



THREE DIMENSIONAL (3D) NAVIGATION of UNIVERSITI MALAYSIA  
PAHANG (PEKAN)

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TECHNICAL REPORT SUBMITTED IN FULFILMENT OF  
THE DEGREE OF COMPUTER SCIENCE

FACULTY OF COMPUTER SYSTEM AND SOFTWARE  
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## STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.

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*BORANG PENGESAHAN STATUS TESIS*

JUDUL: THREE DIMENSIONAL NAVIGATION of UMP PEKAN.....

SESI PENGAJIAN: 2014/2015.....

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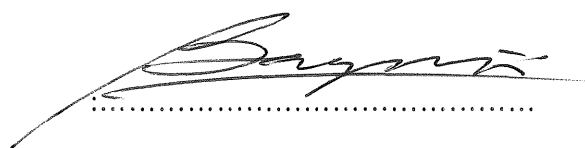
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## **Executive Summary**

In this globalization era buildings are being piled up all over the places and routes are being adjusted in order that people can pass through the new buildings. However, people take times to discover the routes. This is where the navigation becomes helpful for the people to find their way to their destination. For example, Universiti Malaysia Pahang campus Pekan has been added with some new buildings recently and intakes also being increasing every year. Thus new intake can't seem to find their way around at first. Giving them a three dimensional (3D) feel of the environment through the navigation system would be a good exposure. The 3D navigation would also represent the university as a technology university. This 3D navigation also gives a surround look at the destination together with audio input. This system also gives the choices of vehicle and estimation time taken to reach the destination. The objective this system is to help the students navigate through the system especially the new intakes together with their parents. System Development Life Cycle (SDLC) is the method that was chosen to develop the system. This method consists of five phases which are planning, analysis, design and development, implementation and testing. This methodology is chosen because it attempts to reduce inherent project risk by breaking a project into smaller segments, provides easy to change during the development process and it is suitable used on developing this system. The 3D navigation is a web based system and Adobe Dreamweaver is used to create the interface of the system and Maya will be used to create the 3D modelling. This 3D navigation is expected to give the students ease on navigating through the university.

## RINGKASAN EKSEKUTIF

Dalam globalisasi ini bangunan era sedang menimbun di seluruh tempat dan laluan yang sedang diselaraskan supaya orang boleh melalui bangunan baru . Walau bagaimanapun , orang mengambil masa untuk mencari laluan. Ini adalah di mana navigasi menjadi berguna untuk orang-orang untuk mencari jalan mereka ke destinasi mereka . Sebagai contoh , kampus Universiti Malaysia Pahang Pekan telah ditambah dengan beberapa bangunan baru baru-baru ini dan juga pengambilan yang meningkat setiap tahun. Oleh itu pengambilan baru tidak boleh seolah-olah untuk mencari jalan mereka di sekitar pada mulanya. Memberikan mereka satu dimensi ( 3D ) rasa tiga alam sekitar melalui sistem navigasi akan pendedahan yang baik . Navigasi 3D juga akan mewakili universiti sebagai universiti teknologi . Ini navigasi 3D juga memberikan paparan sekeliling di destinasi yang bersama-sama dengan input audio . Sistem ini juga memberi pilihan kenderaan dan anggaran masa yang diambil untuk sampai ke destinasi . Objektif sistem ini adalah untuk membantu pelajar menavigasi melalui sistem terutama pengambilan pelajar baru bersama-sama dengan ibu bapa mereka . Sistem Pembangunan Kitaran Hayat ( SDLC ) adalah kaedah yang telah dipilih untuk membangunkan sistem. Kaedah ini terdiri daripada lima fasa iaitu perancangan , analisis , reka bentuk dan pembangunan , pelaksanaan dan ujian . Metodologi ini dipilih kerana ia cuba untuk mengurangkan risiko projek yang wujud dengan memecahkan projek ke dalam segmen yang lebih kecil , menyediakan mudah untuk berubah semasa proses pembangunan dan ia adalah sesuai digunakan untuk membangunkan sistem ini . Navigasi 3D adalah satu sistem berasaskan web dan Adobe Dreamweaver digunakan untuk mewujudkan antara muka sistem dan Maya akan digunakan untuk mencipta model 3D. Ini navigasi 3D dijangka memberikan pelajar meringankan pada menavigasi melalui universiti.

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## **Part 1**

### **Introduction**

#### **1.1 Introduction**

The project of 3D Navigation of the Universiti Malaysia Pahang (UMP) campus Pekan is mainly targeted to UMP students and staffs and also parents. From observation we can say that students still find it difficult in guiding their way through UMP Pekan. Since we have two campuses which is in Pekan and Gambang, students from Gambang campus find it extremely hard to navigate through the Pekan campus. Sometimes there are events that will be held in Pekan campus therefore UMP Gambang students find it hard to get their way throughout the Pekan campus. This project can offer better view of the Pekan campus and newcomers can reach to their destination faster especially juniors. Some students which to explore the campus when they are free but just afraid of being lost or couldn't find the destination on time. Even students of different faculties can find other than their faculty easier. This project will be in great use especially when on any event days as they can be guidance to the guests, as we are a technology based university our impression should ne vast as well. This project can be built using Adobe Dreamweaver as to build the system and the system interface. To create the 3D modelling of the buildings of the Pekan campus, Autodesk Maya or Cinema 4D can be used. Autodesk Maya and Cinema 4D is one of the best software that can give realistic 3D modelling of the buildings in Pekan campus. Adobe After Effects can be added to show some effects for the animation.

Therefore, 3D Navigation of UMP campus Pekan can ease students and also staffs for navigation and in additional can live up to the name of technology university.

##### **1.1.1 Problem Statement**

When a newcomer enters our university they feel uneasy because they are very new to the surrounding of the university. In addition it gives more uneasy feeling when they couldn't find their way around the university. This happens especially to juniors and most on the first

month of the semester. Students sometimes easily get lost when try to find their way to classes because sometimes they don't know where the class are situated. Even lecturers from different faculty teach students from different faculty. When the students intend to visit their lectures from other faculties they find it hard as they couldn't find their way to their office. There are few signboards at few areas to give navigation for the students and staffs but however it doesn't seem to be effective as it only can show a two dimensional (2D) view of their destination route. Having more signboards and maintaining it cost a lot and is troublesome compared to just implementing this 3D navigation.

### **1.1.2 Objective**

The objectives of 3D Navigation of the UMP campus Pekan are:

1. To design a creative system of 3D navigation of the UMP Pekan.
2. To develop an interactive view of the surrounding of UMP Pekan.
3. To test this system so that it will help students and staffs to navigate through the Pekan campus.

## **1.2 Review of existing project**

1. Universiti Teknologi Malaysia (UTM) campus map

The first review will be on Universiti Teknologi Malaysia(UTM). In their website there is a campus map and the link is [web.utm.my/campus\\_map/](http://web.utm.my/campus_map/). The map is similar to google map. However, their map does not have much visual. The interactive part is only that it can be zoom in and zoom out. Hotspots are shown using markers. Examples library, academic, mosque, hostel, hall and etc. The map uses hand tool to drag the map. User can use the hand tool to drag to wherever point that they prefer. The map is integrated into their website which the user can view the map on their web itself rather than the map opening in a new tab.

## UTM CAMPUS MAP

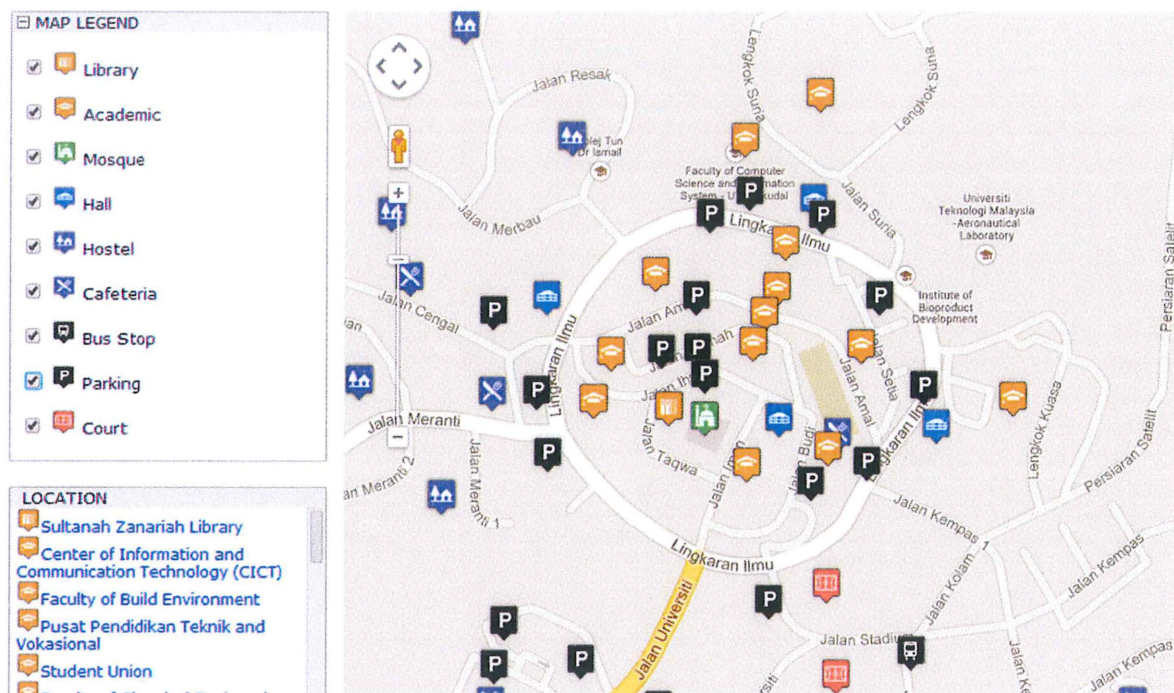


Figure 1.2.1 UTM campus map (screenshot)

### 2. Hackley School 3D map

This school is based in New York, United States of America. This school has three schools in its campus. It is divided into lower school, middle school, and upper school. Since the campus is a big compound it is wise that the school management provide a 3D interactive map in their website. The map can be found from this link [www.hackelyschool.org/3Dcampustour](http://www.hackelyschool.org/3Dcampustour). This map has a good 3D visual of the campus. It shows clearly the building of the campus and also the surrounding. This map uses the zoom in and zoom out tool. As you zoom into the map, the image of the building turns to be clearer and more visualize. This map also uses the drag tool for users to drag the map around to their preferable point of interest. This map has markers to mark their hotspots. The map can be view as a pop out window when you click the link to the map in the website.

