Video Streaming Using Cell Phones for Property Surveillance

by

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the

Information Communication Technology Programme

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Approved by,

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Project Supervisor

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

December 2007

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgement , and that the original work contaied herein have not been undertaken or done by unspecified sources or persons.

NOOR HALIZAH BINTI MOHD MUHAJIR

ABSTRACT

Video Streaming using Cell Phones for Property Surveillance or VStream is a project to control their belongings at anywhere far from their place. Security is synonym with private and confidential issue. People apply security to protect their belongings against intrusion. It is much more convenient as it is available and control by the cell phones. For this VStream project, video streaming elements will be added into the cell phones and this give beneficial people as another alternative to control and see what happen with their belongings through their cell phones. Besides that, another feature of this VStream project is that it is unique compared to other security application available whereby it is more interactive as there are two ways communication between the user and PC camera. For this project, it will apply GPRS elements which then can enable the reader to display video streaming from their cell phones. The methodology of this project consists of two parts which are the research part and the design part. For the research part, the questionnaire, observation and surveys will be the method applied while for the design part, 'Waterfall' methodology that consists of five different stages which are analysis, design, development ,testing and evaluation will be implemented. Last but not least, it is hope that the community will accept this product and make full use of it for benefits of all.

ACKNOWLEDGEMENT

Alhamdulillah to Allah, the Most Gracious and Most Merciful.

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ABBREVIATIONS

GPRS   General Packet Radio Services

IR   Infrared

MMS   Multimedia Message Services

PC   Personal Computer

UMTS   Universal Mobile Telecommunication

UML   Unified Modeling Language

VStream   Video Streaming using Cell Phone for Property Surveillance

CHAPTER 1

INTRODUCTION

1.1 Background of Study

This project is all about to provide easily affordable security system for office room, or any important room where people want to have security by connecting IR transmitter and receiver at the entrance of the room. If anytime, the IR Rays are cut, the PC is intimated and immediately, an SMS is sent to the owner of the setup regarding the intrusion. The owner can open the application using his/her cell phones and view the video. As security is a critical factor for the business and at many places, everyone who utilizes this application can get to know that the events happening at a particular location with just a mobile from a remote location. This package uses a user friendly GUI so that the people can use it with utmost ease.

In this project, IR transmitter passes rays continuously to IR receiver, and this is connected at the top of the entrance of the door. It will be connected to the PC which has web cam and internet connection. If there is no interruption between the transmitter and receiver, the receiver will receive rays continuously. But if any obstruction occurs there, the passage of rays will be disconnecting, and that will be detected by PC. The web cam will start recording the video and simultaneously the SMS will be sending to the mobile phone.

To view the live events happening at a site we need to connect to the PC with which the web cam is connected and the server part of this application should be running there in. Next we can start the client part loaded in the mobile and we need to specify the PC to be connected by passing its IP address where in the server part should be running. We can choose view web cam option to see the video. So, we can connect to any location or the PC through this application which must fulfill the requirements specified.

1.2 Problem Statement

Security is one of the important issues nowadays. We need security to protect our private and confidential things when we are far away from those things. This is to make sure our important things are still in our scope of control though it was tangible from us.

a) **No specific protection against theft, property damage and personal harm**

Protection against theft, property damage and personal harm is important for individuals, companies, and governments. They must be aware of potential threats and make preparations to protect themselves and their property through effective security measures.

b) **Intrusion towards important belongings is unexpected**

For business or at many places it's important to protect their privacy and confidential from intrusion. There are also some who simply want to damage property externally. This could also include people who would break into a folder in the laptop to do some mischief. So, we can defend against an attack by having protective mechanisms or security measures in place.

c) **The important of security in our life**

Security or protection against an attack usually requires anticipation, taking measures to prevent an attack, rapidly responding to an attack, and sometimes making a preemptive attack on suspected threats [1]. A person, property or organization may be vulnerable to an attack. The types of protection include prevention, response and pre-emptive attacks. Prevention against an attack includes making it difficult for someone to attack and displaying the willingness to counter-attack.

1.3 Objectives and Scope of Study

1.3.1 Objectives

Below are the objectives of the project:
a) To develop a mobile application that can display the streaming video.
b) To create an application that can capture the activities happening at a particular location using a web cam.
c) To setup the server module those connects the web cam through the application for capturing image and save into the server.
d) To build transmitter and receiver of infrared to link with the PC camera using the serial port.

1.3.2 Scope of Study

The focus of this research is on how people make the security very important in their daily life and how the make the prevent maintenance to protect their stuff from any miscellaneous cases. It also involved the questions on what way they really want to protect their important things though they are far away from it. Other than that, this study also tried to find out whether they had done any

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activity that can help them protect their stuff using the camera, video streaming or cell phones. They would had the question such as, what are the features that they like on that cell phones or personal computer, what they would like to see in the video streaming during recording, and what they do not want to have video streaming using cell phones with security. The answers for those questions will lead to develop a project that satisfies ones need. All these would be done via questionnaires and survey among the UTP students and also public community.

The final product will basically have the cell phones with the application that can views videos in it and applying for security purposes. The final products also will have the application in the personal computer program that can monitor the location selected using the PC camera and capture video once the IR is interrupted. The IR is implement as the check point where if any intrusion detect the camera will automatically record the activity happen at that time.

The value of the project would be users would only have to display the streaming video through the cell phones and monitor what happen towards their belonging through the cell phone. Another area that is important for this project is the language that will be using in this project is Java including the J2ME WTK and visual basic. The toolkit includes the emulation environments, performance optimization and tuning features, documentation, and examples that developers need to bring efficient and successful wireless applications. Apache Tomcat is the servlet container that is used in the official Reference Implementation for the Java Servlet and JavaServer Pages technologies. Apache Tomcat is developed in an open and participatory environment and released under the Apache Software License. Apache Tomcat powers numerous large-scale, mission-critical web applications across a diverse range of industries and organizations [2]. Therefore, Java with tomcat server would be a suitable tool for this project as the relevancy that has been stated above.

1.3.3 Relevancy of the Project

This project is definitely related to Mobile Computing application that will be developing using Java Programming and emulate using Wireless Toolkit program. Apache Tomcat Server is using for the server side and visual basic language is used in design the interface for the computer. The author has taken courses in Wireless Technology and Object Oriented Programming which is focus in Java application. The author also has been working with visual basic programming for more than three years. Through out this project the author can gain deep understanding and knowledge in both two areas. In creating the application for mobile used, the author need to implement the knowledge in programming, database server and design. The author needs to use J2ME Wireless Toolkit and Apache Tomcat server for the mobile application and visual basic programming in creating the interface for capturing the video. The author also needs to have a basic knowledge in setup the transmitter and receiver to pass the IR continuously between them that maybe the portion of electrical engineering subject.

1.3.4 Feasibility of the Project within the Scope and Time Frame

This project would make life easier for people as it is provides video which people could see and know what happen towards their belongings. The most important thing, it's very useful in sending information at the right time when something happen with their belonging so they can take any action or maintenance prevention to stop those illegal activity. Besides that, it is easier for people to observe far away from their place and they can actually avoid the hustle going to the place that they put their important thing just to make sure those thing are still safe at their place. Beside that, mobile phone is the easy communication medium to transfer data such as video streaming using the General Packet Radio Service (GPRS) provided in the phone itself.

CHAPTER 2

LITERATURE REVIEW AND THEORY

2.1 Video Streaming

2.1.1 Significant Of Video Streaming

Streaming is a technology for playing audio and video files either live or pre-recorded from a Web page. A user can view the audio or video files directly from the Web server for immediate playback. This avoids time consuming downloads of large files. Once users get a message (SMS) through their cell phones, they will have an option whether to display the video record from the PC camera or not view that video at all.

2.1.2 The Evolution of Video Streaming

When audio or video is streamed, a small buffer space is created on the user's cell phones, and data starts downloading into it. As soon as the buffer is full (usually just a matter of seconds), the file starts to play. As the file plays, it uses up information in the buffer, but while it is playing, more data is being downloaded. As long as the data can be downloaded as fast as it is used up in playback, the file will play smoothly.
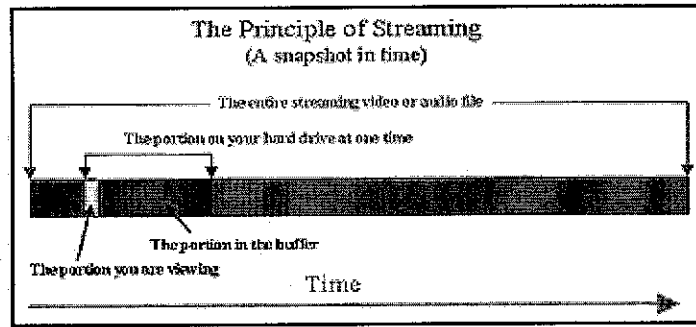
Figure 1: Buffer time during the transferring video

Figure 1 show the delay of the audio or video starts to play. Streamed files also don't require much bandwidth, so they can be played on cell phones that use modems to connect to the Internet. The video streaming that play in the cell phones will have the possibility late in transferring the data from the actual one record from the location about this time.

2.2 Mobile Phone

2.2.1 Significant Of Mobile Phone

A mobile or cellular telephone is a long-range, portable electronic device for personal telecommunications over long distances. In addition to the standard voice function of a telephone, current mobile phones can support many additional services such as SMS for text messaging, email, packet switching for access to the Internet, and MMS for sending and receiving photos and video. The cell phones need to have the SMS application and also support video streaming which need to have GPRS and UMTS application or requirements. SMS will be used as the medium to inform the owner once the infrared have been interrupted.

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a) General Packet Radio Service (GPRS)

In the future, it is expected that low cost voice over IP will be made available in cell phones. 2G cellular systems combined with GPRS is often described as "2.5G", that is, a technology between the second (2G) and third (3G) generations of mobile telephony. This technology is important to make sure the cell phones can support the video streaming sending by the computer. If the cell phones do not have this technology it's quit impossible to play the streaming video.

b) Universal Mobile Telecommunications System (UMTS)

Universal Mobile Telecommunications System (UMTS) is one of the third-generation (3G) mobile phone technologies. UMTS is needed to supports up to 14.0 Mbit/s data transfer [3]. It's will join together with the GPRS to support the video streaming send using the cell phones. With both applications, user can view the streaming video directly through the cell phones but the lag per second will be around 10-30 second compare to the actual video.

