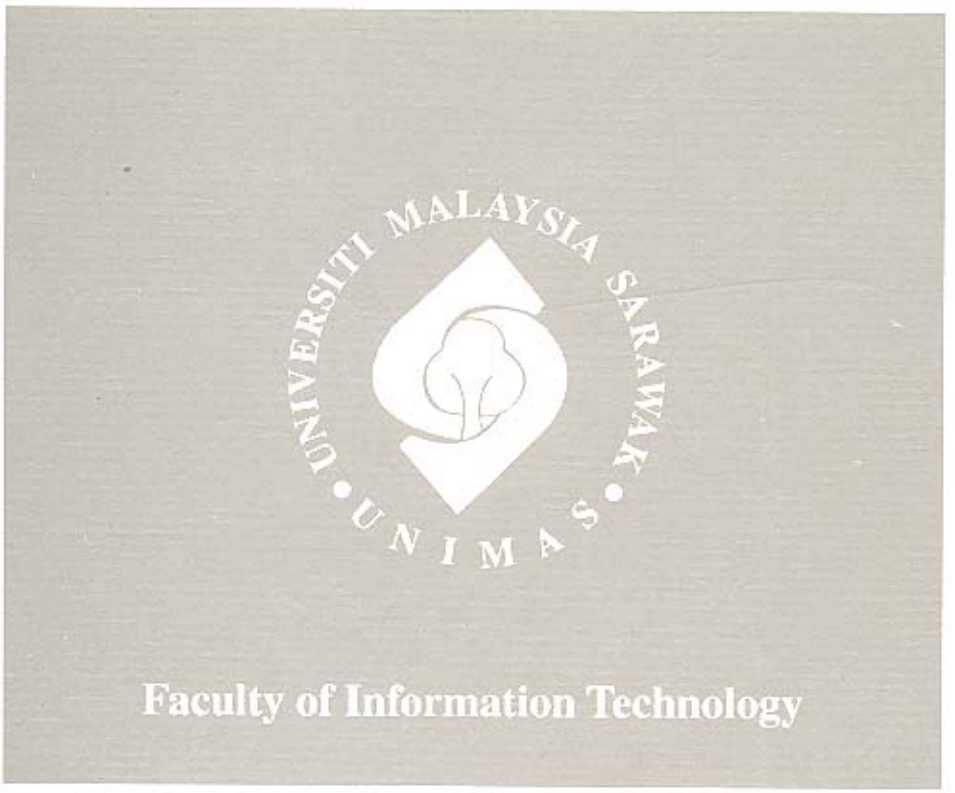

UNIMAS INFORMATION KIOSK (UNIK)

MOHD HELMI BIN MOHAMED TAHIR 5126
MUHAMAD SYUKRI BIN ISHAK 5101
AINUDDIN BIN KHALID 5507

UNIVERSITI MALAYSIA SARAWAK

2003

UNIMAS INFORMATION KIOSK (UNIK)

MOHD HELMI BIN MOHAMED TAHIR (5126)
MUHAMAD SYUKRI BIN ISHAK (5101)
AINUDDIN BIN KHALID (5507)

A report submitted
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ABSTRAK

Multimedia adalah merupakan media yang amat berkuasa dan effisien untuk menjadikan komunikasi, pembelajaran dan sebagainya lebih bagus dan lebih effisien. Dengan menambah elemen multimedia bersama dengan interaktiviti di dalam apa jua media digital, ia akan menjadikan media digital tersebut lebih menarik dan lebih mudah untuk pengguna mencerna informasi tersebut. Salah satu dari media digital yang digunakan oleh UNIMAS untuk menyampaikan maklumat ialah information kiosk. Kajian ini dilakukan untuk mencari kelemahan dan kekurangan kiosk yang telah ada di UNIMAS dan membina kiosk yang baru yang lebih baik. Dengan membina kiosk yang baru, yang dinamakan sebagai UNIK (UNIMAS Information Kiosk) akan menaikkan imej Universiti di mata pelanggannya dan menyampaikan maklumat dengan cara yang lebih efektif.

ABSTRACT

Multimedia is a powerful and efficient tool to make a communication, learning, and etcetera a lot better and more efficient. By adding multimedia elements together with interactivity in any digital media, it will make the digital media much more interesting and easier for user to digest the information. One of the digital media which is used by UNIMAS to provide information is the information kiosk. This research is conducted to find out the deficiencies and incompetencies of the current kiosk and develop a new and improved information kiosk. By developing the new kiosk which is called UNIK (UNIMAS Information Kiosk) will improve the image of the University to its customer and providing the information in a much more effective way.

