer to develop this project is no other than FTMK information itself. Developer also needs to search the Internet for VRML samples and do some researches and development on combining different software before starting the project.

Research was done on other available project (can be found in the internet). The available project was taken as a reference for the developer to study it and tried to upgrade it up in order to suite the requirement needed for the FTMK faculty before it can be ready be used in the future.

2.2 Fact and Finding

Developer has used a simple theory before implement the real project. The theory is to create a 3D building and Virtual Tour and in the same tried to let people to feel the real environment of the FTMK building plan and interact with it in

interactive way. As for this, the project must be entertaining and responsive so that the user will enjoy while using it. Case research for this thesis is based on creating a virtual environment. This includes research on every element or item that was used to create a virtual environment itself such as Panorama and Virtual Reality Modeling Language (VRML). For this thesis, developer has chosen and focused on VRML to implement the final bachelor project.

Nowadays, user still did not realize that virtual tour existed. The available project research showed that virtual tour has already been used in other country. In Malaysia, the used-of virtual tour are not been explored widely (but some organization or firm have used it for non-commercial used).

Multimedia Development Center (MDC) is one of the organizations in Malaysia that made research on virtual reality. MDC was organized on 2004 and was authorized by the Dato' Seri Dr. Mahathir b. Mohammad, Prime Minister at that time. Due to that, the VR Centre was built as the first VR centre in ASEAN.

It is important to understand the true meaning of the virtual reality. Virtual are defined as being essence of effect but not an in fact. Reality means that something which exists independently of ideas concerning it. Virtual Reality (VR) sometimes called Virtual Environment (VE) or Virtual World. It's was computer-generated environment within which people can interact. VR may be characterized by "the illusion of the participation in a synthetic environment. VR relies on 3D, stereoscopic, head tracked displays, hand/body tracking and binaural sound. VR is an immersive, multi-sensory experience" (Gigante, 1993).

The better definition of VR also can be described as a medium composed of interactive computer simulations that sense the participant's position and replace or augment the feedback to one or more sense, giving the feeling of being immersed or being present in the simulation. Another definition of VR described that users can

navigate and view a world of three dimensions in the real time, with six degree of freedom. In essence, virtual reality is clone of physical reality environment.

VR have been used in many applications lately. All the applications have showed improvement in every year. This improvement was caused by the advantages which the VR have gave and provided. For example, VR allow better and faster understanding of even complex applications and provide means for intuitive operations and control. VR are also having acceptance in many industrial applications (product and process) which it have lead to quality of presentation, easiness of interaction and lastly the correctness of behavior. VR provided the most natural means of communicating with computer and provide a wide field of regard visual/auditory portrayal medium. The correct use of the auditory displays can enhance the operator's ability to deal with complex situation where considerable amount of information have to be process. VR also provided natural control interfaces (for example the hand controller with the proper haptic feedback). Lastly, a system based on VR has the potential for low cost budget project and has a potentially wide range of applications.

It is intended to learn from the manufacturing experience - the results of the application of VR to various sectors of engineering have so far been tremendous. VR modeling (VM) has been shown to avoid costly mistakes, and enable planners and managers to envision the whole manufacturing process from design and assembly to product shipping. Factory simulation has helped to make substantial savings on tooling, design, construction and installation. Compared to the use of conventional methods, VM has also been shown to dramatically reduce the amount of time it takes to analyses new design concepts and incorporate them into the production process. It has enabled decision-makers to make last minute changes and eliminated the need to build prototypes. The application of VR has made it much easier for factory workers to accomplish complex and error-prone tasks, and has also offered a safer environment for testing various manufacturing techniques (Hobbs, 2003).