2.2.2 The evolution of mobile phones

Mobile phones also often have features beyond sending text messages and making voice calls including Internet browsing, music (MP3) playback, memo recording, personal organizers, e-mail, built-in cameras and camcorders, ring tones, games, radio, infrared and Bluetooth connectivity, call registers, ability to watch streaming video or download video for later viewing, video call and serve as a wireless modem for a PC.

2.3 Security

2.3.1 Security Definition

According to by Ron Kurtus (revised 27 October 2002)

Security is the protection of a person, property or organization from attack. The theory of security is to know the types of possible attacks, to be aware of the motivations for attacks and your relationship to those motives. The security or defense against such a threat is to make it difficult to attack, threaten counter-measures, or make a pre-emptive attack on a source of threat [1].

2.3.2 Significant of Security

There are people who want to break into a home, company or other building in order to steal or damage property. There are also some who simply want to damage property externally. This could also include people who would break into a web site to do some mischief. Companies, large corporations and nations can come under attack to damage or destroy the organization. The attacks can be aimed at the leadership, organization property, information, people, or reputation. In some cases, a preemptive attack on suspected threats is an appropriate measure. The first line of defense against an attack is to make it difficult for your enemies or the criminal-mined person to make the attack. A thief will find a lock on a door enough to discourage breaking into the building to steal equipment.

2.3.3 The Evolution of Security

Security or protection against an attack usually requires anticipation, taking measures to prevent an attack, rapidly responding to an attack, and sometimes making a preemptive attack on suspected threats. Security is protection. A person, property or organization may be vulnerable to an attack. The types of protection include prevention, response and pre-emptive attacks.

2.3.4 The Need for Security

Security is needed to provide protection to people, property or organizations. There are individuals and members of groups that want to harm other people, steal property or do other damage. The type of harm that some people may want to impose on others may be physical or emotional injury or even damage to the person's reputation. There are people who want to break into a home, company or other building in order to steal or damage property.

2.4 The Infrared

Infrared light lies between the visible and microwave portions of the electromagnetic spectrum. Infrared light has a range of wavelengths, just like visible light has wavelengths that range from red light to violet. "Near infrared" light is closest in wavelength to visible light and "far infrared" is closer to the microwave region of the electromagnetic spectrum. The longer, far infrared wavelengths are about the size of a pin head and the shorter, near infrared ones are the size of cells, or are microscopic [4]. Infrared is used in this project to detect the interrupted between the receiver and transmitter. Infrared will be put between the two places and will pass rays continuously. Once the interruption between two rays are detect the PC camera will start the recording.

2.5 Example Existing System that are equivalent with the Project

There is software developed by Sapura Technology join with Nokia that are quit similar with this project. The function for developing the software is still the same where they develop it special to the manager who wants to monitor her/his staff if there are in outstation. The live video streaming will be display on the mobile phone if the manager requesting to do that. The requirements are same as this project and the author think that this existing system is very useful in helping to develop this project, maybe not in terms of coding but the user interface and also the output.

2.6 3G Coverage in Malaysia

There are 3 big companies in Malaysia which are acted as a provider for the mobile telecommunication which are Maxis, Digi and Celcom. The entire providers have given the permission from the Malaysian government to launch 3G technology. Right now, the 3G development is still under testing and the coverage is only limited to the certain area like Ipoh, Johore Bahru and popular location such as Bukit Bintang and etc. The requirements for 3G in a mobile phone can be add on but for the coverage we need to wait from the provider to provide that service. Table 1 show the coverage of the three providers in Malaysia area including Sabah and Sarawak:

Provider for 3G & Edge	Coverage Limit
Maxis	Penang, Wilayah Persekutuan Kuala Lumpur, Kota Kinabalu, Johor Bahru, Kuantan
Digi	All area that are popular in Malaysia (main city, tourism places and town)
Celcom	Main City

Table 1: 3G Coverage in Malaysia

CHAPTER 3

METHODOLOGY

This chapter will be focusing on the methodology that is going to be implemented along developing this project. The methodology will be divided into two major parts. The two major parts are research methodology and also the design methodology. Each section then will have ways and methods to implement it.

3.1 Project Methodology

The author chooses Waterfall Model as a software development model in developing the project system. The author choose Waterfall model because a feedback loops exist between each phase, so that as new information is uncovered or problems are discovered. The waterfall model takes the fundamental process activities of planning and analysis, design, development, testing and deployment as shown in Figure 2.
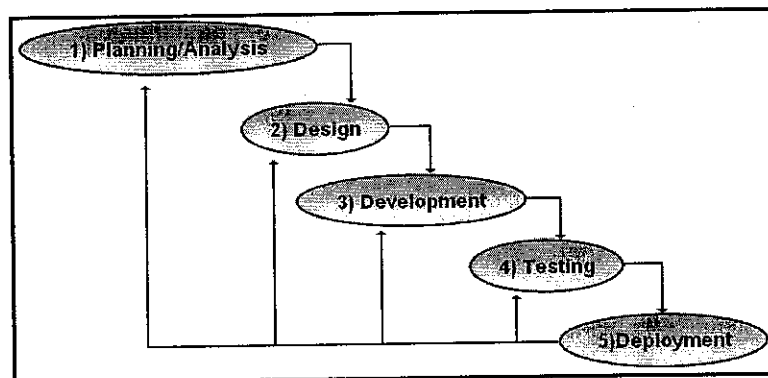
Figure 2: Phased involved in developing Video Streaming using Cell Phones with security- Waterfalls Model

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3.1.1 Planning & Analysis

Techniques used to obtain this understanding is using interviews, survey, discussion, research, use cases, and determine of software features. In this phase the author involve in defining the problem statement, objectives and scope of study. Finally would be the plan project timeline and prepare Gantt chart as in APPENDIX A so that the project could be completed in the given time period.

To implement the interviews techniques, the questionnaire will be used as the tool. The main reason is because it is simple whereby anybody can answer the questions. In order to support the research, the observation, discussion and surveys will be conducted as it would result in better conclusion. To know who is the target audience for this research is also to be included in this research methodology part as they are the one that will be using the system. Besides that, internet research, journals, articles and as well as books will also be the reference in this study.

a) Questionnaire

The ease of this method will contribute to time saving. In addition, questionnaire can be easily distributed among the student. Therefore, the chances to get various answers might be better. Among the area that would be touched in the studies are, the awareness among students in protect their belonging from intrusion, and have ever they make use of it. Besides that, the expected features that people would like to have in the interface. It is significant to ask those questions in order to understand better the user point of view and as well as to get the rough idea on the characteristics should have. This is to avoid dissatisfaction on user after the product has been created.

b) Observations and Surveys

Observation and surveys will be implemented after the questionnaire parts had finished. The observation and surveys are very important to be conducted as it would be very helpful to direct us towards the correct path because there might be uncertainty in answers given by the person from the questionnaire. In this section, more complex analysis will be implemented in order to clarify the unclear things which might occurred along the implementation of questionnaire. The focus area in this phase is basically as the same as in the questionnaire. However, in this section, the analysis would be more specific such as researching on articles or journals and others to be evidence and reasons of the answers that we have obtained in the questionnaire.

3.1.2 Design

Design phase in VStream project involves defining the hardware and software architecture, specifying performance and security parameters, designing data storage containers and constraints, choosing the IDE and programming language, and indicating strategies to deal with issues such as exception handling, resource management and interface connectivity. In designing the system architecture the process will be divided into two parts. The architecture for this project is shown as Figure 3 below.

The first one would be the program to capture data when the infrared interrupted and the other one would be in managing the video to be sent to the mobile phone. In the capture data from the PC connected with internet phase, it is planned to have transmitters and receiver which will give signal continuously until something interrupt between them. When the situation happens the PC will capture the live video and at the same time will send SMS to the owner through

the cells phone. Once the owner get the message there are given the choice whether to see the video or not.
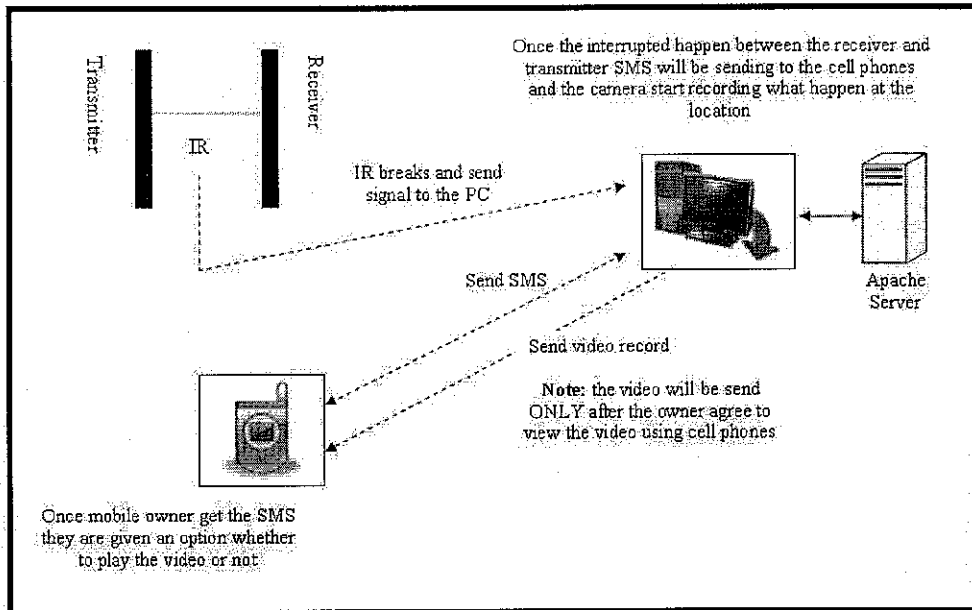
Figure 3: System Architecture

For plays the video parts, the cells phone should have all the requirements to play streaming video such as 3G application, GPRS enable and etc. the owner will given an option to play the video live from their cell phones and will monitor through their cell phones.
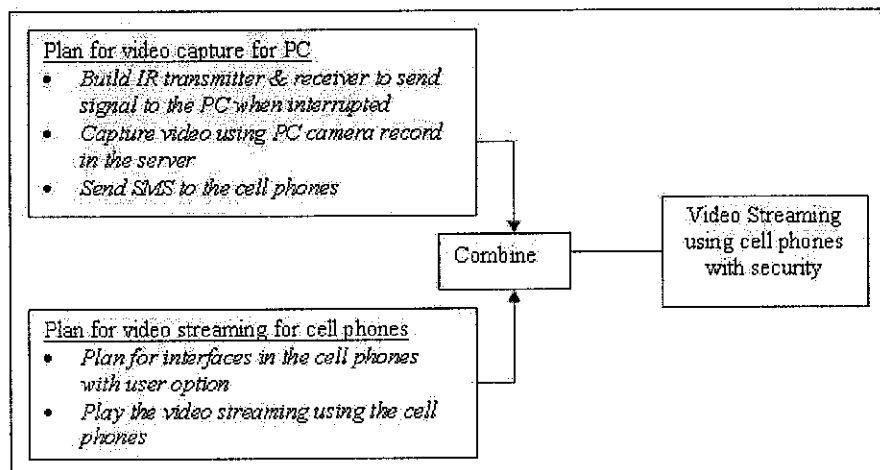
Figure 4: Design process

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Then, programming language (the planned language for the time being is Java) need to be applied in the personal computer in order to allow the system to capture the situation using the PC camera and send the video lively to the cell phones owner. The cell phones will have the programs where can received the SMS and give an option whether the owner decide to play the video or not. Figure 4 show the flow of the design process.