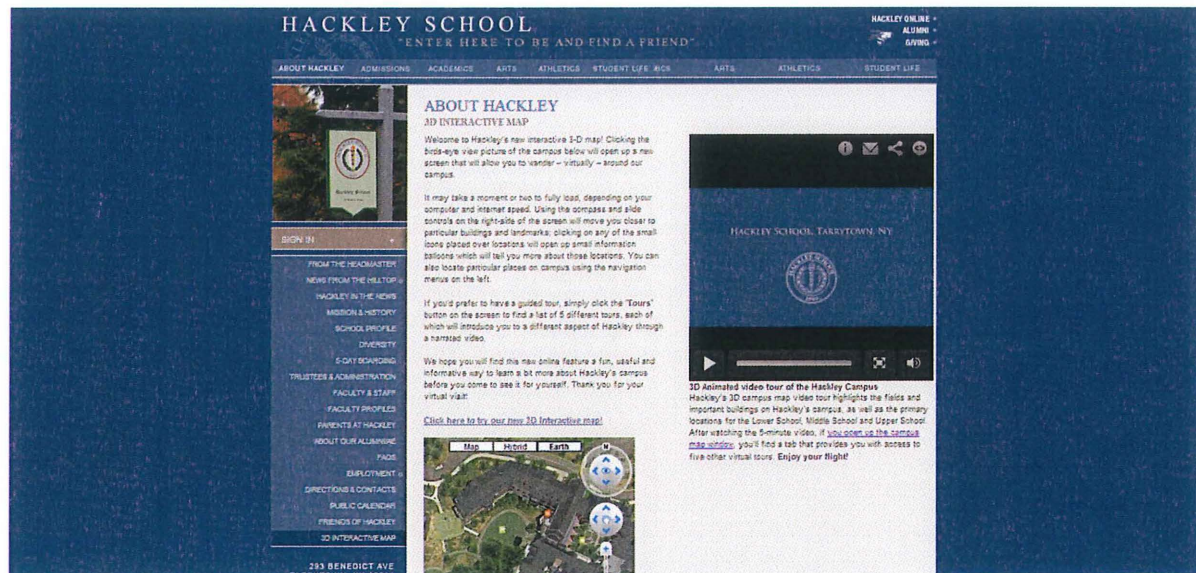


Figure 1.2.2 Hackley School website

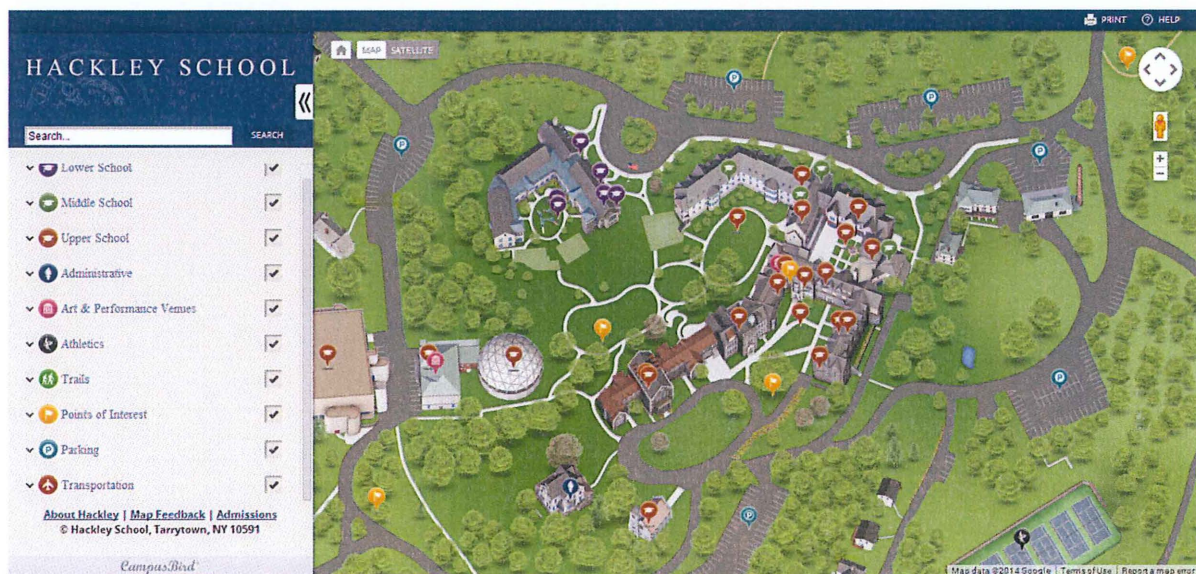


Figure 1.2.3 Hackley School 3D interactive map

### 3. University of Victoria

This is a university which is based in Canada. This university uses a PDF format as for their map. The map is an image which has 3D blocks which resembles their campus buildings and surroundings. The map has been merged into a flatten image. The images have been marked with names to identify them. User will use the names to identify their destination using the map. The map has indication to help users which act as guidelines. The map is basically an overview of the campus from top but with 3D effect which been flatten into image. The user can download the map and print it out.

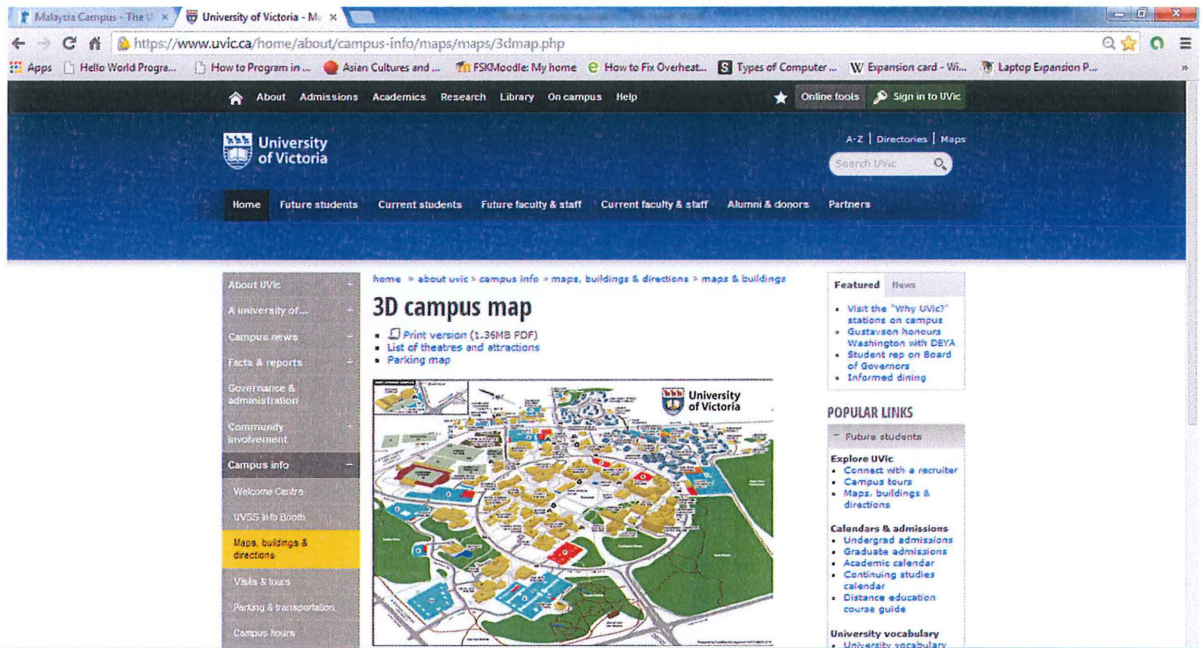


Figure 1.2.4 University of Victoria website

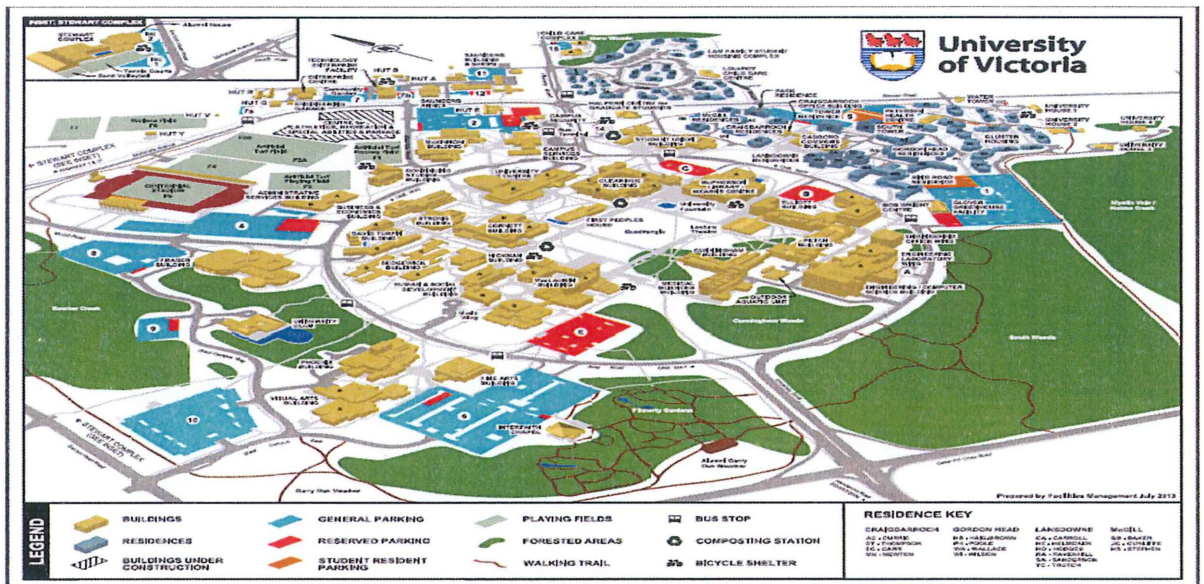


Figure 1.2.5 University of Victoria map (pdf form)

### 1.2.1 Relationship to the current project

The table 1.1 shows the comparison between UTM, Hackley School, University of Victoria and the current system. There are six aspects that being compared with. The aspects are 3D images, interactive, navigation, time consumption, panorama effect and audio input.



