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Video surveillance system / Mohd Firdaus Ab Wahab.

VIDEO SURVEILLANCE SYSTEM

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This report is submitted in partial fulfillment of requirements for the award of Bachelor of Electronic Engineering (Telecommunication Electronics) with honours

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
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I dedicate this book to my father and my mother, family members
and last but not least, to all my UTeM lecturers and friends.

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ABSTRACT

Video surveillance system's project is about monitoring system that can be implement by user in real time. The system will allow user to view the movement and direction of the individual cameras over the computer via local area network (LAN). This project consists of web camera as a surveillance medium which is controlled by software designed using Microsoft Visual Basic 6 to run as a surveillance system. This surveillance system is use to monitor, supervise, inspection and to look up a person or a target area and also can be operate in Local Area Network (LAN). Many common surveillance systems are using an analog system, for example by using analog camera with Video Cassette Recorder (VCR) system. In the market today, some of the digital surveillance system had been develop by using Internet Protocol (IP) camera that is very expansive and not affordable by all users. So the project objective is to build a network based surveillance which the system can work up with digital video inputs (webcam). This system allow user at client side to view the entire surveillance camera from server side. Visual Basics 6 is used to develop the interfacing system between software and webcam to make monitor from server side available. It can be said that, the project is low at cost but very effective in real time.

ABSTRAK

Projek video pengawasan sistem ini berkaitan dengan sistem pengawasan yang boleh dilaksanakan oleh pengguna dalam masa nyata. Sistem ini akan membenarkan pengguna melihat pergerakan yang berlaku melalui kamera menggunakan rangkaian kawasan setempat (LAN). Projek ini terdiri daripada kamera web sebagai satu pengantara pengawasan di mana dikawal oleh perisian rekabentuk menggunakan Microsoft Visual Asasi 6 berfungsi seperti satu sistem pengawasan. Sistem pengawasan ini digunakan untuk memantau, menyelia, dan melihat seseorang atau kawasan sasaran. Kebanyakan sistem pengawasan sedia ada menggunakan sistem analog untuk menyelia sebagai contoh sistem kamera analog dengan perakam kaset video (VCR). Di pasaran hari ini, terdapat beberapa sistem pengawasan digital yang menggunakan kamera protokol internet (IP) yang sangat mahal dan tidak mampu untuk dimiliki oleh semua pengguna. Oleh itu objektif projek ini adalah untuk membina sebuah sistem pengawasan rangkaian yang boleh menggunakan sumber video digital (kamera web). Sistem ini membolehkan pengguna di pihak pelanggan untuk melihat kamera pengawasan daripada pihak pemberi. Asas-asas visual 6 digunakan bagi menghasilkan sistem perisian yang membolehkan ia berfungsi dengan kamera web dan boleh digunakan untuk pemantauan daripada pihak pemberi. Kesimpulannya, projek ini adalah murah dari segi kos namun sangat berkesan dalam masa nyata.

CONTENTS

CHAPTER	ITEM	PAGE
	PROJECT TITLE	i
	VERIFYING FORM	ii
	DECLARATION	iii
	SUPERVISOR APPROVAL	iv
	DEDICATION	v
	ACKNOWLEDGEMENT	vi
	ABSTRACT	vii
	ABSTRAK	viii
	CONTENTS	ix
	LIST OF TABLE	xii
	LIST OF FIGURES	xiii
	LIST OF ABBREVIATION	xiv
	LIST OF APPENDIX	xv
I.	INTRODUCTION	
	1.1 PROJECT OBJECTIVE	2
	1.2 SCOPE OF WORK	2
	1.3 PROBLEM STATEMENT	2
	1.4 THESIS OUTLINE	3