3.1.3 Development

This phase will also be divided into two parts as shown in Figure 5 which are video capture for PC and video streaming for the cell phones. However, for this process, it just implementing the design workflow based on what had been planned during the planning phase.
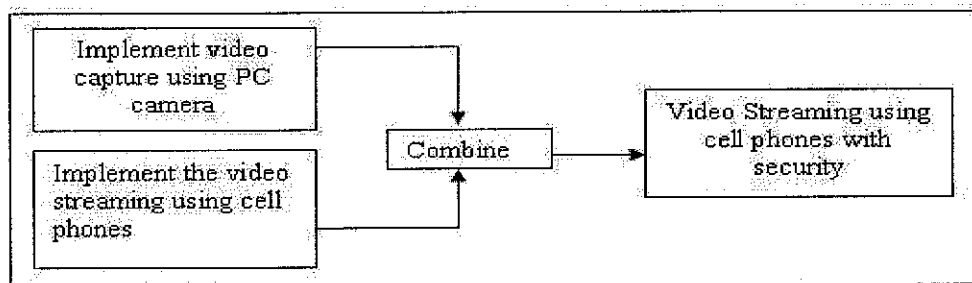
Figure 5: Development Process

3.1.4 Testing

In this stage, both individual components and the integrated whole are methodically verified to ensure that they are error-free and fully meet the requirements outlined in the first step. The individual program units or programs are integrated and tested as a complete system to ensure that the software requirements have been met. Among of the tasks that would be carried

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on is reviewing, validating and testing the modules created in the system regularly in order to ensure the system runs as expected.

3.1.5 Deployment

This phase will include several steps which are installation, maintenance, evaluation and modifications. The modifications arise either due to change requests, or defects uncovered during live use of the system.

3.2 Tools Requirements

Language used	a) Java
	b) Visual Basic
Requirements	**Software Requirements**
	a) J2SDk1.4 or better
	b) J2ME WTK2.1 or higher
	c) Visual Basic 6.0
	d) Jakarta Tomcat Server 5.0 or better
	Hardware Requirements
	a) Pentium P3 (2.66GHz) Processor or higher
	b) Minimum 256 MB RAM
	c) Web Cam
	d) Modem
	Other Requirements
	a) GPRS enabled Mobile with a minimum of 20KB of free memory to upload the application
	b) PC connected to internet

Table 2: Hardware and Software requirements

3.2.1 Software

a) J2ME WTK2.1 or higher

The Sun Java Wireless Toolkit includes the emulation environments, performance optimization and tuning features. In this project, the emulator in the wireless toolkit will be used to play the video directly from the server.

b) Jakarta Tomcat Server 5.0 or better

Apache Tomcat is developed in an open and participatory environment and released under the Apache Software License. The author used the Apache Tomcat as a server because it is free software and this software is applicable with the project. This server will be responsible in save the video that have been record by the web cam and give the permission to the mobile user to retrieve the video when necessary.

c) Visual Basic

Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications and creation of ActiveX controls and objects. This ActiveX controls object is very useful in adding the activeX control for playing the video. The author will add a new component to make sure the web cam video can be display using the visual basic program that have been develop.

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3.2.2 Hardware Requirements

a) Pentium P3 (2.66GHz) Processor or higher

b) Minimum 256 MB RAM

c) Web Camera

3.2.3 Other Requirements

a) GPRS enabled Mobile

b) PC connected to internet

c) Modem

3.3 Constraint

a) **Requirements and Tools Needed**

The author needs to survey the hardware and software requirements clearly to develop the project especially for the hardware part such as camera, telephone with 3G, infrared for receiver and data transmitter and etc. These requirements will increase the cost productivity. For example, as the 3G coverage is limited, the author needs to provide PC camera that have function in recording video.

b) **Rollout and continuing development of UMTS**

For fully fledged UMTS incorporating Video on Demand features, one base station needs to be set up every 1--1.5 km (0.62–0.93 mi) [6]. As there are limited coverage for 3G and edge technology in Malaysia, the author decide to test and implement the video streaming part using the midlet as it can support video player. The other solution is record the video and then sends to the mobile phone.

CHAPTER 4

RESULT AND DISCUSSION

4.1 System Modeling

In this part the author will create the UML modeling which are including the use case diagram and sequence diagram. This is important to see the system more clearly and to know the flow of the system.

4.1.1 Flow Chart

This flow chart is required to gain more understanding with the system. Figure 6 shows the step or flow how the system is going on. IR passes rays continuously to receiver and will be connected to the PC which has web cam and internet connection. If there is no interruption between the transmitter and receiver, the receiver will receive rays continuously, and this will be monitor by the PC continuously. If any obstruction occurs there, the passage of rays will be disconnecting, and that will be detected by the hardware connected to the PC. If there is any obstruction, the web cam will start recording the video and simultaneously the SMS will be send to corresponding person.

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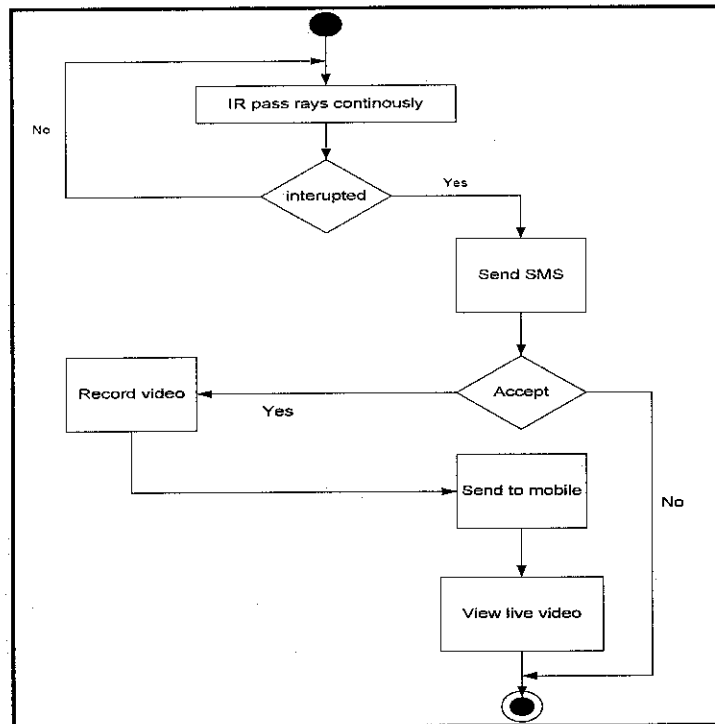
Figure 6 : Flow Chart

To view the live events happening at a site we need to connect to the PC with which the web cam is connected and the server part of this application should be running there in. User can choose view web cam option to see the live video. So, user can connect to any location or the PC through this application which must fulfill the requirements specified.

4.1.2 UML Diagram

a) Use Case Diagram

The author created the use case diagram as shown in Figure 7 to describe the basic function of the system. Its can be used to describe the current as-is system and the to-be system being developed. The author used use case as a simple description of a system's functions from the bird's-eye view of the users.

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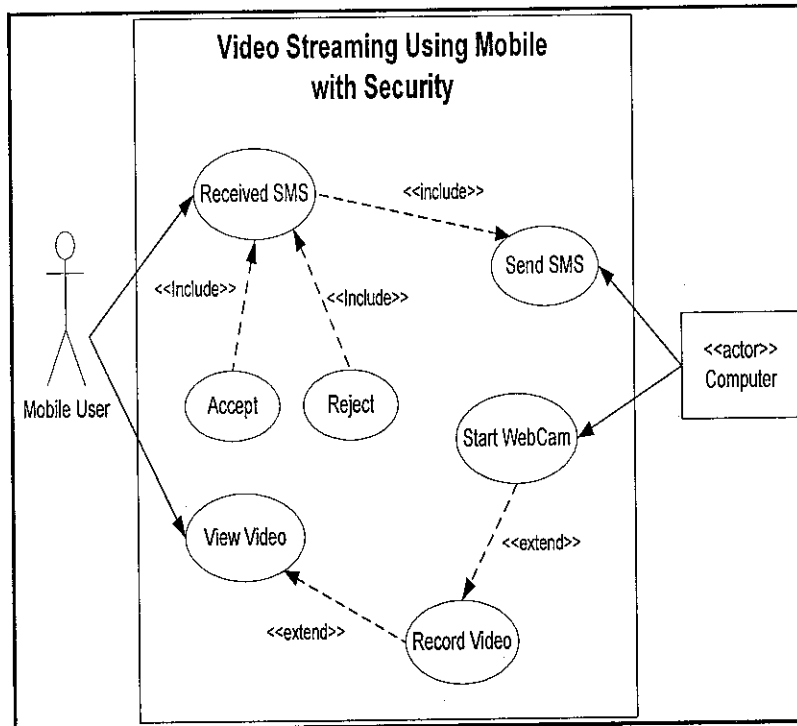
Figure 7 : Use Case Diagram

The PC will send an SMS to the mobile user once there is an interruption happens. At the same time, the PC will start record the video and save to the PC server. Mobile user have the choices whether to accept or reject to play video. If the user accepts to play the video, the server PC will send the video and user will play the video through the mobile phone.

b) Sequence Diagram

The author created the sequence diagram as shown in Figure 8 to describe the internal dynamic aspects of an information system that supports the business. With sequences diagram, its will show what the internal logic of the process without specifying how the process are to be implemented.