**Table 1.2.1.1 Comparison with current system**

<b>Features</b>	<b>UTM</b>	<b>Hackley School</b>	<b>University of Victoria</b>	<b>Universiti Malaysia Pahang (Pekan) 3D Map Navigation</b>
<b>3D image</b>	Yes	Yes	No	Yes
<b>Interactive</b>	Yes	Yes	No	Yes
<b>Navigation</b>	No	No	No	Yes
<b>Time consumption</b>	Yes	Yes	No	No
<b>Panorama effect</b>	No	No	No	Yes
<b>Audio input</b>	No	No	No	Yes

From the table above we can conclude that the UMP Pekan 3D Map Navigation has 3D images, interactive, has navigation, not time consuming, has panorama effect and also audio input.

### **1.3 Current system and its limitation**

The system that will be developed is UMP Pekan 3D Map Navigation. This system will be developed using Pekan campus only as the surrounding. This system is only based on Pekan campus and will be useful to UMP students and staffs especially Pekan campus students. The system will be included with navigation to ease the user about the paths. The user will know how to navigate through the campus easily. The audio input is added into the system to give an extra feature to the system. The panorama effect will be added to the main hotspots to give the user the visual of their destination. This panoramic effect can ease the users to identify their destination easier and faster. The system also has interactive features. The users can choose their destination and the system will show their navigation to the destination. The system is expected to load fast to ensure it is user-friendly.

The expected limitation for the system will be that the user only can choose their destinations from the given choices. This is because the system is a heavy system which loads high 3D graphics therefore if the destination is typed wrongly the system might not be able to show the navigation accurately. Another limitation is that the system only navigates through the paths of the building but does not navigate into the buildings. This is to ensure that loading time can be reduced.

#### **1.4 Scope**

This project is about three dimensional (3D) navigation for the students around UMP campus Pekan.

This project is concentrated on UMP campus Pekan only. The system of the project will use software such as Autodesk Maya, Cinema 4D, Adobe Dreamweaver, Adobe After Effects and Adobe Photoshop. Autodesk Maya and Cinema 4D use as to create the 3D modelling of the building in Pekan campus. Using this software give more realistic 3D models. Adobe Dreamweaver is the main behind the system construction. As this software (Dreamweaver) will create the interface and interactive for the users to use. Adobe After Effects will create effects for the navigation to be more appealing and the Photoshop is to create or edit photos that will be view in panorama mode.

This project only covers the layout of the building and not the inner part of the building which the offices of staffs and lecturers will be located. The location of the building will also include the name of lecturers' offices situated in it but not showing the navigation into the building.

#### **1.5 Thesis Organization**

These technical report consist of three parts. Part 1 is the introduction, which have problem statement, objective, scope, review of existing system, relation with current system, current system and its limitation and terminology. Part 2 is the report body which includes the

detail about the system. This part consist of user requirement, design description, development plan and testing plan. Part 3 is the conclusion.

## Part 2

### Report Body

#### 2.1 User Requirements

User requirements are the requirements that needed to be included to accomplish the system. The 3D Navigation Universiti Malaysia Pahang (UMP) campus Pekan system will be conducted based on the requirement that were obtained. These requirements will be as a guide line to develop the system.

#### 2.2 Flow charts/context diagram/data flow diagram

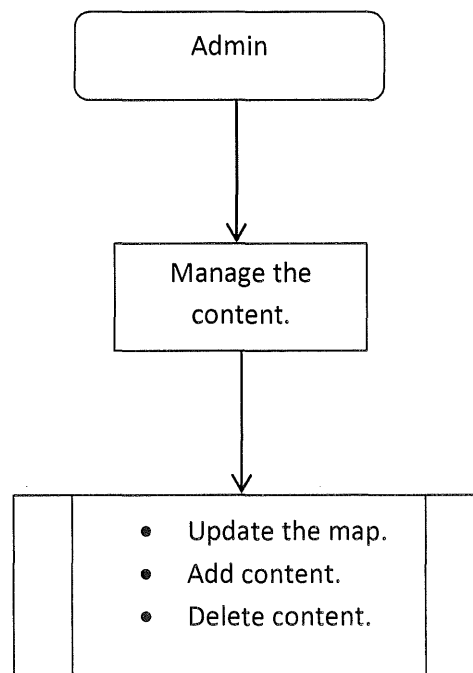
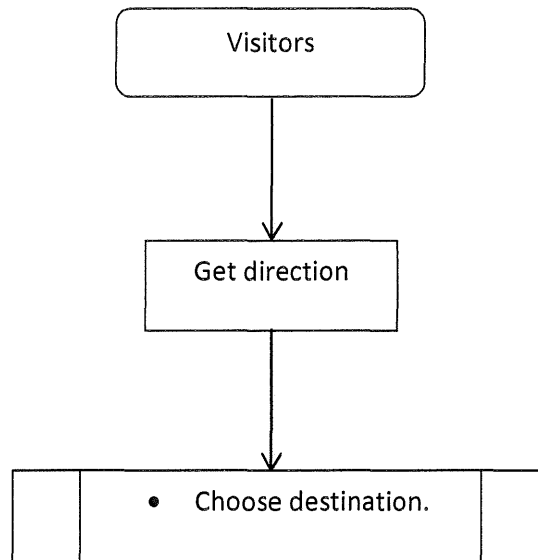
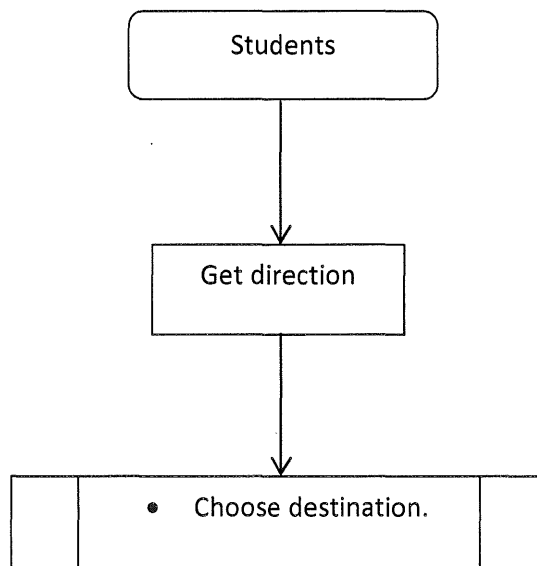


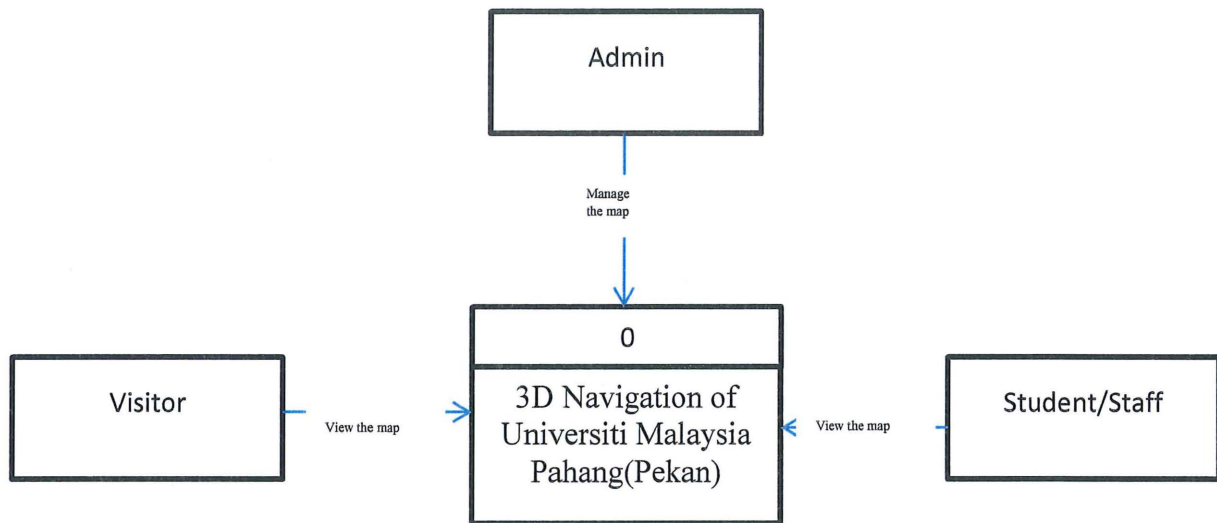
Figure 2.2.2 Admin Flow Chart



**Figure 2.2.3 Visitors Flow Chart**



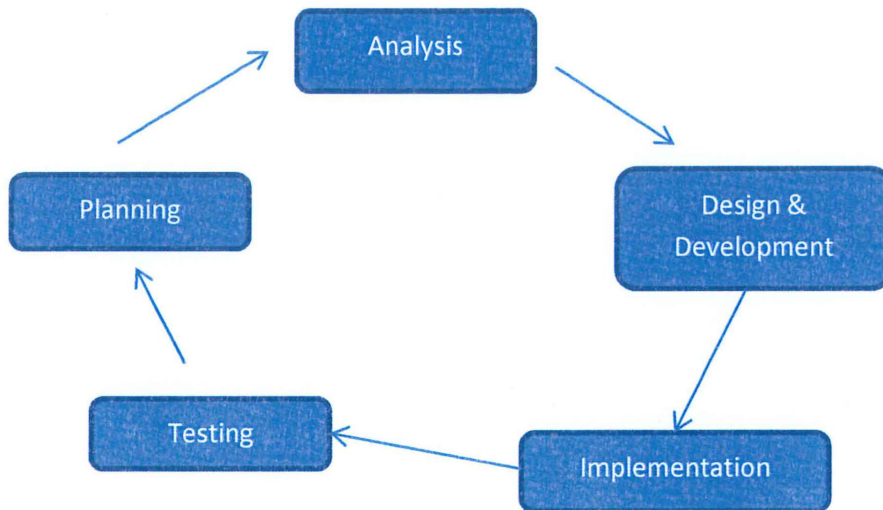
**Figure 2.2.4 Students Flow Chart**



**Figure 2.2.5 Context Diagram**

### 2.3 Methods and Materials Used

The system of 3D Navigation of the Universiti Malaysia Pahang (UMP) campus Pekan used the method of System Development Life Cycle (SDLC). This method is used to ensure that the project is being done accordingly and efficiently. System analyst and system developers commonly use this method to develop their system. Basically there five steps in this method which starts from planning, analysis, design and development, implementation and testing. SDLC provides a high quality system, manage the project well enough to accomplish as required and give the system to its full potential. SDLC will prove that the project can be developed with more functions, developed faster with fewer resources, and high quality with the best way as possible.