II. LITERATURE REVIEW

2.1	BACKGROUND STUDY	4
2.1.1	Hidden Spy Cameras for Covert Operations and At-Home Security Protection	4
2.1.2	Wireless Security Cameras	5
2.1.3	Night Vision Cameras Equipped with IR for Any Low Light Situation	5
2.1.4	Network Security Cameras that Work With Home or Office Network	5
2.1.5	Color Bullet Cameras	5
2.2	UNIVERSAL SERIAL BUS	6
2.2.1	Overview	6
2.2.2	USB Connectors	7
2.3	TCP/IP	10
2.4	PORT	10
2.5	LOCAL AREA NETWORK	11
2.5.1	LAN Network Address	11
2.5.2	Network and Broadcast Addresses	12
2.5.3	Subnet Masks	12
2.5.4	Domain Name	13
2.5.5	Hostnames	13
2.5.6	Assigning IP Addresses in a LAN	14
2.5.7	Static IP Addressing	14
2.5.8	Dynamic IP Addressing	14
2.6	WINSOCK	15
2.6.1	Technology	16
2.7	VISUAL BASIC	17
2.7.1	Language Features	18
2.7.2	Characteristics Present in Visual Basic	19
2.7.2.1	Boolean Constant True has Numeric Value	19
2.7.2.2	Logical and Bitwise Operators are Unified	20
2.7.2.3	C++ or Java Exception Handling	20

III. METHODOLOGY

3.1	INTRODUCTION	21
3.2	STRUCTURE OF A VISUAL BASIC APPLICATION	23
3.3	STEPS IN DEVELOPING APPLICATION	24
3.4	SERVER	29
3.5	CLIENT	34

IV. RESULT AND DISCUSSION

4.1	INTRODUCTION	38
4.2	SERVER	39
4.3	CLIENT	42
4.4	DISCUSSION	43

V. CONCLUSION

5.1	CONCLUSION	44
5.2	FUTURE PLAN	45

REFERENCE	46
------------------	----

APPENDIX	47
-----------------	----

LIST OF TABLE

NO	TITLE	PAGE
2.1	Address ranges and LAN sizes	12
2.2	Sample IP addresses for a LAN	14

LIST OF FIGURES

NO	TITLE	PAGE
2.1	USB symbol	6
3.0	Flow chart for the whole project	23
3.1	Form	26
3.2	Toolbox	27
3.3	Properties	28
3.4	Form layout	28
3.5	Form properties	29
3.6	Splash form for server	30
3.7	Login form for server	31
3.8	Server form	33
3.9	Splash form for client	35
3.10	Login form for client	36
3.11	Client form	38

LIST OF ABBREVIATION

CCTV - Closed-Circuit Television

DVR - Digital Video Recorder

IP - Internet Protocol

LAN - Local Area Network

TCP/IP- Transmission Control Protocol / Internet Protocol

USB - Universal Serial Bus

LIST OF APPENDIX

NO	TITLE	PAGE
A	Server	47
B	Client	55
C	Module	58

CHAPTER I

INTRODUCTION

There are immediate needs for computerized surveillance systems in commercial, law enforcement and military applications. Mounting video cameras is cheap, but finding available human resources to observe the output is expensive. Although surveillance cameras are already prevalent in banks, stores, and parking lots, video data currently is used only "after the fact" as a forensic tool, thus losing its primary benefit as an active, real-time medium. What is needed is continuous 24-hour monitoring of surveillance video to alert security officers to a burglary in progress, or to a suspicious individual loitering in the parking lot, while there is still time to prevent the crime. In addition to the obvious security applications, video surveillance technology has been proposed to measure traffic flow, detect accidents on highways, monitor pedestrian congestion in public spaces, compile consumer demographics in shopping malls and amusement parks, log routine maintenance tasks at nuclear facilities, and count endangered species. The numerous military applications include patrolling national borders, measuring the flow of refugees in troubled areas, monitoring peace treaties, and providing secure perimeters around bases and embassies.

1.1 PROJECT OBJECTIVE

The purpose of this project is to design and implement a digital video surveillance system that will provide easy access to both live and archived images from the library or hard disk from our computer. To accomplish this, digital image capturing and database archiving is used.

This program will record and save activities and situation in the computer and at anytime it can play back the recorded. This project consist of the transmission module needed to control the camera movements using a platform and the video feed with real time transmissions. The quality of the camera feedback will directly influence the transmission capabilities of the video and this will pose some difficulty as well as the acceptable response time of the commands used to adjust the camera platform.