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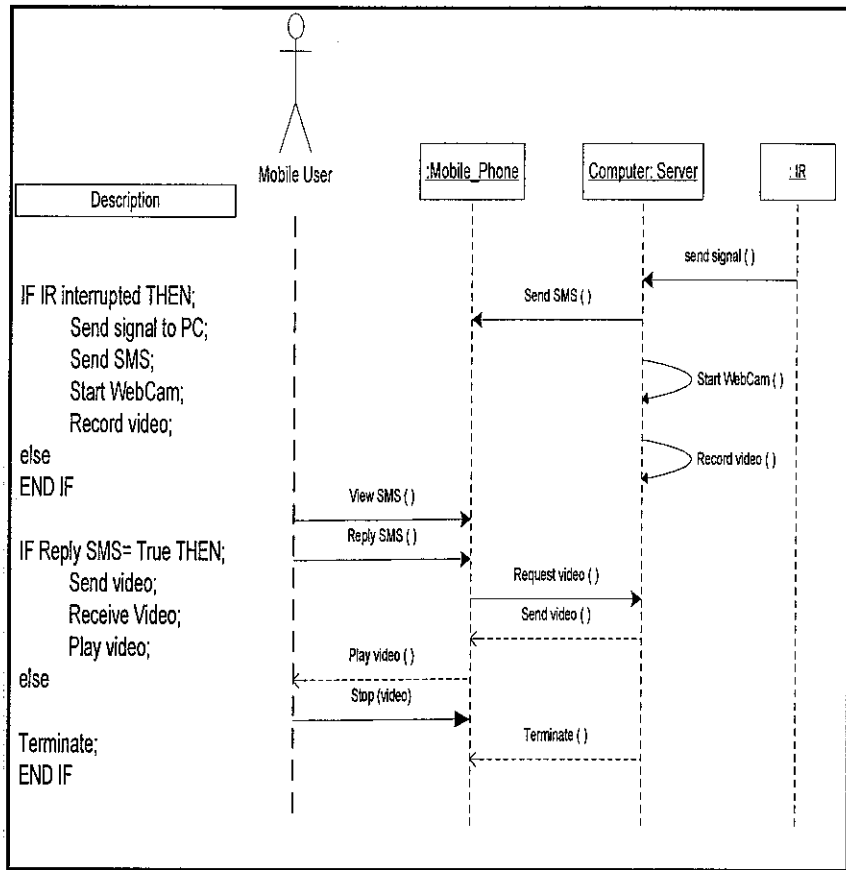
Figure 8 : Sequence Diagram

Once there is an interruption during the transmission between the transmitter and receiver, the receiver will send signal to the computer and at the same time on the camera. Then SMS will be sent to mobile and camera start to record the video live happenings. When user is agreeing to view the video, the PC server will send the video through the mobile phone and user can view the video through it, or otherwise any transaction is terminated.

4.2 User Interface Design

User interface design or screen design was designed with the objective to sketch the product layout. It is significant to have a screen design, so that when it comes to design phase, there is no need to rethink and clarify what the system should have and should not have. It is basically as a guideline to the designer.

4.2.1 User Interface for Mobile Phone Application

The author will create the user interface for the mobile phone as the medium communications between the mobile's user and the computer. All three screens are important as the interface for interaction. There are three screen suggested to be develop for the mobile application which are:

a) Screen 1: Receive Message Screen

b) Screen 2: Permission to View the Video

c) Screen 3: Playing the Video

Screen 1: Once the IR is interrupted, it will send a signal to the PC and camera PC will start recording and at the same time one message will be send to the mobile phone to inform mobile user regarding the interruption. User will receive a message through the mobile phone as show in Figure 9.
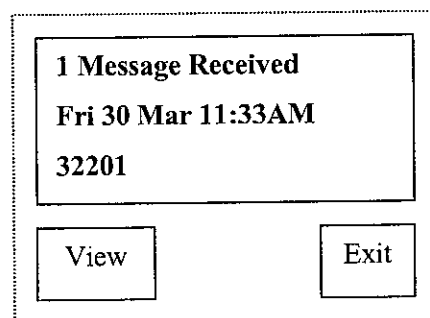
Figure 9: Screen 1 shows how the message is receive

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Screen 2: Once users view the message, they will have an option whether to play the video or not as show in Figure 10. If they don't want to play the video they can choose "Exit" and choose "Play" to playing the video.

Interruption happens towards your belonging.

Back   Reply
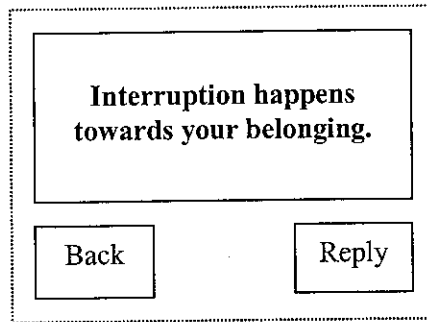
Figure 10: Screen 2 shows how to prompt user to view the video

Screen 3: The second page is where the video streaming is playing. User will have an option whether to stop the video means, go back to the previous screen by choosing "Stop" as show in Figure 11.

Playing Media

Stop
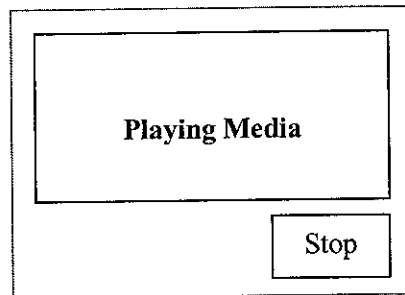
Figure 11: Screen 3 shows how to play the media

4.3 Hardware Configuration

Hardware devices are required in this system in setting the infrared. These devices are needed to cater the infrared receiver and transmitter to connect with the computer. The infrared receiver will send signal to the compute if any interruption occurs. Example devices that will be used in the hardware configuration setting are Hobby Kit (infrared transmitter and infrared receiver), resistor, and Zenor diode. All this hardware parts are important in transmitting the signal from infrared to the computer suing parallel port.

4.3.1 Schematic Diagram for Hardware Configuration
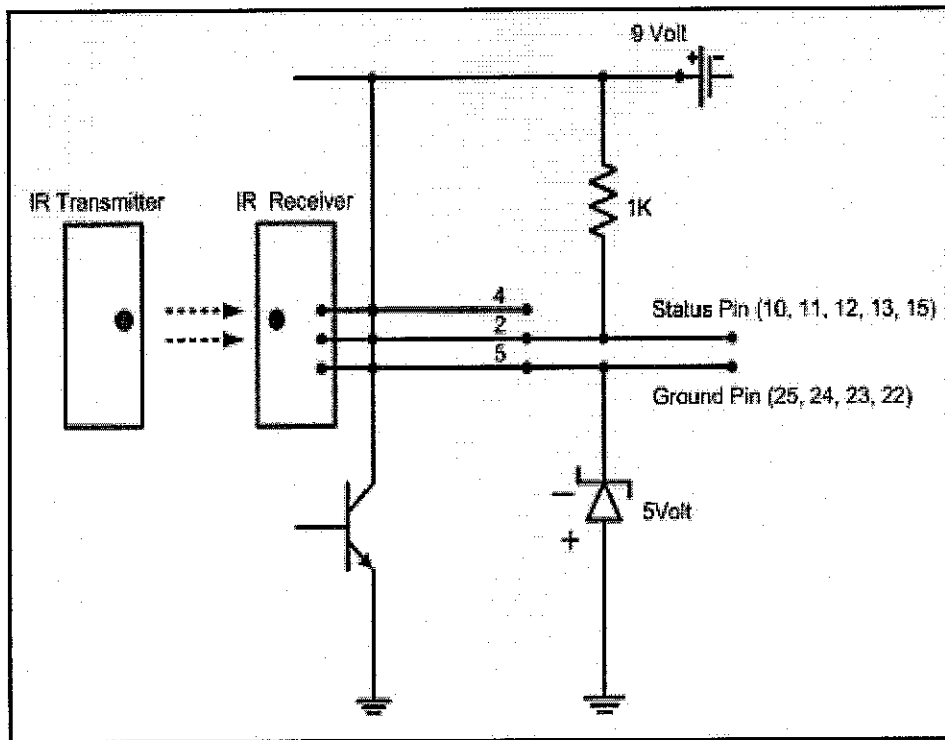
Figure 12: Hardware Configuration

The hardware configuration for this project is as show in Figure 12. Infrared Emitter (Transmitter) will always send signal to the infrared detector (receiver) continuously. But, once interruption happens the receiver will receive the data and send to the computer port (in this project the author use parallel port to read the input). The resistor is needed to reduce the current that go through to the

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circuit. The computer can only receive maximum 5 volt of current and if more than that the computer will restart and maybe the motherboard will be damage. This entire configuration will have the responsibility in transferring the signal to the computer. The author need to make sure all the settings are correctly implemented to promise the connection is works well.

Parallel port is usually comes as 25pin female port and it is commonly used to connect printers to computer. But many geeks use it to connect their own devices to their PCs. Ground Pins are used as neutral these pins are used as (-) in batteries. Because the author connecting a device to parallel port in order to read the data input from the port only, so the author need to use one or ground pins and read pin to work. For example connecting a ground pin and (+) and another one to input pin. For reading purposed use the below mechanism is used.