Chapter 1

AN OVERVIEW

1.1 INTRODUCTION

The evolution of technologies brings the virtual uncertainty become reality. Therefore people can access the information in various ways and surely the perception and interpretation of information become differs to each other. To make sure that the information can be retrieved in a correct ways, a system must be developed in proper dimensions. In addition, nowadays information can be presented in an assortment of ways to make it more appealing. The attractiveness of information is a range of combination: text, graphics, audio, video and animations. This attractiveness is what we called multimedia.

Generally multimedia is not a new concepts, but Browell (1996) describe multimedia is something that combines the capability of technologies that used to be separate and it can combine things like text, graphics, sounds and still or motion pictures in a smooth way to present training or information: and print, telecommunications, video and broadcasting, and computers have merged· and the result is what we now call multimedia.

Hence, the presentation of information can be done by using kiosk. Rowley (1995) defines multimedia kiosk are workstations which are specifically designed for public access. They may be standalone or networked through a larger computer system.

This research is conducted to review the functions and usage of kiosk in UNIMAS. In addition, the research is done to determine the important elements and methods in developing the kiosk system, a prototype kiosk system for UNIMAS called UNIMAS Information Kiosk (UNIK)

1.2 PROBLEM STATEMENT

Based on literature, European countries and United States, kiosk has been used in public areas or any strategic locations that people can access to it. According to Rowley (1995) the potential locations include:

- In·store (the organization's own)
- In·store (another organization's store)
- In or outside banks (as ATMs)
- In supermarkets
- In shopping centers and malls
- In libraries and leisure centers
- In major tourist attractions
- In coffee shops and bars
- In hotels, airports and train stations
- At trade shows and exhibitions
- On university campuses
- In the foyers of office blocks.

In UNIMAS, there are three sets of kiosk located in different places like House of Chancellery, Faculty of Engineering and Center of E-Learning. Despite the three sets of kiosk, there is only one set of kiosk can be use. Based on the observation and research done on the particular kiosk system, there are few weaknesses can be highlighted:

i. It is located at non-strategic places
ii. Poor interface-design
iii. Audio and video elements are not fully function
iv. In consistence layout of navigation buttons

Therefore, by determining the weaknesses a better kiosk system can be propose.

1.3 PURPOSE OF STUDY

The purposes of research are:

i. Determining the underlying functions of kiosk
ii. Determining the functions of kiosk in universities/campuses

In addition, this research is done to develop a prototype of kiosk system for UNIMAS.

1.4 SCOPE OF PROJECT

The focus of this research is to develop a prototype kiosk system for UNIMAS. The planned system to be developed is targeted to end-users. The end-users consist of:

i. UNIMAS student
ii. UNIMAS staffs
iii. Visitors

1.5 RESEARCH SIGNIFICANCE

The research significance is to develop a prototype kiosk system, in further for future advancement in dealing with human needs. By developing the prototype system, existing system can be improved by creating new features in the system. By then, the responses of the end-users can be determined and being used as a guideline for further research. Furthermore, it can be a catalyst for better performance and improvement for it.

This research can support UNIMAS to achieve the mission statement by providing a new way of delegating information to the end-users effectively and efficiently. In addition, the end-users can access the services and information provided by UNIMAS wherever it is needed.

1.6 PROJECT PLAN/SCHEDULE

Every project should have its own planning on how the tasks are coordinated and when the project should be executed. In developing UNIMAS Information Kiosk (UNIK), several tasks have been divided to each of group members. The tasks are given based on the experience and expertise of each individual.

1.7 OUTLINE OF PROJECT REPORT

Chapter 2 will cover the researches that have been done regarding this project. We will also reviews some of the existing systems and compare it with the systems that are going to be developed. The comparisons are done in terms of the technology, programming, system features, interface and implementation tools used in the reviewed system. A brief overview about the proposed system are also portray in this chapter.

Chapter 3 gives detailed information on how the system is going to be developed. This chapter will highlight various stages involved in system development.

Chapter 4 covers the system analysis. The analysis is divided into two categories that is current and proposed system analysis. Furthermore we will define the requirements that are needed to implement the system.

Chapter 5 concentrates on the system design of the project. This is where the logical design of the system are put onto paper thus to give a clearer view of the system that are going to be develop.

Chapter 6 focuses on how the project is going to be implementing in such a way that the system is going to be use. This chapter will give the detail information on how the system is going to be installed and also the implementation of the system module. The security procedure and user manual are also clarified in this chapter.