1.2 SCOPE OF WORK

The main purpose in this project is to develop a surveillance system that will be implementing by user. This implicates that the system has to be effective in real time. As the project title describes, the two key words of this design are interactive and remote. The system allows user to view the movement and direction of the individual cameras over the computer in the house or office via the local area network (LAN).

1.3 PROBLEM STATEMENT

Some of the current technologies still use an analog video surveillance system. Most times it requires user to go the entire tape through until the event occurs. Since these tapes are sometimes up to 3 days long this could be a very lengthy process. Another problem with this method is that in most cases the tapes are only viewed if an event is brought to the attention of the staff.

In the past, digital was not a cost-effective solution for most companies. Not only the existing security solutions difficult to augment with new technologies, the simple fact is that it takes a lot of disk space and processing power to go digital until many customers turn away. Now the industry is experiencing large growth of hard drive space and an increase in cheaper, faster processors. Thus the price is more reasonable and digital is more feasible as a solution in general.

1.4 THESIS OUTLINE

This thesis consists of five chapters; Introduction, literature review, methodology, result and discussion, and finally the conclusion. For the chapter 1, it had discussed about project objective, scope of work and problem statement.

In chapter 2, it had discussed concerning type of camera, universal serial bus (BUS) and local area network (LAN). Nowadays there are several types of camera in marketplace such as USB camera, hidden spy cameras, wireless security cameras, night vision cameras and the rest. USB camera is preferred to be used in this project because it is a low cost camera.

In chapter 3, it discusses more on how to prepare this project. This project consists of two parts, which are client and server. Server is used by admin of computer to set the IP number and port number. While for client is used by normal user to view webcam from the server. Client have to know IP number in server pc's when try to view webcam.

In chapter 4, it shows result that had done in this project. This chapter will discuss more detail about the result for the system. The major part of the system consist server and client result.

In chapter 5, it concludes the entire project and has some suggestion or future plan for this project.

CHAPTER II

LITERATURE REVIEW

2.1 BACKGROUND STUDY

Nowadays there are several types of camera in marketplace such as USB camera, hidden spy cameras, wireless security cameras, night vision cameras and the rest. USB camera is preferred to be used in this project because it is a low cost camera. Several types of cameras are listed below.

2.1.1 Hidden Spy Cameras for Covert Operations and At-Home Security Protection

Covert or Hidden Spy Cameras are used for many purposes such as to prevent theft, to watch employees, to catch cheating spouses, for covert operations, or simply to monitor a nanny or caregiver when client are not home. This is where the word Nanny Cam originated. Hidden Spy Cameras are customer installable and can easily connect to a household VCR or an Industrial DVR, depending on client needs.

2.1.2 Wireless Security Cameras

Wireless Cameras provide a versatile Surveillance System that adapts to ever-changing needs. With no wires to run, user will be fully operational in no time. Change the camera position quickly and easily to watch the action unfold.

Some Wireless Security Cameras transmit to a receiver over a high frequency radio signal (RF) similar to a cordless phone. These cameras can also be connected to a video monitor or recorder for live viewing or recording. User can even connect these cameras to an Internet Connected DVR.

2.1.3 Night Vision Cameras Equipped with IR for Any Low Light Situation

Night Vision Cameras are a great way to monitor and secure exterior building entrances and rural perimeters, or to keep an eye on a sleeping infant in a dark room. Infrared Light reacts very well to living tissue or movement and provides detailed imagery in near darkness.

2.1.4 Network Security Cameras that Work With Home or Office Network

Network Cameras allow users to monitor and record high quality video over a Local Area Network (LAN) or a Wireless Area Network (WAN). Network Cameras enable user to transform current computer network into a central command for user Video System.

2.1.5 Color Bullet Cameras

High end, professional-level, discreet Color Cameras with excellent resolution and image quality for indoor use virtually anywhere.

2.2 UNIVERSAL SERIAL BUS

2.2.1 Overview

Universal Serial Bus (USB) is a serial bus standard to act as interface devices. It was originally designed for personal computers, but it has become commonplace on handheld devices such as portable memory devices, video game consoles, PDAs and portable media players.

A major component in the legacy-free PC, USB was devised to help retire all serial and parallel ports on personal computers since these were not standardized and required a multitude of device drivers to be developed and maintained.