- o 8 Output pins [D0 to D7]
- o 5 Status pins [S4 to S7 and S3]
- o 4 Control pins [C0 to C3]
- o 8 Ground pins [18 to 25]
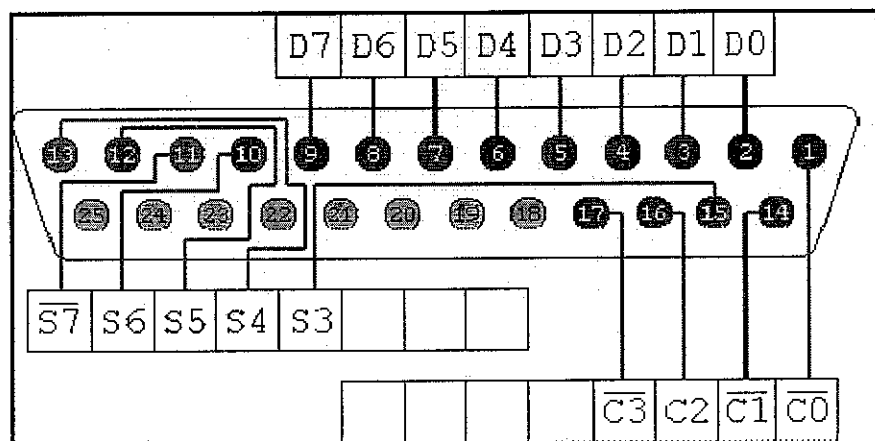
Figure 13: Parallel port usually comes as 25 pin female port

To check whether the application runs fine take a small wire and short a Status Pin and a Ground Pin. For example Status pins are 10,11,12,13,15 and if the wire short 10th pin and 25th (Ground) pin then the value of the port should be 104. If the wire short some other pins like 11th and 25th then the value of port maybe will be cahnge to value 88 or similar value.

4.3.2 Equipments

The equipments need for the project is as show in Table 3:

Equipments	Function
Infrared Transmitter	To transmit infrared signal to the receiver continuously.
Infrared Receiver	Receive signal from infrared transmitter and once interruption happen it has responsibility to send signal to the PC to on the PC camera.
Resistor	Reduce the current from 9 volt to 5 volt.
PC Camera	Record video

Table 3 : Equipments needed for hardware configuration part

4.4 Data Gathering and Analysis

4.4.1 Questionnaire

The author have designed questionnaire with hope that it will be a good guideline in developing the project. The objective of the questionnaire is to gather as much as important information related to the issue in order to help the better design. The purpose of this questionnaire is to investigate the importance of mobile phone in handling security and the relevancy in implementing the issue nowadays. It also attempts to examine the effectiveness activity that can be done to overcome these issues and digest out the effected of it.

The questionnaire has been distributed to 30 respondents of UTP students and outsider. Sample questionnaire is in Appendix B. the questionnaire have been divided into three sections which are Part I, Part II and Part III. Part I are just a simple questions to know the background that is done the questionnaire such as gender, semester and etc. Part II is general information to know the level of knowledge of the respondents about the video streaming with security using mobile phone and also the importance of having the mobile phones with security function nowadays. Respondents will answer those questions based on their experiences and knowledge. Final part which is Part III provided the respondents to give their ideas and suggestion regarding this video streaming in mobile phone with security.

4.4.2 Questionnaires Result

For this section, all data is gathered and simplify in tables therefore, it can be easily viewed. Then, the data is manipulated into graphs, so that we can see the clearer version of data collected. Data collected for each question is presented in a table then transferred into a graph.

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PART I

Question 1: Gender

From the surveys of 20 students, there were 10 male students and 10 female students which were selected randomly.

Question 2: Year/Semester in the university

From the surveys there were 10 students from final semester, 3 students from 3rd year and 7 students from 4th year.

Question 3: Have a mobile phone or not

All respondent have their own mobile phones with different brand. They chose Nokia, Motorola and Samsung as their favorite telephones but they are still about 2 students who are using others brand.

Question 4: Why are you using mobile phone?

From the result shown in Figure 13 we can make a conclusion those respondents using the mobile phone just to make a call and receive a call. They seems don't know that many function they can use that will give benefit to their life. 10 respondents using cell phone as entertainment and organizer and others used for taking picture, listen to the radio, message, mp3 player and play games. Nobody used the mobile phone as security in helping their life become easier.
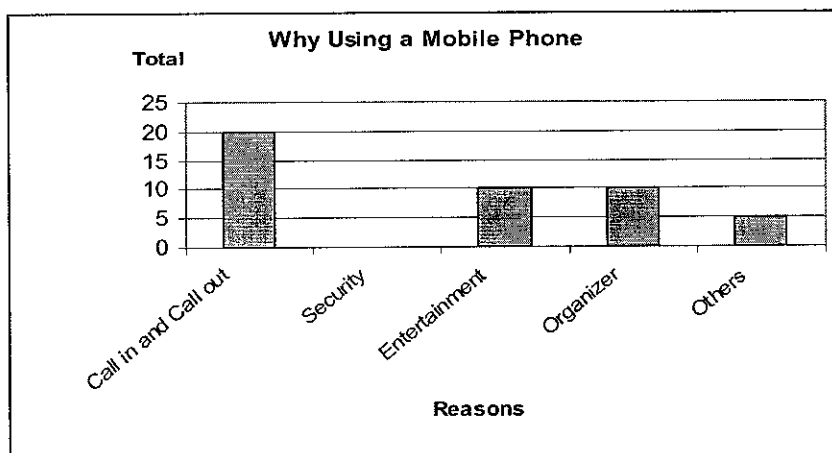
Figure 14: Reasons why using a mobile phone

Question 5: Which company provider do you use?

Most of the respondents chose Maxis as shown in Figure 14 which is 12 respondents, 3 chose Celcom, 5 chose Digi as provider. All the provider have the permission by government to launch 3G but its still in progress and will be improve time by time.
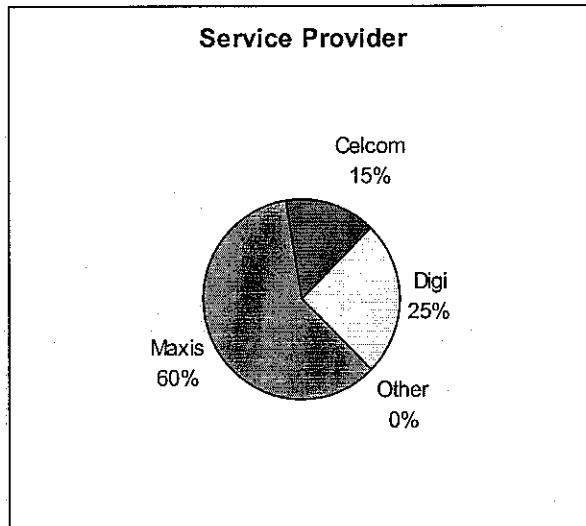
Figure 15: Service provider used by respondents

Question 5: Mobile Phone requirements

20 respondents have SMS service in their mobile, 18 have MMS, WAP, GSM and GPRS services, and 10 have 3-Generation service as shown in Figure 15. It's important to survey the requirements to make sure this project can give benefits to community and can be fully implemented.
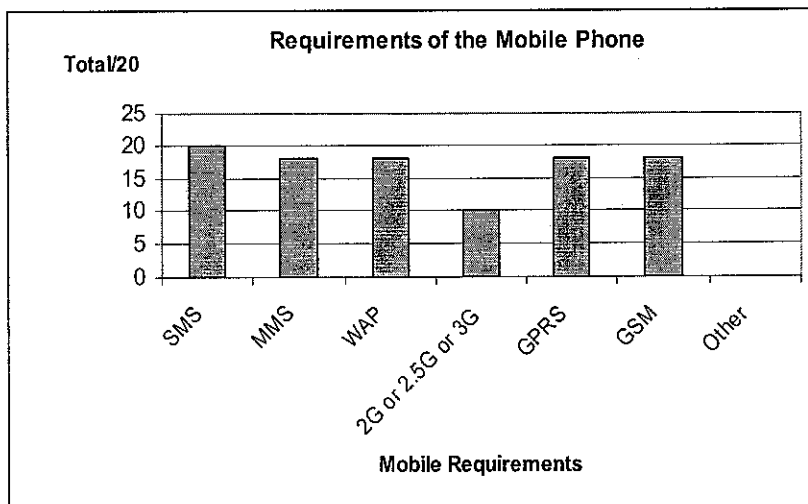
Figure 16: Mobile Phone Requirements

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PART II

The following statements describe the knowledge level of mobile user in video streaming with security using mobile phone.

No	Description on the level knowledge of mobile user in video streaming with security using mobile phone
7A	There are many technology is created to improve the performance and usage of mobile such as GPRS, GSM, EDGE, 3G and etc
7B	We can play video streaming using the mobile phone but need to meet the requirement specification
7C	The coverage for 2G, 2.5G, 3G and EDGE is limited at certain area that provided by the communication provider
7D	PC can send SMS, MMS or Video to your mobile phone
7E	Streaming is a technology for playing audio and video files either live or pre-recorded from a web page.
7F	Everyone who utilize this application can get to know that the events happening at a particular location with just a mobile from a remote location
7G	To view the live events happening at a site we need to connect to the PC with which the web cam is connected
7H	To view live streaming the cells phone need to have GPRS and UMTS applications/requirements
7I	Mobile phone is the easy communication medium to transfer such as video streaming
7J	A mobile phone is a long-range, portable electronic device for personal telecommunications over long distances

Figure 17: The Knowledge Level of Mobile User about Video Streaming

Note: From the graph, Series 6 is 'Very well known', Series 2 is 'Don't know at all' and Series 1 is 'not applicable' or 'no comments'.

The following statements describe the importance of having the mobile phone with security function nowadays.

No	Description in the importance of having the mobile phone as security nowadays
8A	The improvement in advance communication and mobile technology (GPRS, EDGE, 3G and etc)
8B	Help the mobile owner in monitoring the important belonging far from them using their mobile only
8C	The important of security in our daily life need to be improve with new technology
8D	Security using cell phones is still new but many researches are done to implement it
8E	Make life become more easier and can go anywhere with no worries
8F	Very useful in sending information at the right time when something happen with their belonging so we can take any action or maintenance prevention to stop those illegal activity

Table 4: Importance elements of mobile phone with security
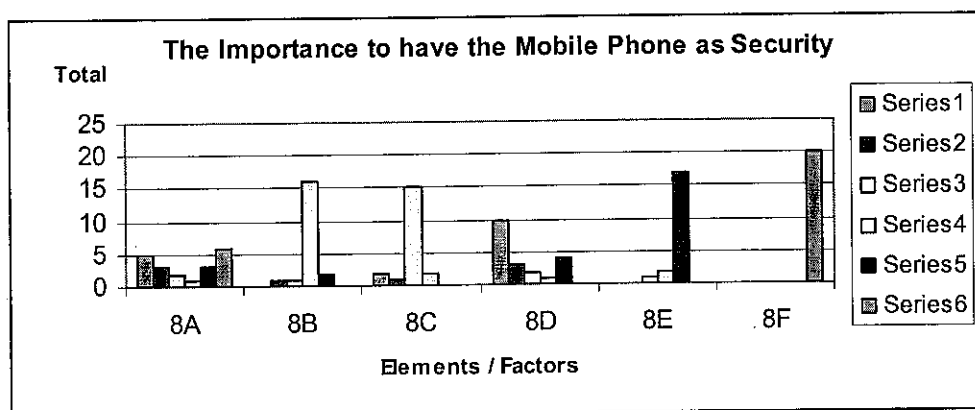
Figure 18: The Importance to have Mobile Phone as Security

Note: From the graph, Series 6 is 'Very well known', Series 2 is 'Don't know at all' and Series 1 is 'not applicable' or 'no comments'.