Chapter 7 examines the effectiveness of the system that has been developed. In this part, the system is put into testing and is measured by the results that are gathered in the testing phase. The system limitations are also stated in this chapter.

Chapter 8 concludes the project report with an expectation for further advancement for the system.

Chapter 2

LITERATURE REVIEW

2.1 INTRODUCTION

As we can see today lots of stand-alone multimedia terminals or kiosk are available in the hotels, train stations, shopping malls, museums, grocery stores, etc. This is to provide information and guidance. By doing such installation, it will reduce demand on traditional information booths and personnel. In addition the kiosk is working around the clock and still provides the information when life help is off.

Multimedia, as we all know, is a powerful and efficient tool to make a communication, learning, etc a lot better and more efficient. By adding multimedia elements in the website, CD-ROM, kiosk or any other digital media it will make more interactive and easier for use to digest the information. Nowadays a lot of things are associated with 'multimedia' not just a cheap publicity since the government establishing it.

2.2 HISTORY OF KIOSK

There is no specific source available, which recorded or documented about the history of kiosk. Kiosk was started in 1984 when MicroTouch invented the first touch monitor in the USA (Kiosk.Org, 2001). Few years later, together with the computer industry revolution, the kiosk software is made for the touch monitor until now the touch monitor can be used with almost any kind of platform or operating system. In 1991, the first kiosk is said to be firstly displayed as a product at Comdex (US) containing missing children application (Kiosk.Org, 2001). Since then, the interactive kiosk has become a million dollar industry in the US. In 1998, it generates $369.7 million dollar and estimate to grow $2.94 billion dollar in 2003. It is not just a stand-alone booth for people getting information but also to do banking, shopping or getting on-line to the internet.

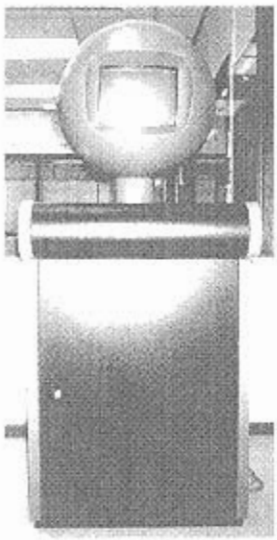

Figure 2.1: Unimas Iris Kiosk

2.3 GRAPHICAL USER INTERFACE (GUI)

GUI in public access environments, are relatively new phenomena, and this evaluation process has only just begun. Rowley (1995) in her journal mentioned about the research of GUI which focus on the following:

- top-level functions, including user guidance, index and search features.
- operational functions, such as execute, break and escape.
- navigational functions, which deal with movement within the database, and ergonomic functions, such as the layout of screens, the use of colour and terminology.

However there are already studies and research made by professionals on how to make a GUI regardless its environment. By following the principle, the good GUI design can be made. Developers always forget the user and often the application developed too advance for the user. Developer design the application based on what they know and not what the user know. Application must reflect the perspective and the behavior of the user (Hobart, 1995).

A good user interface can also be made with the amount of choice presented initially to the user reduced to a limited selection (Wisdom, 2002). After only two touches the user is looking at a specific page which provides information on a specific need.

There's also a study of how Apple design a good GUI (Luppa, 1997). A good GUI will:

- Reflect the perspective and the behavior of the user.
- Using reserve icon and word which is commonly used by people for example "Exit" means exiting the current menu or process.
- Provide keyboard support.
- Provide traceable path.
- Keeps text clear
- Simple design.
- Objects should look like what they do so that the user can recognize them and point to them.
- Consistent design, using a metaphor.
- The environment should appear to remain stable, understandable, and familiar.
- There should be little or no difference between what the user sees and what the user gets.
- The user, not the computer, should control the action.

2.4 MENU AND NAVIGATION IN A KIOSK

A menu is a set options displayed on the screen where the selection and execution of one or more of the options results in a change state of the interface (Preece, 1994). With menus, the users do not have to remember the item they want; they only need to select the choices/options on the menu.

It is useful to organize the command in the menu in a hierarchical way because according to Preece (1994) in designing, the menu must be comprehensible and natural to use. To overcome the problem of deciding which items to include at various levels and which items to group together at different levels, Preece (1994) suggest the ordering of menu made in alphabetical, categorical, conventional or frequency of use.

International Standard For Standardization (ISO) in their ISO 14915-2 which applies to both the presentation of content and interaction techniques for user control of computer-based multimedia application stated that there are several types of navigation techniques which can be applied.