**Figure 2.3.1 System Development Life Cycle**

### 2.3.1 Planning

The first phase of SDLC is planning. This phase is very important in making a project as every project that need to be created need a thorough planning before starting it. In this phase the problems are identified to ensure in this project that the problems do not occur. This phase can identify the scope of the project and the objective of the project. The planning phase is used by software developers to gather and analysis information on the system before launching the project. This will ensure that the developers can prioritize the main information of the project using the previous or existing system as reference and comparison. After getting to know about the system, the problems are identified and then the ideas will be brainstormed, and at the end a schedule will be produced to be guide when the project is launched.

The first problem is that the visitor facing difficulties getting to know the surroundings of the universities especially parents. The second problem is students find it difficult to allocate lecturers office or faculty other than their faculty. The third problem will be that the guidance shown for visitors and student are not affective for them to give a proper direction. The project feasibility is confirmed by doing research on internet and current manual methods by comparison with existing methods. When the comparison is done with the existing system, ways to solve the problem was discovered to come up with an efficient system. A Gantt chart is produced to schedule the work and allocate the resources. Finally the project is launched according to the Gantt chart that produced.

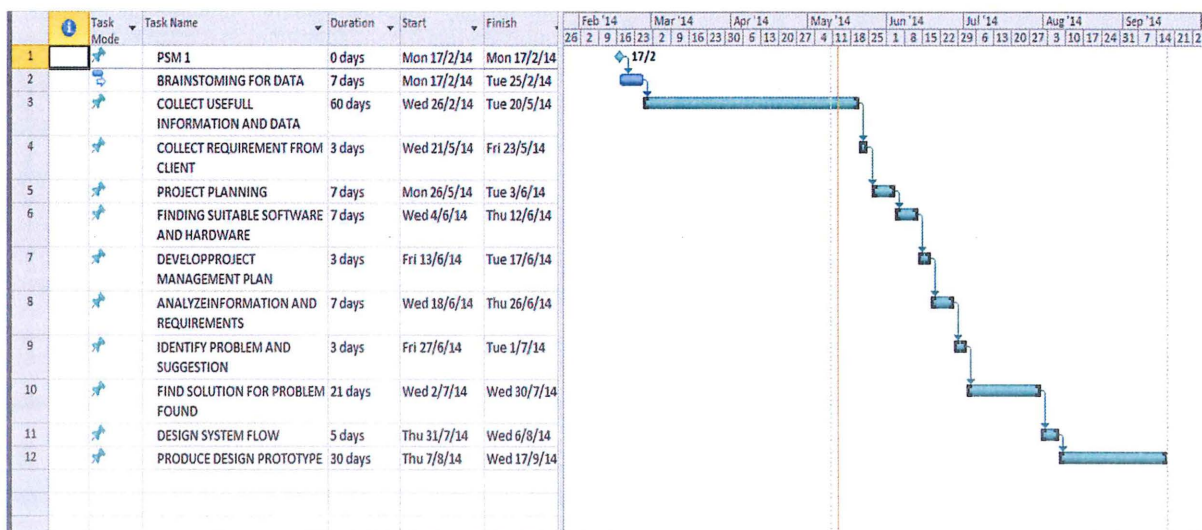


Figure 2.3.2 Gantt Chart



### 2.3.2 Analysis

In the second phase of the SDLC is the analysis phase. This phase is where the system will be analysis for its design and the requirements. In this phase there are three parts which are determining requirement, structuring requirement and design strategy. A study on the Universiti Malaysia Pahang (UMP) campus Pekan has been done. The problems that were identified were that there is no system of this kind in the UMP Pekan. Visitors especially parents having difficulties navigating through the UMP Pekan and students also find it hard to find other faculties and offices. The existing systems of other universities were studied to gather information to develop this system.

#### 2.3.2.1 Determining the requirement

In determining the requirement there three parts:

- i. User requirement

**Table 2.3.2.1 User Requirement**

No	Description
1	Administrators have the accessibility to change the content of the system (edit, delete and add).
2	No password required for the users to view the system.
3	Users can choose the type of vehicle to the destination.
4	Users can know the time taken to reach the destination.
5	Users able to know the distance of their destination.
6	Visual display needed in the system. Replay should be included for further understanding of the surroundings.
7	Audio guidance should be included to ensure the users understand the direction given through the visual.
8	Images of the destination should be included once the destination is shown in system.
9	Add feedback page to learn the feedbacks from the users.
10	The surroundings shown in visual format need to be in three dimensional (3D).

## ii. Software requirement

**Table 2.3.2.2 Software Requirement**

<b>Software</b>	<b>Purpose</b>
Adobe Dreamweaver	To develop the website and its functions
XAMPP	Database
Autodesk Maya	To model 3D models and capture it as a video
Adobe After Effects	To add video effects
Adobe Photoshop	To create panorama images
PTGUI	Alternative software for panorama creation
Microsoft Word	For documentation works
Microsoft Project	To create gantt chart
Microsoft Visio	To create flow charts

## iii. Hardware requirement

**Table 2.3.2.3 Hardware Requirement**

<b>Hardware</b>	<b>Purpose</b>
Camera	To capture images
Audio recorder	To record audio to input in the system
Hard Disk	Store the project and documentation works
Pen Drive	Data transfer

**2.3.2.2 Structuring Requirement**

Structuring requirement is where the requirement are being structured according to the user requirement and shows the structure of the system. The structure can be viewed through then data flow diagram (DFD). The DFD diagram is structured to compatible with the user requirements.

### 2.3.2.3 Design Strategy

In this design strategy the design of the system will be developed in order to visualize the structure of the design before implementing the design onto the system. The system is designed at first using the data flow diagram, flow chart, and context diagram. This design strategy can ensure that the system will be optimized with user requirement with a high performance design structure.

## 2.3.3 Design and Development

### 2.3.3.1 Design

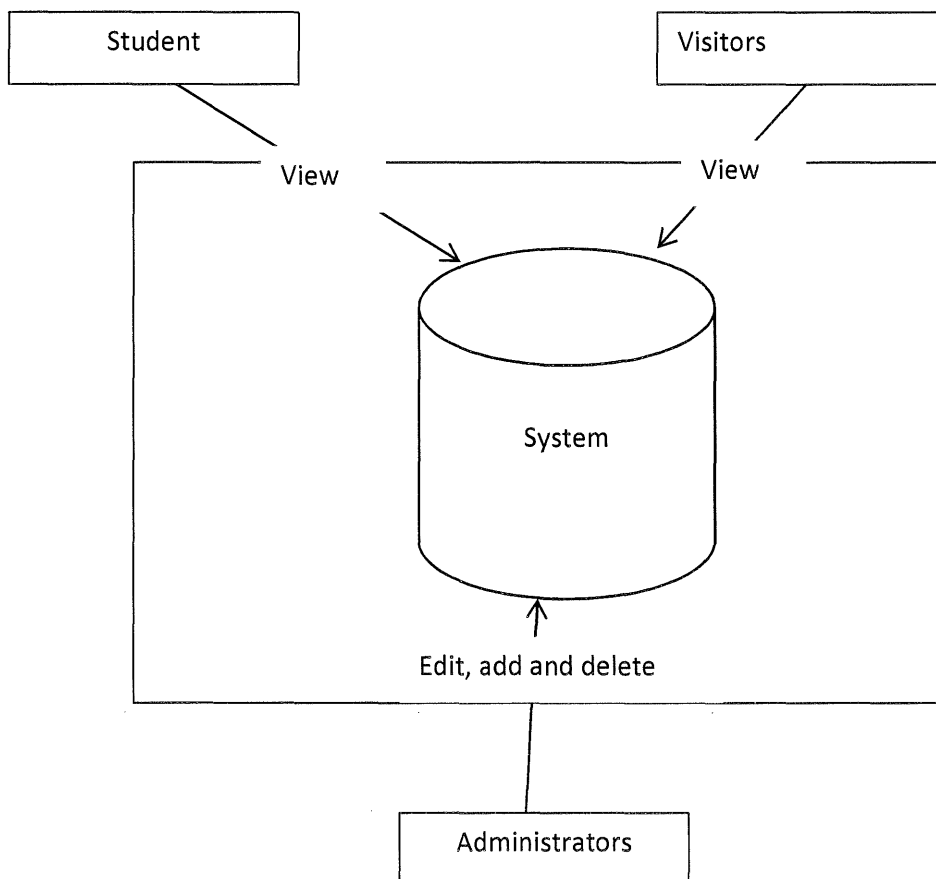


Figure 2.3.3.1 Design

The above figure shows the system architecture of the 3D Navigation of Univesiti Malaysia Pahang campus Pekan. In the figure above shows that there are three modules which are administrator module, students module and visitors module. Each modules created follows the user requirement given.

Administrator module function to manage the content of the page which are the direction of the map and feedback. Administrator will have the privilege of edit , add, update and delete the content. Admin also have the privilege of viewing the feedback and deleting the feedbacks.

Students module is actually the students will just view the content of the map direction. The privilege of writing feedback is not given to the students.

Visitors module is where visitors will view the map for direction and will give their feedback about the system. The visitors' feedbacks will be considered as guidance to update the system.

### 2.3.3.2 Development Plan

Development means converting the system into a functional system by using the development tools. In this phase the project constructed using HTML and JAVA for the website platform and the three dimensional models created using MAYA. This project does not require any login session as this project is mainly for public view without any login. In this phase the details of each interfaces and how the models were created has been explained.