From the questionnaire we can make a conclusion that most of the respondents do not have knowledge about video streaming using cell phones as shown in Figure 18. They know mobile can view video but they did not use the technology because of certain limitation such as limited coverage, slow in transferring and etc. Most the respondent agree that cell phone are very important nowadays and can use for security purpose. Mobile phones will help us in monitoring the important belonging far from us efficiently.

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4.5 System Implementation

4.5.1 Infrared Configuration

Infrared Emitter (Transmitter) will always send signal to the infrared detector (receiver) continuously. But, once interruption happens the receiver will receive the data and send to the computer. Infrared Emitter (Transmitter) will always send signal to the infrared detector (receiver) continuously. But, once interruption happens the receiver will receive the data and send to the computer port (in this project the author use parallel port to read the input). The resistor is needed to reduce the current that go through to the circuit. The computer can only receive maximum 5 volt of current and if more than that the computer will restart and maybe the motherboard will be damage. This entire configuration will have the responsibility in transferring the signal to the computer. The author need to make sure all the settings are correctly implemented to promise the connection is works well.

Parallel port is usually comes as 25pin female port and it is commonly used to connect printers to computer. But many geeks use it to connect their own devices to their PCs. Ground Pins are used as neutral these pins are used as (-) in batteries. Because the author connecting a device to parallel port in order to read the data input from the port only, so the author need to use one or ground pins and read pin to work. For example connecting a ground pin and (+) and another one to input pin.

4.5.2 Capture Video

When interruptions happen, the web cam will capture the video for 15 seconds. The video will be directly saved to the apache server as "vstream.mpg" file. The location of the file is in C:\apache\htdocs and can be embarked using the URL http://localhost/vstream.mpg.

From the interface as show in Figure 19, user needs to set the web cam setting such as format and compression format. In this project, the emulator only can play video file with .mpg format so the user need to set the video format to the necessary format. Once interruption happen the capture video button will automatically active and start recording the video. The function of each button is shown in Table 5.
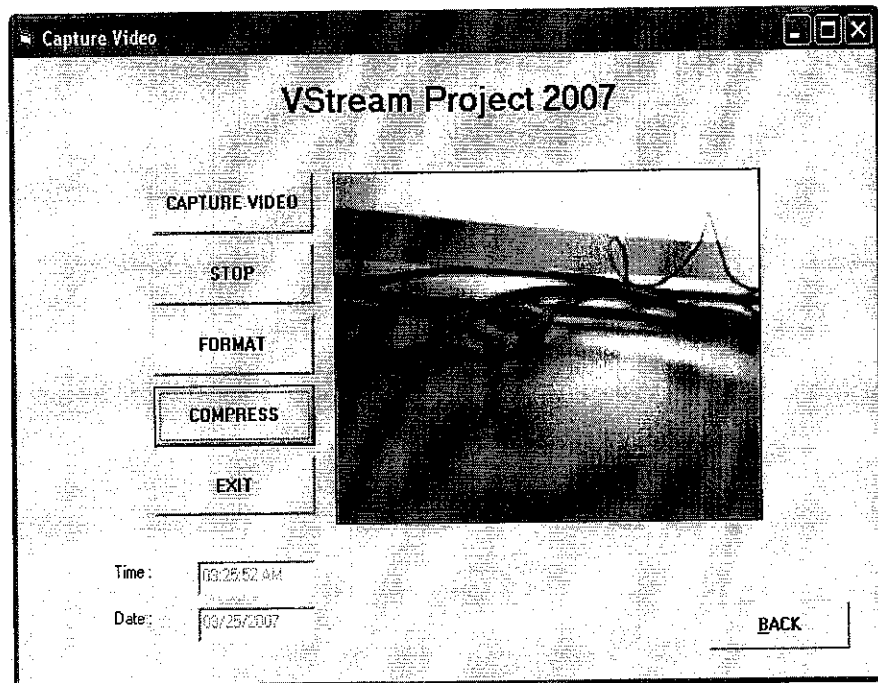
Figure 19: User Interface for Capture Video
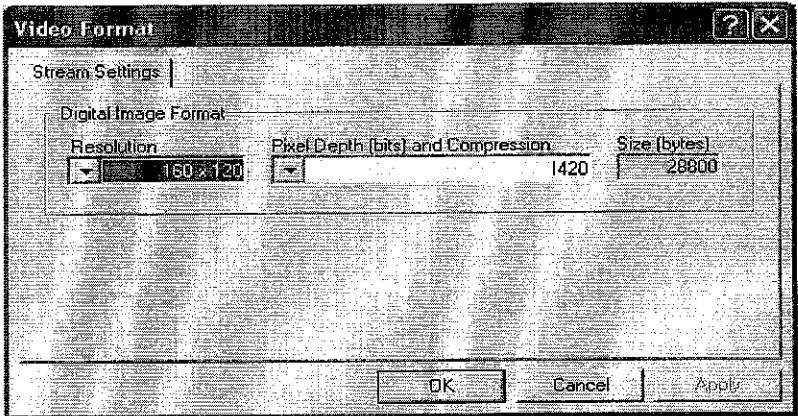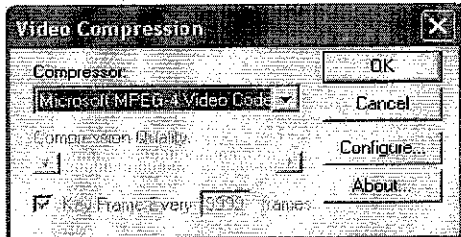
Buttons	Functions
CAPTURE VIDEO	Once interruption happens, the "CAPTURE" button will automatically active and start record using the webcam. The video capture has been set within 15 seconds and will be saved as .mpg format in C:\apache\htdocs.
STOP	Will stop the video capture once the button is clicked.
FORMAT	To set the format for the picture. The video format can be setting using the screen popup as shown below.
EXIT	End the program
COMPRESS	To set the file format. But, in this project the user need to set the file format in .mpg format because the mobile application only can display the video under .mpg format. The screen is show as below:

Table 5: Buttons and Function on the Capture Video Interface

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4.5.3 Send an SMS to a Mobile User

The author used the GSM modem to send the SMS to the mobile user. The modem driver has been installed using the Nokia 6280 modem drivers. The modem will be act as the medium in sending the SMS from the laptop to the mobile phone. Once the interruptions happen, the web cam will start to record the video and at the same time the PC will send an SMS to tell the owner to view the video using the URL given. Figure 20 show the interface involves in sending the SMS using the USB modem of Nokia. The function of each button is shown in Table 6.
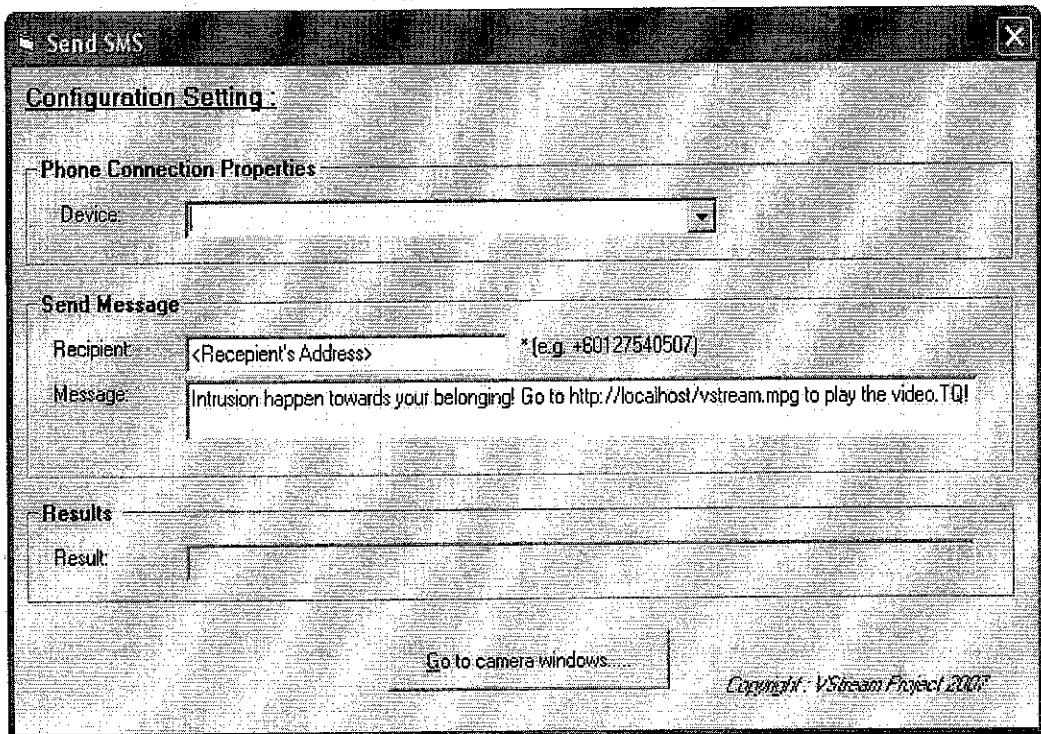
Figure 20: User Interface for Sending an SMS

Buttons	Functions
Phone Connection Properties	User need to choose their modem properties to send the SMS to their mobile phone. In this project the author used Nokia 6280 as a modem.
Send Message	a) Recipient The user needs to set the destination of the message by put in the mobile phone number. The format of the mobile phone number has been set and user needs to follow the format to make sure that the message will deliver successfully to the recipient. b) Message In this project, the author has set the message as "Intrusion happen towards your belonging! Go to http://localhost/vstream.mpg". Once the message send, user of the mobile will receive the SMS.
Result	The label column will show whether the SMS have been delivered to the recipients successfully or not. user also can check the status for all the SMS that have been send at C:/Documents and Settings/user/Temp/GsmLog.txt