2.4.1 Automatic Navigation

The content is presented by the system without user's input. The user will not have to select which page he/she wants to go, the application will automatically bring him/her to the next page in the application.

2.4.2 Predetermined Navigation

The user has only one choice of where to go next, but where the user has control over when to go to this next content. Example: Upon answering question 2 in quiz the user is sent to question 3.

2.4.3 User Determined Navigation

The user can choose which content to go to the next page from a number of options. Example: The user selects between going into further details in a topic and going on to the next topic.

2.4.4 Adaptive Determined Navigation

The choices available are determined by the system based on the content and some combination of: an individual's history, an individual's personal characteristics, a group's social history, and/or a group's characteristics. Example: The system limits the choices presented based on a profile of the user's interests.

2.5 CONTENT STRUCTURE IN A KIOSK

According to ISO 14915-2, the content in a multimedia application can be organized in several ways. This is to provide a better structure in the application.

2.5.1 Linear Structures

The contents are organized in a sequence. Linear structures may include sequences where media objects are presented in parallel.

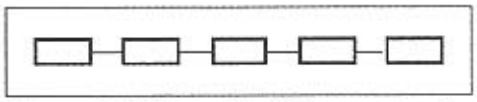

Figure 2.2: Example of linear structure

2.5.2 Tree Structures

The contents are organized in a hierarchical manner, where each component is associated with only one higher level component and may be associated with multiple lower level components.

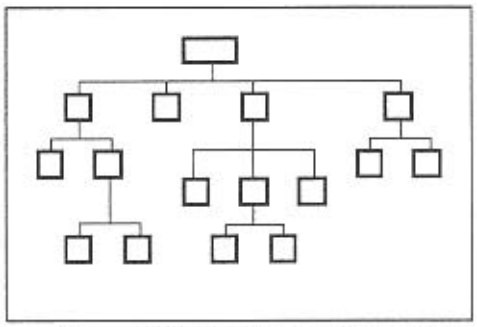

Figure 2.3: Example of tree structure

2.5.3 Network Structures

The contents are organized in a manner where each component may be associated with multiple organize their elements in a manner where each component may be associated with multiple other components. An example of a fully connected structure of content chunks or presentation segments, where all chunks or presentation segments are connected to all other content chunks or presentation segments, is illustrated in the figure below.

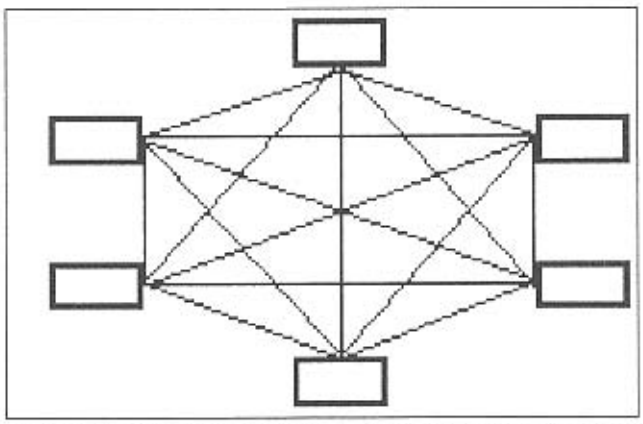

Figure 2.4: Example of fully connected network structure

An example of a partly connected structure of content chunks or presentation segments, where all content chunks or presentation segments are not necessarily connected to all other content chunks or presentation segments, is illustrated in the figure below.

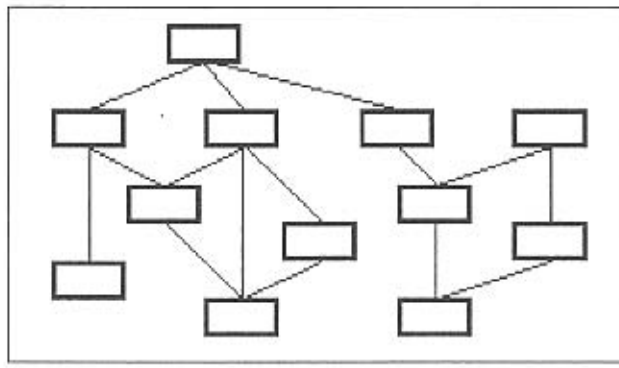

Figure 2.5: Example of partially connected network structure

2.6 HARDWARE IN A KIOSK

2.6.1 Sound

In a computer system, the component responsible to produce the sound is the sound card. Usually it is already build-in into the mainboard. The sound card is needed to decode sound files into audio that can be sent to the speakers (www.basichardware.com).