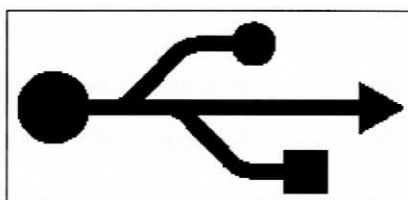


Figure 2.1: USB symbol

A USB system has an asymmetric design, consisting of a host controller and multiple daisy-chained peripheral devices. Additional USB hubs may be included in the chain, allowing branching into a tree structure, subject to a limit of 5 levels of branching per controller. No more than 127 devices, including the bus devices, may be connected to a single host controller. Modern computers often have several host controllers, allowing a very large number of USB devices to be connected. USB cables do not need to be terminated.

USB's ability to daisy-chain devices led early prediction that each USB device would include a downstream port to allow for long chains of devices. Many of the first computers shipped with USB ports therefore had only two. But economical and technical reasons kept daisy-chaining from becoming widespread. To reduce the need for USB hubs, desktop computers now come with more USB ports, typically

six, with up to half of them on the front panel to facilitate temporary connection of portable devices.

USB was designed to allow peripherals to be connected without expansion cards for the computer's ISA, EISA, or PCI bus, and to improve plug-and-play capabilities by allowing devices to be hot-swapped (connected or disconnected without powering down or rebooting the computer). When a device is first connected, the host enumerates and recognizes it, and loads the device driver it needs.

USB can connect peripherals such as mouse devices, keyboards, PDAs, gamepads and joysticks, scanners, digital cameras, printers, external storage, networking components and many more. For many devices such as scanners and digital cameras, USB has become the standard connection method. USB is also used extensively to connect non-networked printers, replacing the parallel ports that had previously been in wide use. USB simplifies connecting several printers to one computer.

2.2.2 USB connectors

There are several types of USB connectors, and some have been added as the specification has progressed. From the original USB specification, these are series "A" plug, series "A" receptacle, series "B" plug, series "B" receptacle.

Cables have only plugs and hosts and devices have only receptacles. Hosts have type-A receptacles. If they have receptacles the devices have the type-B. Type-A plugs only mate with type-A receptacles, and type-B with type-B receptacles. The On-the-Go supplement allows a product to be either host or device, with a mini-AB receptacle that accepts either a mini-A plug or a mini-B plug. Mini-A, mini-B, and mini-AB connectors are identified easily by color. The plastic inside mini-A plugs and receptacles is always white, that in mini-B connectors black, and that in mini-AB receptacles grey.

There are limited set of cables allowed by the USB specification. Cables fall into two categories, detachable and captive. For purposes of the specification, captive includes any cable with a custom connector on the device end. Any captive cable has only a type-A plug, either Standard-A or mini-A. Any detachable USB cable has one type-A connector (either standard-A or mini-A) and one type-B connector (either standard-B or mini-B).

Any cable with a receptacle or with two "A" or two "B" connectors is, by definition, not USB. However, many cable manufacturers make and sell USB-compatible (yet not strictly conforming) extension cables with a Standard-A plug on one end and Standard-A receptacle on one end. Cables with two type A or even two type B plugs are available from more specialist suppliers.

Note that only "full-speed" and "hi-speed" devices use detachable cables. Compliant "Low-speed" devices only use captive cables, because the low-speed specification does not allow for the electrical characteristics of standard detachable USB cables.

The mini-A, mini-B, and mini-AB connectors are used for smaller devices such as PDAs, mobile phones or digital cameras. The Series "A" plug is approximately 4 by 12 mm, the Series "B" approximately 7 by 8 mm, and the mini-A and mini-B plugs approximately 3 by 7 mm.

The connectors which the USB committee specified were designed to support a number of USB's underlying goals and to reflect lessons learned from the varied menagerie of connectors then in service. In particular:

1. the connectors are designed to be robust. Many previous connector designs were fragile, with pins or other delicate components prone to bending or breaking, even with the application of only very modest force. The electrical contacts in a USB connector are protected by an adjacent plastic tongue, and the entire connecting assembly is further protected by an enclosing metal sheath. As a result USB connectors can safely be handled, inserted, and