Table 6 : Buttons and Function for Sending an SMS interface

4.5.4 Playing Video Using Emulator

This program was developed using java and run using the wireless toolkit emulator as shown in Figure 21 (a).
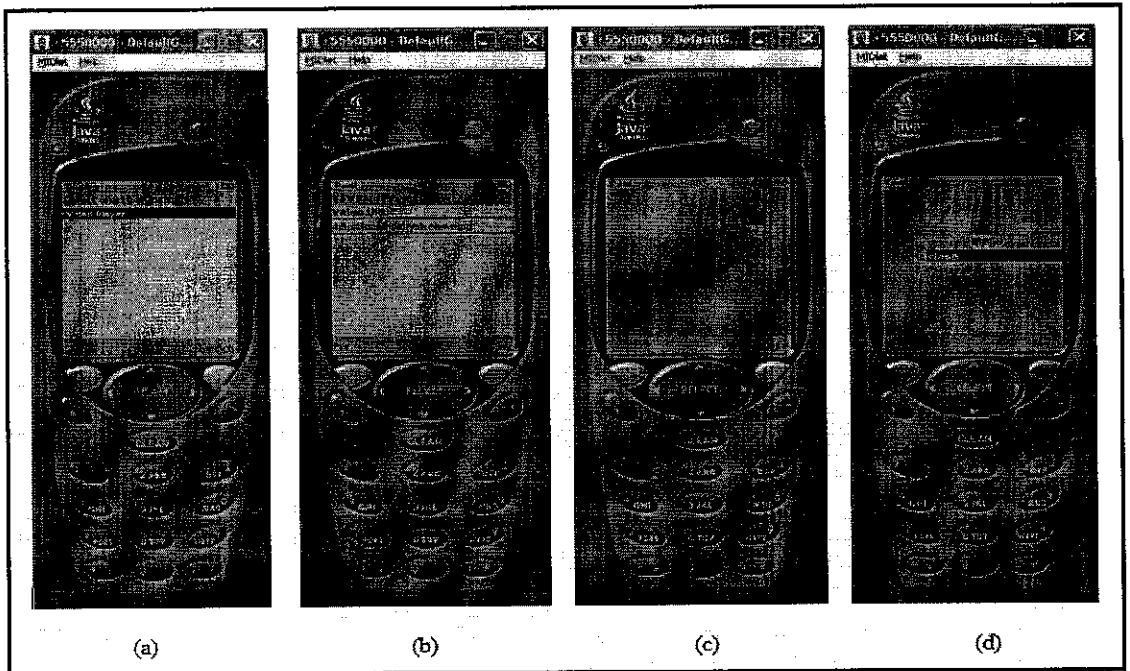
Figure 21: Playing video using emulator

The URL to grab the video from the apache server is http://localhost/vstream.mpg. This URL have been set whenever user open the program that have been install in the mobile phone. User have the choice whether to play the video by clicking "Play" menu or close the program by clicking "Exit" menu as shown in Figure 21 (b). Once user click play function, the video will be play through the emulator. This video will play directly from the apache server. User can have choice to close and go back to the main menu during the video playing as shown in Figure 21 (c). When user click "close" function, the video will stop playing and go back to the previous menu. User can replay the video by clicking the "re-play" menu. Once user clicks this function, the video will start playing again as shown in Figure 21 (d). When user clicks at "close" function, it will go back to the previous menu.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This project is implemented to prevent any miscellaneous cases to our belongings. This application develops for security purposed. So, its need proper plan to make sure the output of the product is really useful and can be used successfully. The planning should be well-planned and considered for any constraint. Security is one of the important issues nowadays. Security is synonym with private and confidential issue. People apply security to protect their belongings against intrusion. Video Streaming using Cell Phones for Property Surveillance or VStream is an alternative for the user to control their belongings at anywhere far from their place. It is much more convenient as it is available and control by the cell phones. For this VStream project, video streaming elements will be added into the cell phones and this give beneficial people as another alternative to control and see what happen with their belongings through their cell phones. Besides that, another feature of this VStream project is that it is unique compared to other security application available whereby it is more interactive as there are two ways communication between the users and PC camera.

5.2 Recommendation

5.2.1 Using Live Streaming

Playing the live video using the cell phones will be more applicable as we are in security line. The web cam will capture the live happenings, and at the same time the server will send the video to the mobile phone. The video will play through the mobile phone live but maybe delay in seconds.

5.2.2 Install the program in the real mobile phone environment

It will be more attractive if the java program that has been developed can be installed into the mobile phone. In this project, the author just used the emulator to play the video from the server. Its will be better if the video can play using the real mobile phone. From this, the author can see whether the application is really applicable with the real environment or not.

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APPENDICES

APPENDIX A:

Project Scheduling (Gant Chart)

ID		Task Name
1		**Selection of Project Topic**
2		**Preliminary Report**
3		Research Work
4		Report Submission
5		**Project Kick Off**
6		**Planning and Analysis**
7		Gantt Chart
8		**User Requirements Analysis**
9		Questionaire
10		Observation and Internet Research
11		Understand the Requirements Analysis
12		Understand the Architecture and Functionality
13		Recommend and Design the Software Solution
14		**Design**
15		**Experimental Modelling**
16		UML Modelling
17		**User Interface**
18		Mobile Application
19		Hardware Configuration
20		**Development**
21		Coding
22		Perform Configuration

Qtr 1, 2007 — Jan, Feb, Mar
Qtr 2, 2007 — Apr, May, Jun
Qtr 3, 2007 — Jul, Aug, Sep
Qtr 4, 2007 — Oct, Nov

Task		Milestone	External Tasks
Split		Summary	External Milestone
Progress		Project Summary	Deadline

Project: vstream gant chart
Date: Mon 11/12/07

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ID		Task Name
23		**Documentation**
24		Perform User Manual Guide
25		**Implement**
26		User Testing
27		Installation
28		**Deployment**
29		Trouble Shooting & Problem Resolution
30		Functionality & Enhancement
31		Final Report Submission & Presentation

Timeline headers: Qtr 1, 2007 (Jan, Feb, Mar), Qtr 2, 2007 (Apr, May, Jun), Qtr 3, 2007 (Jul, Aug, Sep), Qtr 4, 2007 (Oct, Nov)

Legend:
- Task
- Split
- Progress
- Milestone
- Summary
- Project Summary
- External Tasks
- External Milestone
- Deadline

Project: vstream gant chart
Date: Mon 11/12/07

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APPENDIX B:

Questionnaire

ABOUT THE QUESTIONAIRE

Who is conducting this research?
This is a research conducted by the student who is taken Final Year Project (FYP) Part I and it's important for the student to complete the tasks as the requirements of the university.

What is the purpose?
The purpose of this questionnaire is to investigate the **importance of mobile phone in handling security and the relevancy in implementing the issue nowadays**. It also attempts to examine the effectiveness activity that can be done to overcome these issues and digest out the effected of it.

How will the data be used?
This data will be used to develop an analysis regarding these issues to find the actual answer from the people outside. All information collected in the course of this study will be regarded as strictly confidential. Name of person who is answering the questionnaire will not be mentions in any form of publication.

PART I (Background Information)

Please ticks your answer for the following questions completely in the space provided.

1. My gender is

Male	
Female	

2. I am in the _____ year since first enrollment at the university.

1	
2	
3	
4	
5	
Other (specify)	

3. Do you have a mobile phone?

Yes	
No	

If 'Yes', please specify the brand or version that you use (e.g. Nokia N90, Motorola V600 and etc)_____

4. Why are you using mobile phone?

Call in and call out	
Security	
Entertainment	
Organizer	
Other (Specify)	

5. Which company provider do you use?

Maxis	
Celcom	
Digi	
Other (specify)	

6. Do your mobile phone support below requirements? (you can tick more than one)

SMS	
MMS	
WAP	
EDGE	
2G or 2.5 G or 3G	
GPRS	
GSM	
Other (Please specify)	

PART II (General Information)

Please tick your answers in the boxes provided.

7. The following statements describe **the level knowledge of mobile user in video streaming with security using mobile phone.** Based on your experiences please rate each element/factor on a scale from 1 to 5, where 5 is 'Very well known', 1 is 'Don't know at all' and n/a is 'not applicable' or 'no comments'.

Don't know   ⟶   Very well
at all   known

No	Description on the level knowledge of mobile user in video streaming with security using mobile phone	n/a	1	2	3	4	5
7A	There are many technology is created to improve the performance and usage of mobile such as GPRS, GSM, EDGE, 3G and etc						
7B	We can play video streaming using the mobile phone but need to meet the requirement specification						
7C	The coverage for 2G, 2.5G, 3G and EDGE is limited at certain area that provided by the communication provider						
7D	PC can send SMS, MMS or Video to your mobile phone						
7E	Streaming is a technology for playing audio and video files either live or pre-recorded from a web page.						
7F	Everyone who utilize this application can get to know that the events happening at a particular location with just a mobile from a remote location						
7G	To view the live events happening at a site we need to connect to the PC with which the web cam is connected						
7H	To view live streaming the cells phone need to have GPRS and UMTS applications/requirements						
7I	Mobile phone is the easy communication medium to transfer such as video streaming						
7J	A mobile phone is a long-range, portable electronic device for personal telecommunications over long distances						

8. The following statements describe **the importance of having the mobile phone with security function nowadays**. Based on your experiences please rate each element/factor on a scale from 1 to 7, where 7 is 'strongly agree', 1 is 'strongly disagree' and n/a is 'not applicable' or 'no comments'.

Strongly ⟶ Strongly
disagree   agree

No	Description in the importance of having the mobile phone as security nowadays	n/a	1	2	3	4	5
8A	The improvement in advance communication and mobile technology (GPRS, EDGE, 3G and etc)						
8B	Help the mobile owner in monitoring the important belonging far from them using their mobile only						
8C	The important of security in our daily life need to be improve with new technology						
8D	Security using cell phones is still new but many researches are done to implement it						
8E	Make life become more easier and can go anywhere with no worries						
8F	Very useful in sending information at the right time when something happen with their belonging so we can take any action or maintenance prevention to stop those illegal activity						

PART III

Please tick at the box provide and give your opinions and comments regarding the issue.

9. Do you ever heard about video streaming using mobile phone with security?

Yes	
No	

How do you know about it?