2.6.2 Central Processing Unit (CPU)

CPU or central processing unit is the brain of the computer. It controls the computer's process and allows to perform instructions. The speed of the processing is determined by the value of the megahertz (MHz) which means the higher the value of the MHz, the greater the speed of the CPU. The kiosk should use a fast CPU in order to provide better performance.

2.6.3 Random Access Memory (RAM)

Before a program is run, PC will load the program into a temporary memory which is called Random Access Memory (RAM) by reading certain necessary files from the disk (hard disk or optical disk). When the PC is running, not only the OS is running but there are other program running at the background without the user knowing it such as anti virus software, certain hardware drivers, etc. The computer will process the information in the memory first than the hard disk [Tway, 1992]. The more memory the PC have, the more information you will have fast access to and the better your computer will perform (www.basichardware.com).

When RAM is not enough in the system, the OS will send the information to the hard disk which is known as hard disk swapping [Tan, 2002]. Instead of RAM, the system will ends up reading from the hard disk

instead of the RAM which is at least 50 times slower than usual [Tan, 2002]. In multimedia system such as the kiosk, bigger RAM will provide better performance.

2.6.4 Hard Disk

Hard is one of the important components in a computer system. Large amount of hard disk is needed because multimedia presentation files such as the application of the kiosk consist of large files. Another aspect to consider is the speed of the hard disk because it also determines the performance of the system even though the CPU speed is high. This is because the CPU will still have to wait the information from the hard drive (www.basichardware.com). Most hard disk nowadays, including in UNIMAS kiosk, rotates at 5400 rpm (revolution per minute) and 7200 rpm for high-end workstation [Simon Tan, 2002]. The speed of the hard disk depends of the disk's rotational speed but for the system a 5400 rpm hard disk is enough since 7200 rpm hard disk is too costly [Tan, S. 2002].

2.6.5 Graphics Board

PCs today will have a graphic system in their system and most of it will have at least a Video Graphic Accelerator build-in into the mainboard. The minimum requirement of the graphics system is 16-bit colors with the minimum display resolution of 800x600 dpi (dot per inch), which is currently used in UNIMAS kiosk.

Beside onboard graphic system mentioned above, there are also video cards made for the computer system. The video card is made based on few different chipsets that are chipset 1, chipset 2 and chipset 3. Video cards have their own advanced processing chips that make all kinds of calculations to make scenes look more realistic (www.basichardware.com) but it need larger and faster memory.

2.6.6 Touch-Screen Monitor

A touch-screen monitor allow user to touch screen instead of using a mouse or keyboard to input their response or request [Tway, 1992]. The monitor has a textured coating across the glass face [Vaughan, 1996]. This coating is sensitive to pressure and registers the location of the user's finger when it touches the screen [Vaughan, 1996].

According to TouchScreens.Com (www.touchscreens.com), a basic touch-screen has three main components: a touch sensor, a controller, and a software driver. A touch screen sensor is a clear glass panel with a touch responsive surface. The touch sensor/panel is placed over a display screen so that the responsive area of the panel covers the viewable area of the video screen. There are several different touch sensor technologies on the market today, each using a different method to detect touch input. The sensor generally has an electrical current or signal going through it and touching the screen causes a voltage or signal change. This voltage change is used to determine the location of the touch to the screen.

The controller is a small PC card that connects between the touch sensor and the PC. It takes information from the touch sensor and translates it into information that PC can understand. The controller is usually installed inside the monitor for integrated monitors or it is housed in a plastic case for external touch add-ons/overlays. The controller determines what type of interface/connection you will need on the PC. Integrated touch monitors will have an extra cable connection on the back for the touch-screen. Controllers are available that can connect to a Serial/COM port (PC) or to a USB port (PC or Macintosh). Specialized controllers are also available that work with DVD players and other devices.

The driver is a software update for the PC system that allows the touch-screen and computer to work together. It tells the computer's operating system how to interpret the touch event information that is sent from the controller. Most touch screen drivers today are a mouse-emulation type driver. This makes touching the screen the same as clicking your mouse at the same location on the screen. This allows the touch-screen to work with existing software and allows new applications to be developed without the need for touch-screen specific programming. Some equipment such as thin client terminals, DVD players, and specialized computer systems either do not use software drivers or they have their own built-in touch screen driver.