Figure 2.3.3.2 Home

The home page is the first page that the user will encounter upon. In the home page the user will have four options to enter. There are Intro, Visit, UMP Navi and About Us. These four pages are the only pages that the user will encounter upon.



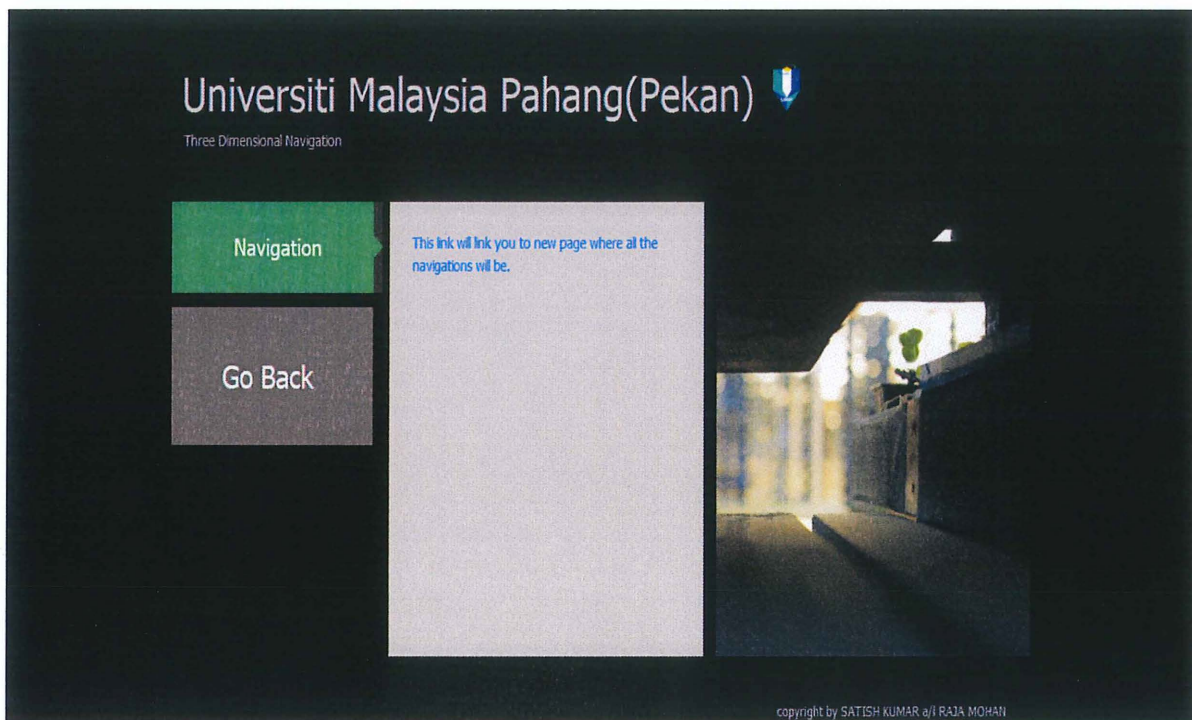
**Figure 2.3.3.3 Intro**

This interface is the interface where the user will be directed when the user click on the 'INTRO'. This interface is mainly just an introduction of the Universiti Malaysia Pahang.



**Figure 2.3.3.5 Visit-Picture enlarge**

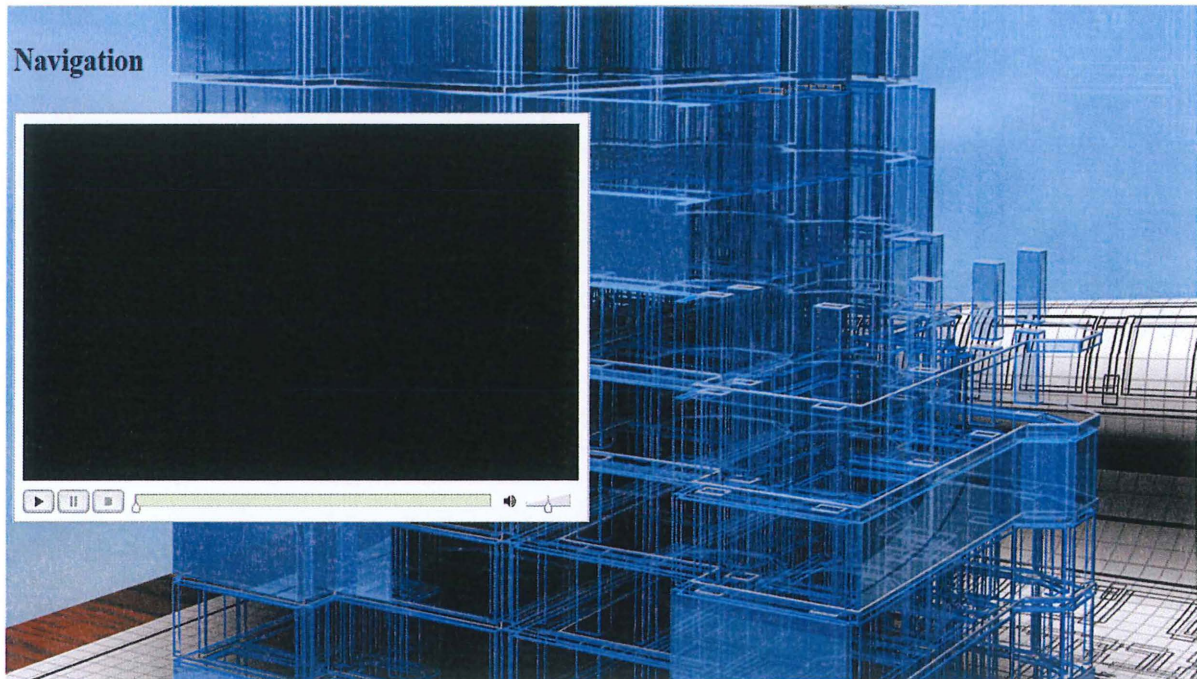
This is the interface when the user clicks on the images to enlarge it. The user has to hover onto the image until there is an 'X' symbol appears and then the user will have to click it to enlarge the image. Since user usually prefer to view image in thumbnail form and then click it to view in large form, therefore this interface was created in such way.



**Figure 2.3.3.6 Map Navi**

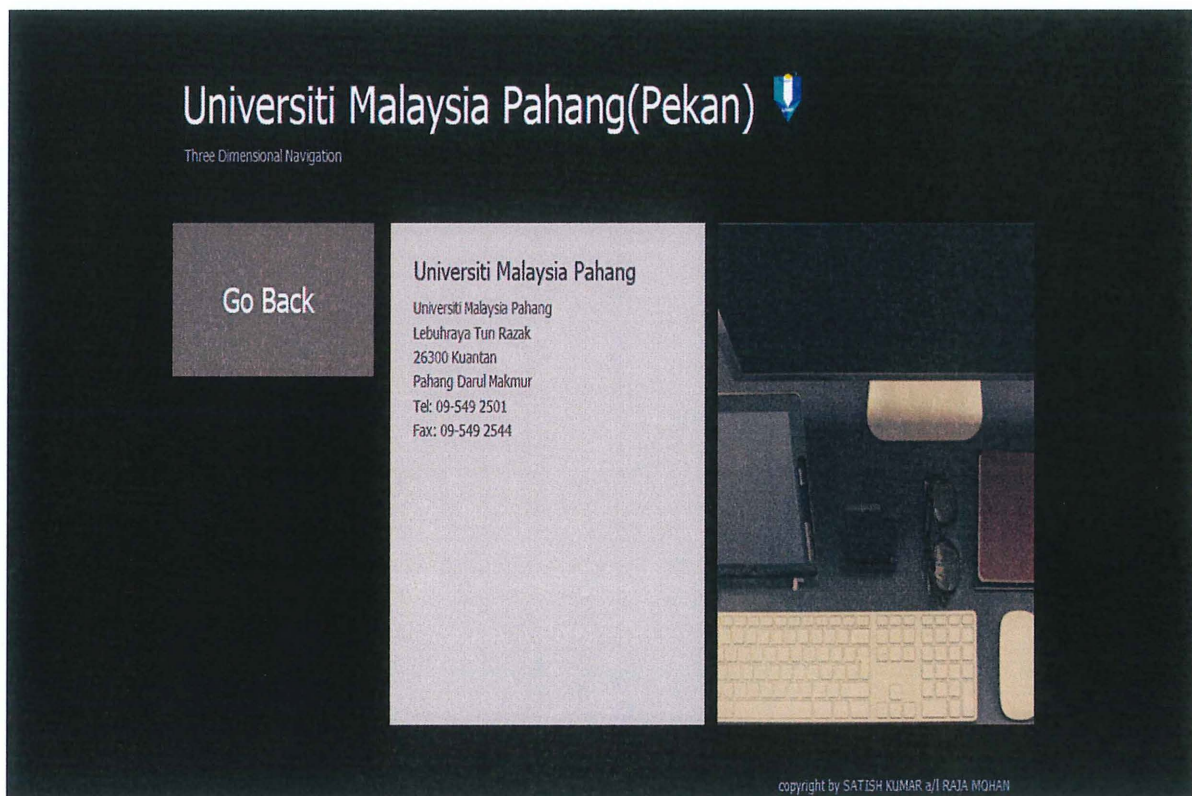
This interface is for the user to be directed into another page where the navigation will be shown separately. This was done so that the user will have the website in sight of the user while watching the video.





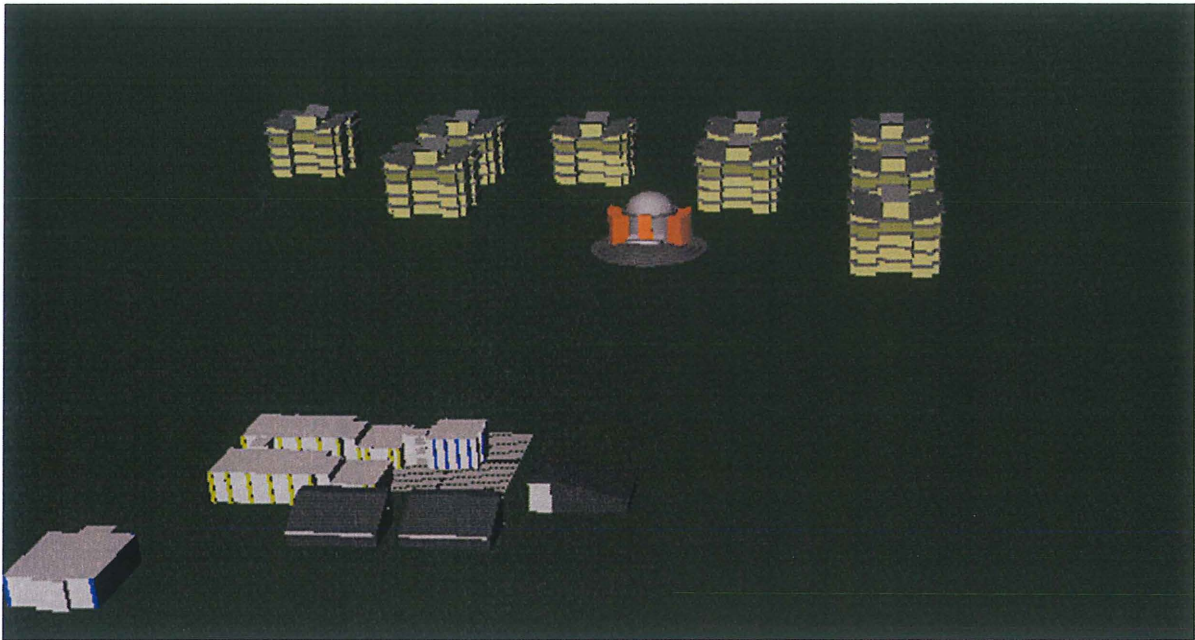
**Figure 2.3.3.7 Navigation-video**

This interface is where the user will view their navigation. The navigation video is either in format of avi or flv. The media player is a skin from the dreamweaver.

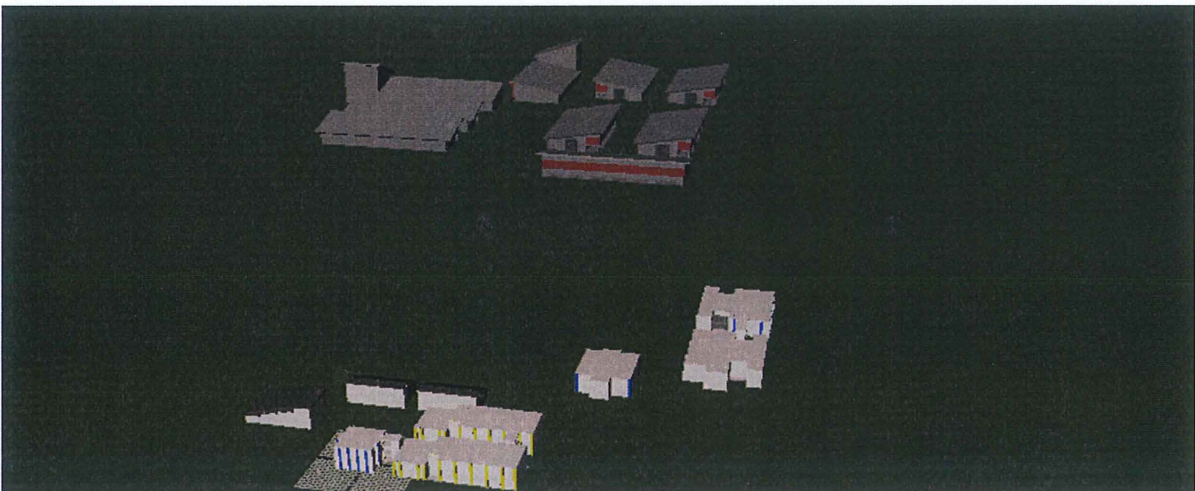


**Figure 2.3.3.8 About Us**

This is the interface that will be directed to when user click on 'about us'. This page is just address of the university.



**Figure 2.3.3.9 3D Models**



**Figure 2.3.3.10 3D Models-2**

Both figures above shows that the three dimensional models for the navigation. The models were built using Maya. The modelling were done using polygon sculpting.

### 2.3.4 Implementation

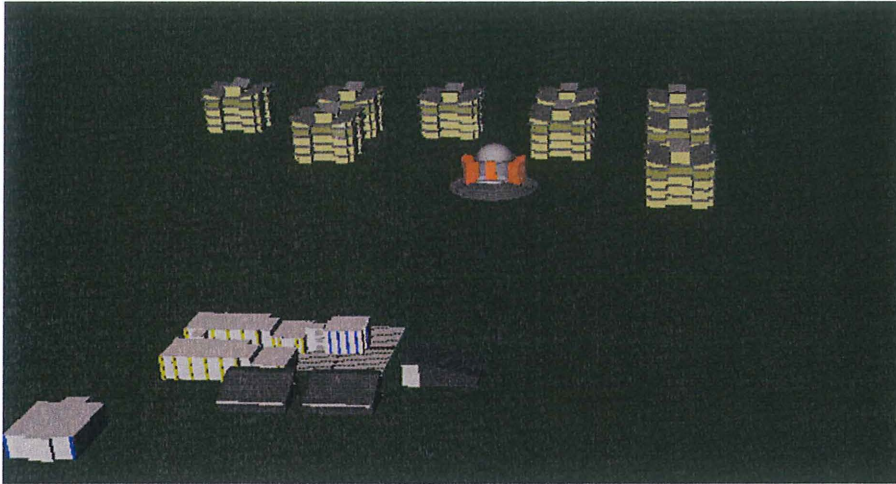
This project is created using the HTML as the platform. The whole interfaces are all in HTML and java script. This topic will discuss about the implemented programming and modelling in this project.

#### 2.3.4.1 Programming

**Table 2.3.4.1 Programming**

<b>Name</b>	<b>Usage</b>	<b>Location</b>
<div>	To create the layout of the and container for the menu and interface of the HTML.	Home, Intro, Map Navi and Contact Us
<p>	To implement description in the interface	Home, Intro, Map Navi and Contact Us.
<h1>	To implement header in the interface	Home, Intro, Map Navi and Contact Us.
<class>	To differentiate the layout of the interface that want to be implemented using custom css.	Home, Intro, Map Navi and Contact Us.
<object>	To implement the video format into the HTML interface.	Map Navi
<script>	To implement java script programming.	Home, Intro, Map Navi and Contact Us.

### 2.3.4.2 Modelling



**Figure 2.3.4.1 3D Models**

The picture above shows a part of the models created for the navigation. The process of implementing will be shown in the below table.

**Table 2.3.4.2 Modelling**

Method	Description
Polygon sculpting	This method was used to make the shape of the model.
Texturing	Used to create realistic sky and also add realistic look to the models.
Lighting	Used to give a sun-like lighting to the scene.

### 2.3.4.3 Animation

This part is where the navigation will be in place. In order to do it the following methods and features were applied.

**Table 2.3.4.3 Animation**

Method	Description
Camera	To create camera view of the navigation.
CV curve	This tool was used in order to create the path for the camera.
Rendering	This is the most important method which was used to convert the scene into an animation.

## 2.3.5 Testing

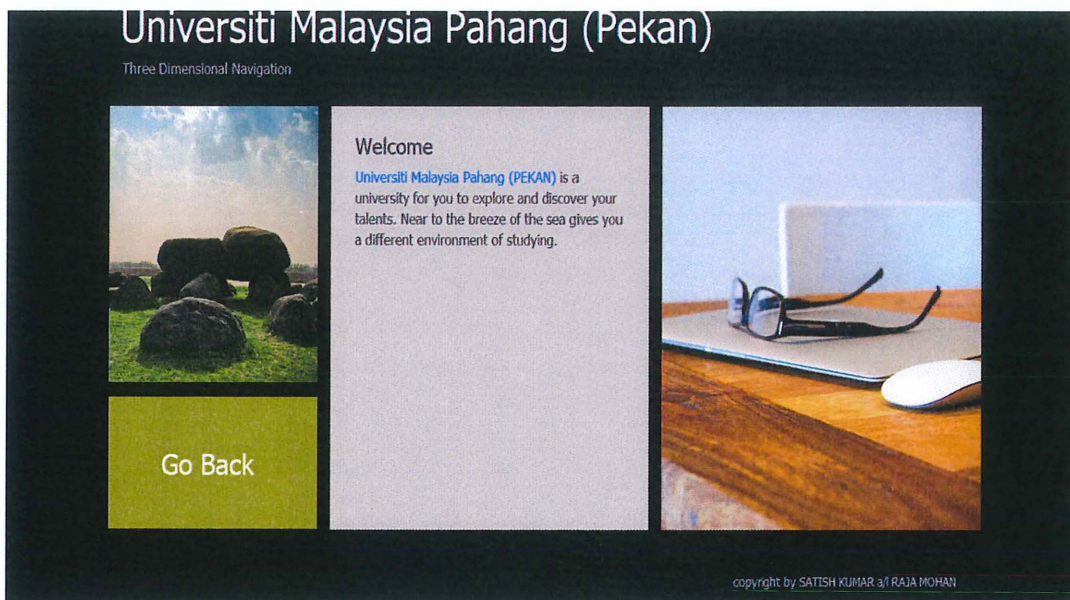
This part is where the project will be tested to ensure that the project runs without any errors.

### 2.3.5.1 Testing flow



**Figure 2.3.5.1 Home**

Once clicked on the intro button it will direct to the intro interface.