There are three types of touch screen technology (whatis.techtarget.com):

- Resistive: A resistive touch screen panel is coated with a thin metallic electrically conductive and resistive layer that causes a change in the electrical current which is registered as a touch event and sent to the controller for processing. Resistive touch screen panels are generally more affordable but offer only 75% clarity and the layer can be damaged by sharp objects. Resistive touch screen panels are not affected by outside elements such as dust or water. This type of technology is used in UNIMAS kiosk.

- Surface wave: Surface wave technology uses ultrasonic waves that pass over the touch screen panel. When the panel is touched, a portion of the wave is absorbed. This change in the ultrasonic waves registers the position of the touch event and sends this information to the controller for processing. Surface wave touch screen panels are the most advanced of the three types, but they can be damaged by outside elements.

- Capacitive: A capacitive touch screen panel is coated with a material that stores electrical charges. When the panel is touched, a small amount of charge is drawn to the point of contact. Circuits located at each corner of the panel measure the charge and send the information to the controller for processing. Capacitive touch screen panels must be touched with a finger unlike resistive and surface wave panels that can

use fingers and stylus. Capacitive touch screens are not affected by outside elements and have high clarity.

2.7 REVIEWING THE EXISTING SYSTEM

There are two kiosks which is called "Unimas Iris Kiosk" available in UNIMAS. The reviews below are made on the kiosk's software and hardware.

2.7.1 Graphical User Interface (GUI)

The current kiosk has a stable, understandable, and familiar environment. This is one of the criteria of a good GUI design as mentioned earlier in section 2.3. However the GUI designs in not attractive to attract user to use the kiosk for the second time.

2.7.2 Sound

The kiosk incorporate background music and voice from the video could not be heard maybe due to problem with the speakers in the system.

2.7.3 Menu and Navigation

In the current kiosk, the type of navigation used is 'user determined navigation". The user will have to take some time to understand the navigation of the kiosk. This is because the navigation is quite confusing. User has to use the kiosk for a couple of times before he/she can get use to it in order to get the information.

2.7.4 Content Structure

UNIMAS kiosk uses tree structure (refer Appendix B).

2.7.5 Platform

The kiosk in UNIMAS runs in Microsoft Windows platform. Windows provides support for multimedia in its system [Judith Jeffcoate, 1995] such as:

- Object Linking and Embedding (OLE) technology to let users insert multimedia elements into software programs.
- Media Command Interface (MCI) to allow Windows-compatible application to control multimedia devices such as CD-ROM drivers, audio and animation players. The Digital Video-MCI command set, designed in conjunction with Intel, supports digital video computing.
- Audio Video Interleaved (AVI), a file format for digital video under Windows designed to be cross-platform compatible.

2.7.6 Location

The present Unimas kiosks are located at the Cansellori and Faculty of Engineering. Cansellori is a good place for the kiosk because Cansellori is one of the first places where people from outside Unimas will go to. Wisdom, L. (2002) suggests that kiosk is best placed at the main attraction

of the place and far away from the help desk or help counter. This is because if the kiosk is placed near a manned help counter, people will firstly go to the personnel at the counter. Therefore the purpose of making the kiosk is not met.

2.7.7 Housing

Application is not the only important component in the kiosk. The housing of the kiosk where the hardware of the kiosk resides is also equally important with the application (Farr, 2002). Unimas info kiosk has an attractive housing which can attract people because it is made resemble a human eye (iris), which suit the name "Unimas Iris Kiosk".

2.7.8 Hardware

We can't identity the hardware or the computer components of the current kiosk because the department which handles the kiosk does not have the keys to open the housing.

2.8 KIOSK APPLICATION DEVELOPMENT

In this section will review the hardware and software used to develop the new kiosk.

2.8.1 Hardware

The application for the kiosk is developed using PC with the specification stated in Table 2.1. The components required same as user's hardware requirement but with higher specification on the user part.

Component	Typical For DOS
CPU	Intel Pentium 667
Memory	128 MB
Graphics	SVGA
Storage	20 Gb Hard Disk
Sound	Sound Blaster Live!

Table 2.1: Specification of the PC for Application's Development

Other hardware and software used in the development of kiosk application beside the basic hardware requirement above are:

2.8.1.1 Video Capture Card

This is the peripheral used to convert video from analog format (from video tapes) into digital format. It is a peripheral installed in the computer and provides an input connection for a video camera or video player and transmit the video into the computer. The video will then convert into digital format such Windows AVI format and the converted files can be used in multimedia presentation.