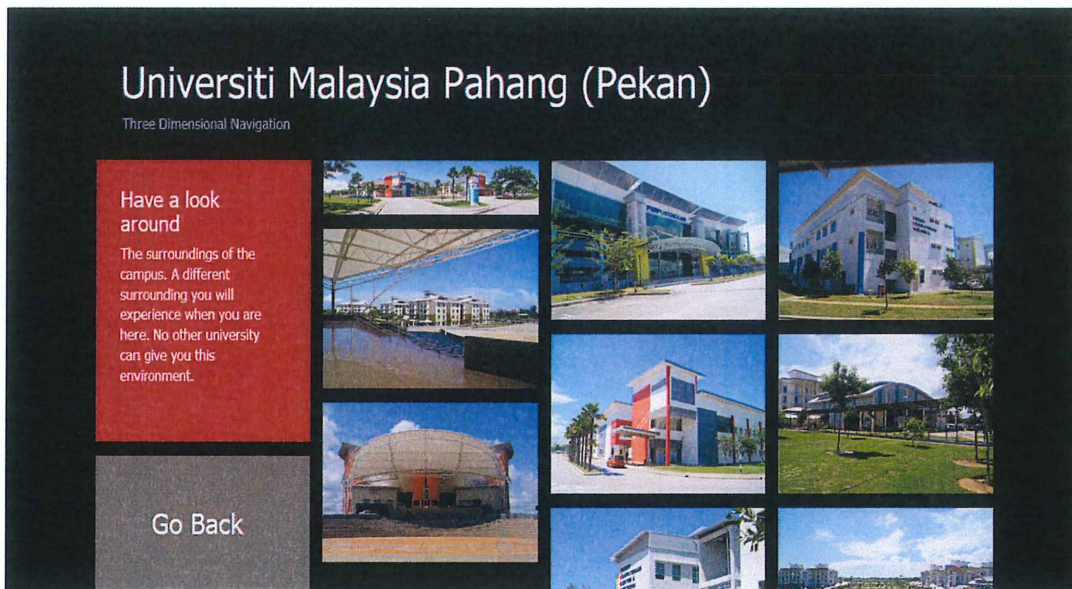
**Figure 2.3.5.2 Intro**

This is the interface of the intro once being clicked and the go back button will direct back to the home interface



**Figure 2.3.5.3 Home**

From this home interface the system will direct to visit interface when clicked on visit button.



**Figure 2.3.5.4 Visit**

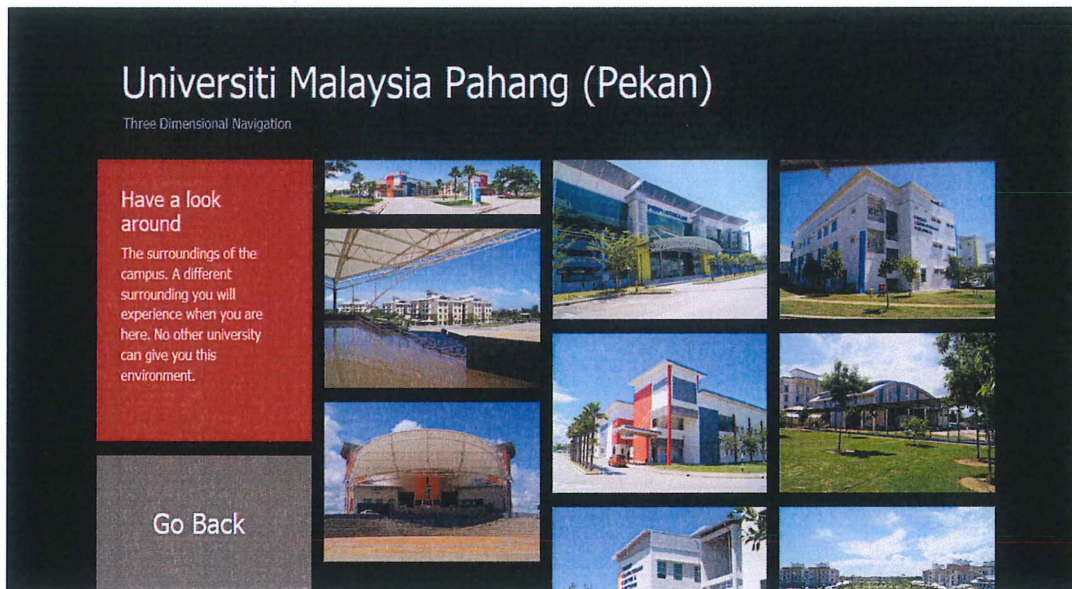
This is the interface of the visit. Once the picture is being clicked the picture will enlarge.



**Figure 2.3.5.5 Visit-Picture enlarge**

This is how it looks when the pictures being clicked. When the "X" is being clicked it will direct back to the visit interface again.





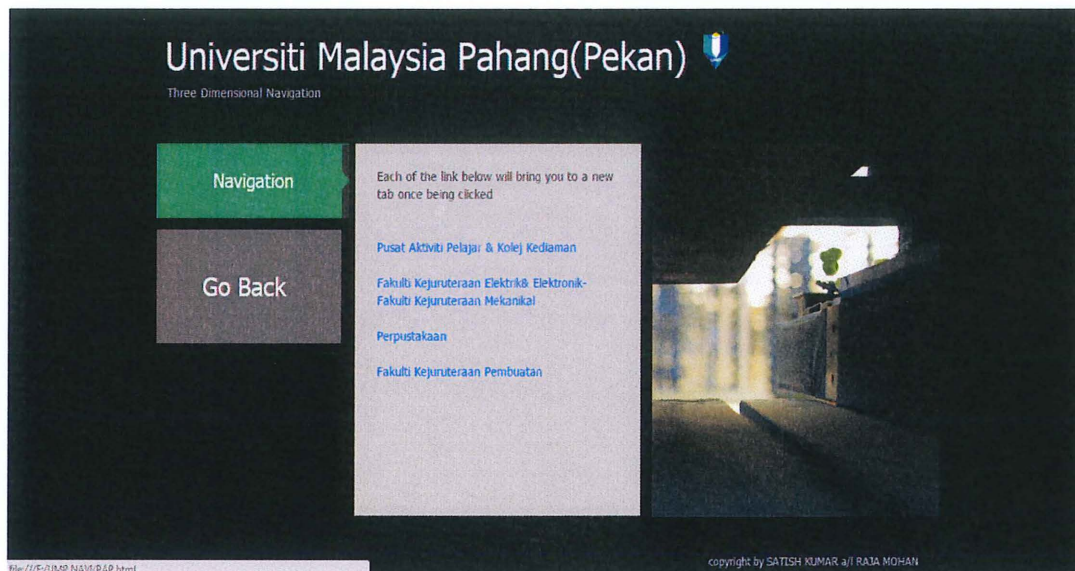
**Figure 2.3.5.6 Visit**

Once clicked the 'go back' button it will direct to the home interface.



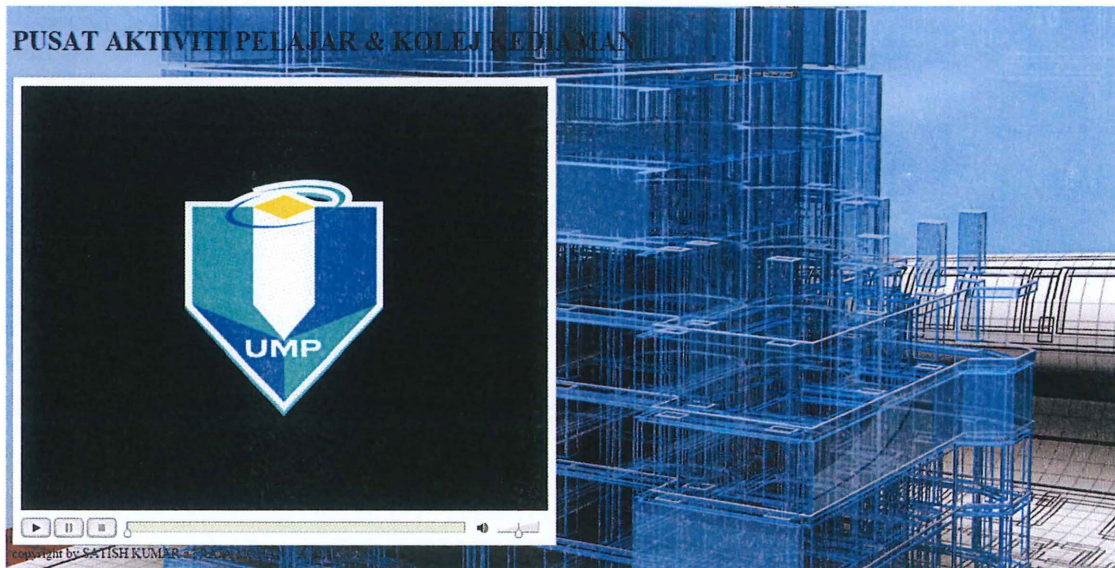
**Figure 2.3.5.7 Home**

Once the "Map Navi" button being clicked it will direct to the navigation interface.

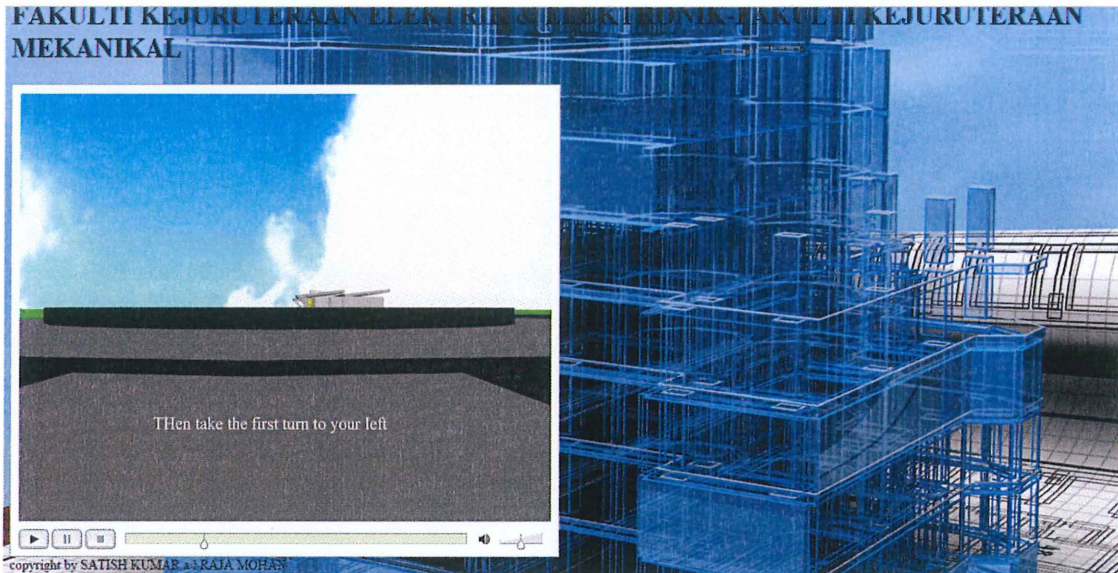


**Figure 2.3.5.8 Map Navi**

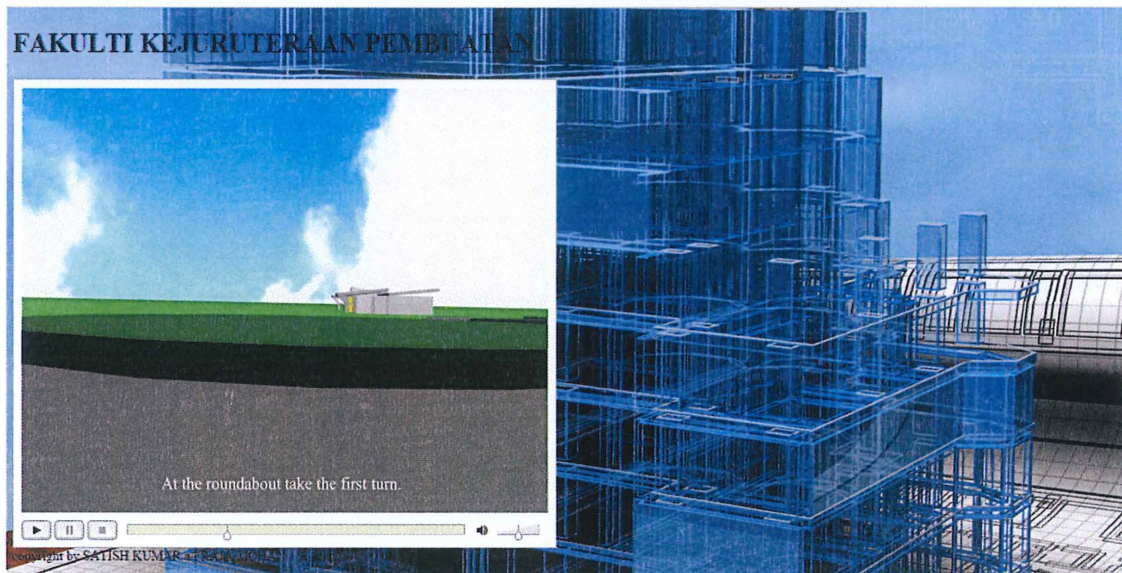
This is the interface of the navigation interface. There are links to the navigations animation and the link will direct to a new tab. This means that the user will have a new tab opened once the link is being clicked.



**Figure 2.3.5.9 Navigation(PAP&KK)**



**Figure 2.3.5.10 Navigation (FKEE & FKM)**



**Figure 2.3.5.11 Navigation(FKP)**



**Figure 2.3.5.12 Navigation (Library)**

The above images are the interface for all the links in the navigation interface.



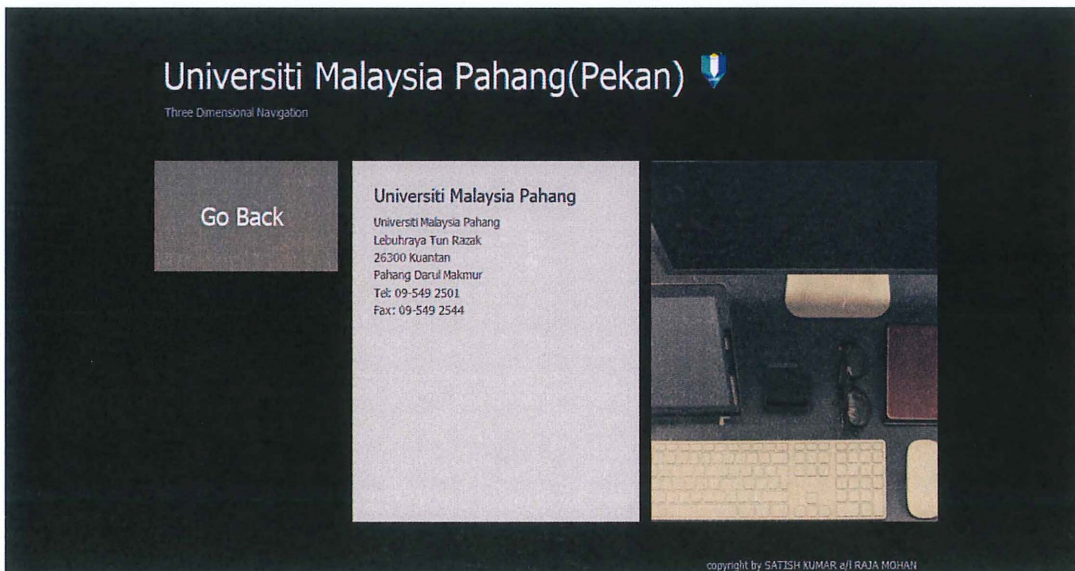
**Figure 2.3.5.13 Map Navi**

From this interface click the “go back” button to be directed to the home interface.



**Figure 2.3.5.14 Home**

From here to go to the about us interface the “About Us” button have to be clicked.



**Figure 2.3.5.15 About Us**

This is the interface of “About Us”.

## **2.4 Discussion**

### **2.4.1 Advantages and Disadvantages**

In this topic the advantages and disadvantages will be discussed in order to improvise the system in future.

#### Advantages

- i. The system gives the user an overview of the surroundings in the campus.
- ii. The navigation will be shown in three dimensional images which give better understanding of the campus.
- iii. This system is user friendly and easy to be handled

#### Disadvantages

- i. The starting point of the navigation is fixed from the campus gate.
- ii. The user can only view the given navigation.

## **2.5 Assumptions**

In order to make the system run properly there are some requirements that need to be fulfilled. They are:

- i. The system needs Windows operating system.
- ii. The computer or laptop need to have Adobe Flash Player and plugins.
- iii. The computer requirements are matching or higher than the system specification requirement.

## **2.6 Suggestion and enhancement for the project**

Although this system has fulfilled the objectives, scopes, and purposes successfully, but this system still need to be improved and enhanced. There are several enhancements that can be done in the near future:

- i. The number of navigations can be added to give more in detailing of the campus.
- ii. The functionality of the system should be added in the future.

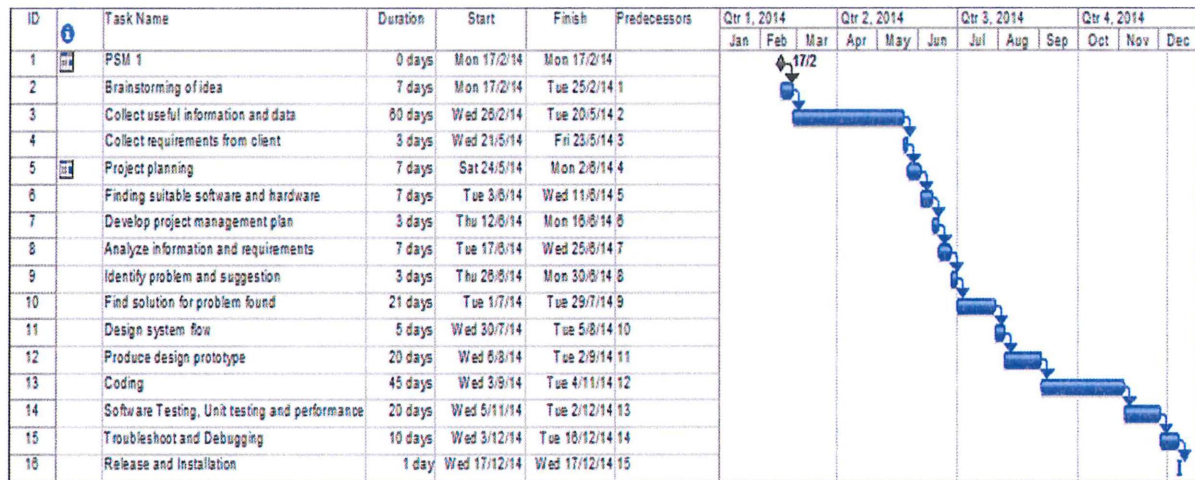
### **3.0 Conclusion**

This system, Universiti Malaysia Pahang (Pekan) Three Dimensional Navigation is a system where the navigation where shown in three dimensional. This system is very useful for the guests, parents and new students to navigate throughout the whole campus. This system is an identity that shows that the UMP is a technology university. This system was created using HTML, java script, Autodesk Maya, Adobe After Effects cs6 and Photoshop. This system was produced with the guidance of System Development Life Cycle (SDLC). This system was fully followed the steps of the SDLC in order to achieve the objectives. This system is being only scoped at UMP campus Pekan. Since the Pekan campus will soon be the main campus therefore it is in the best interest that the navigation system should be available in order to ease to guests to UMP Pekan.



## Appendix

### Gantt chart



## Reference

- [1] Portal of University of Victoria, from <https://www.uvic.ca/>. Accessed on 24/3/14.
- [2] Hackley School, from <http://www.hackleyschool.org/>. Accessed on 24/3/14.
- [3] Unversiti Teknologi Malaysia, from <http://www.utm.my/> . Accessed on 24/3/14.
- [4] System Development Life Cycle, [http://en.wikipedia.org/wiki/Systems\\_development\\_life\\_cycle](http://en.wikipedia.org/wiki/Systems_development_life_cycle) Accessed on 1/5/14.

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RUJ. TUAN (YOUR REF) :

UMP.12.02/13.11/01/08/Jld 2 ( 03 )

12 Mei 2014

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Tuan/Puan,

**TAJUK** : **3D NAVIGATION OF UNIVERSITI MALAYSIA  
PAHANG**

**NAMA PELAJAR** : **SATISH KUMAR A/L RAJA MOHAN**

**TAHUN/PROGRAM** : **3/IJAZAH SARJANA MUDA SAINS KOMPUTER  
(TEKNOLOGI GRAFIK & MULTIMEDIA)  
DENGAN KEPUJIAN**

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Sekian, segala kerjasama dan perhatian tuan/puan didahului dengan ucapan ribuan terima kasih.

**“BERKHIDMAT UNTUK NEGARA”**

Saya yang menjalankan tugas,

  
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