_____

10. In your opinion isn't relevant to implement security in the mobile phone by monitoring your belonging that far from you?

Yes	
No	

Why? _____

_____

11. Do you think that the functionality in the mobile phone nowadays is user friendly? Why you say so?

_____

_____

12. Please suggest any program/function that can improve security using mobile phone. Please give your reason why you are suggested that program/function.

_____

_____

End of questionnaire. Thank you for your participation!

APPENDIX C:

Coding

Capture Video

```
Private Sub cmdBack_Click()
Form2.Hide
Form1.Show

End Sub

Private Sub cmdCompress_Click()
ezVidCap1.ShowDlgCompressionOptions

End Sub

Private Sub cmdFormat_Click()
ezVidCap1.ShowDlgVideoFormat

End Sub

Private Sub cmdSend_Click()

Form1.Show
Form1.buttonView.Value = True
Form1.buttonSend.Value = True
'SendConfig.Show

End Sub

Private Sub cmdStop_Click()
ezVidCap1.CaptureEnd

End Sub

Private Sub cmdCapture_Click()

ezVidCap1.CaptureFile = txtAVI.Text
'ezVidCap1.CaptureFile = "C:\apache\htdocs\vstream.mpg"
ezVidCap1.CaptureVideo

Form1.buttonSend.Value = True

End Sub

Private Sub cmdExit_Click()
End

End Sub


Private Sub Form_Load()

'*******************************************************************
'Capture video if MSComm1=True

If MSComm1.PortOpen = True Then
```

```
ezVidCap1.CaptureFile = "C:\apache\htdocs\vstream.mpg"
ezVidCap1.CaptureVideo

Form1.buttonSend.Value = True

End If

'*******************************************************************

End Sub

Private Sub Timer1_Timer()
txtTime.Text = Format(Now, "hh:mm:ss AM/PM")
txtDate.Text = Format(Now, "mm/dd/yyyy")
End Sub
```

Send SMS

```
Public objConstants As ASmsCtrl.Constants
Public objGsmOut As ASmsCtrl.GsmOut
Public objGsmIn As ASmsCtrl.GsmIn

Private Declare Function GetTempPath Lib "kernel32" Alias "GetTempPathA" (ByVal nBufferLength As
Long, ByVal lpBuffer As String) As Long
Private Const MAX_PATH = 260

Dim ShowReference As Boolean

Private Function SetDefaultLogFile()

Dim Buffer As String
Buffer = Space(MAX_PATH)

If GetTempPath(MAX_PATH, Buffer) <> 0 Then
    textLogfile.Text = Left$(Buffer, InStr(Buffer, vbNullChar) - 1) & "GsmLog.txt"
Else
    textLogfile.Text = "C:\SmppLog.txt"
End If
End Function

Private Sub buttonReceive_Click()

    Dim NumMessages As Long
    Dim i As Long

    buttonReceive.Enabled = False

    Screen.MousePointer = vbHourglass

    ListView.ListItems.Clear

    objGsmIn.Device = comboDevice.Text          ' Set Device

    objGsmIn.LogFile = textLogfile.Text          ' Set Logfile
```

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```vb
If comboSpeed.Text = "Default" Then              ' Set DeviceSpeed
    objGsmIn.DeviceSpeed = 0
Else
    objGsmIn.DeviceSpeed = comboSpeed.Text
End If

objGsmIn.Storage = RecvConfig.comboStore.ListIndex           ' Set selected message store
objGsmIn.DeleteAfterReceive = RecvConfig.checkDelete.Value     ' Delete messages from storage
after receive

objGsmIn.Receive                          ' Retrieve messages

If GetResult(False) = 0 Then              ' Success?

    objGsmIn.GetFirstMessage

    While GetResult(False) = 0

        Dim lList As ListItem

        Set lList = ListView.ListItems.Add(, , objGsmIn.MessageTime)   ' Add data to list control
        lList.SubItems(1) = objGsmIn.MessageSender
        lList.SubItems(2) = objGsmIn.MessageData

        objGsmIn.GetNextMessage

    Wend
End If

Screen.MousePointer = vbDefault
buttonReceive.Enabled = True

End Sub

Private Sub buttonReceiveOptions_Click()
    RecvConfig.Show
End Sub

Private Sub buttonSend_Click()
    Dim MessageType As Long

    buttonSend.Enabled = False

    textResult.Caption = "Sending message, Please wait..."
    textResult.Refresh

    ' Set Device
    objGsmOut.Device = comboDevice.Text

    ' Set LogFile
    objGsmOut.LogFile = textLogfile.Text

    ' Set Speed
    If comboSpeed.ListIndex = 0 Then
        objGsmOut.DeviceSpeed = 0               ' use default speed
    Else
```

```vb
    objGsmOut.DeviceSpeed = comboSpeed.List(comboSpeed.ListIndex)
End If


MessageType = objConstants.asMESSAGETYPE_TEXT

If SendConfig.checkMultipart.Value = 1 Then
    MessageType = objConstants.asMESSAGETYPE_TEXT_MULTIPART
End If

If SendConfig.checkFlash.Value = 1 Then
    MessageType = objConstants.asMESSAGETYPE_TEXT_FLASH
End If

' Set Delivery Report
objGsmOut.RequestStatusReport = SendConfig.checkReport.Value

' Set recipient
objGsmOut.MessageRecipient = textRecipient.Text

' Set Message parameters
objGsmOut.MessageData = textMessage.Text

' Set Message Type

objGsmOut.MessageType = MessageType

    ' Send the message
objGsmOut.Send

' Display result
ShowReference = True
GetResult (True)
ShowReference = False

buttonSend.Enabled = True

End Sub

'Private Sub buttonSendOptions_Click()
'    SendConfig.Show
'End Sub

Private Sub cmdGo_Click()

If comboDevice = "" Or textRecipient.Text = "<Recepient's Address>" Then
MsgBox "Please enter device recipient no"
Else
Form2.Show
End If

End Sub

Private Sub Form_Load()
    Dim lDeviceCount As Long
    Dim i As Long
```

```
    ShowReference = False

    Set objGsmOut = CreateObject("ActiveXperts.GsmOut")
    Set objGsmIn = CreateObject("ActiveXperts.GsmIn")
    Set objConstants = CreateObject("ActiveXperts.SmsConstants")

    lDeviceCount = objGsmOut.GetDeviceCount()  ' Get number of devices

    comboDevice.AddItem ("")
'   comboDevice.AddItem ("COM1")        ' Add serial devices
'   comboDevice.AddItem ("COM2")
'   comboDevice.AddItem ("COM3")
'   comboDevice.AddItem ("COM4")

    For i = 0 To lDeviceCount - 1
        comboDevice.AddItem (objGsmOut.GetDevice(i)) ' Add devices to list box
    Next

'   comboDevice.AddItem ("")
'   comboDevice.AddItem ("COM1")        ' Add serial devices
'   comboDevice.AddItem ("COM2")
'   comboDevice.AddItem ("COM3")
'   comboDevice.AddItem ("COM4")

    comboDevice.ListIndex = 0

    comboSpeed.AddItem ("Default")      ' Setup devicespeed combo
    comboSpeed.AddItem ("1200")
    comboSpeed.AddItem ("2400")
    comboSpeed.AddItem ("9600")
    comboSpeed.AddItem ("19200")
    comboSpeed.AddItem ("38400")
    comboSpeed.AddItem ("57600")
    comboSpeed.AddItem ("115200")

    comboSpeed.ListIndex = 0

    SetDefaultLogFile

End Sub

Public Function GetResult(bSend As Boolean) As Long

    Dim lResult As Long

    If (bSend = True) Then
        lResult = objGsmOut.LastError
    Else
        lResult = objGsmIn.LastError
    End If

    If (lResult = 0 Or lResult = 23140) Then
        If (ShowReference = True) Then
            textResult.Caption = "SUCCESS, MessageReference = " & objGsmOut.MessageReference
        Else
```

```vbnet
            textResult.Caption = "SUCCESS"
        End If
    Else
        textResult.Caption = "ERROR " & lResult & " : " & objGsmIn.GetErrorDescription(lResult)     ' Set
Result
    End If

    GetResult = lResult

End Function

Public Function FileExists(sFileName As String) As Boolean
    FileExists = CBool(Len(Dir$(sFileName))) And CBool(Len(sFileName))
End Function

Private Sub buttonView_Click()              ' View logfile
    If FileExists(textLogfile.Text) = True Then
    Shell "notepad " + textLogfile.Text, vbNormalFocus
    End If
End Sub
```

Video Player 1

```
import javax.microedition.midlet.*;
import javax.microedition.lcdui.*;

/** VStream Project */
public class VideoPlayer extends MIDlet implements CommandListener
{
        private Command exitCommand;
        private Command playCommand;
        private Command contentTypeCommand;

        private Display display;
        private TextField textField;
        public Form form;
        private Gauge gauge;

        private static final int GAUGE_LEVELS = 4;
        private static final int GAUGE_MAX = 12;
        private static final String DEFAULT_URL = "http://localhost/vstream.mpg";


        public VideoPlayer() {
                display = Display.getDisplay(this);
                form = new Form("VStream Project");
                textField = new TextField("Video URL", DEFAULT_URL, 100, TextField.ANY);
                gauge = new Gauge("Acquiring video", false, GAUGE_MAX, 0);
                exitCommand = new Command("Exit", Command.EXIT, 2);
                playCommand = new Command("Play", Command.SCREEN, 1);
                /**contentTypeCommand = new Command("Supported media types",
Command.SCREEN, 2);*/
                form.addCommand(playCommand);
                form.addCommand(exitCommand);
                /**form.addCommand(contentTypeCommand);*/
                form.setCommandListener(this);
                form.append(textField);
        }


        public void startApp(){
                display.setCurrent(form);
        }


        public void pauseApp(){
        }


        public void destroyApp(boolean unconditional){
        }


        public void commandAction(Command c, Displayable s){

                if(c == exitCommand){
```

```
                    destroyApp(false);
                    notifyDestroyed();
        }

        else if(c == playCommand){
                    gauge.setValue(0);
                    form.append(gauge);

                    VideoCanvas videoCanvas = new VideoCanvas(this);
                    videoCanvas.initializeVideo(textField.getString());

        }

        /**else if (c == contentTypeCommand){ */
                    /**String url = textField.getString();*/
                    /**int position = url.indexOf(':');*/
                    /**String protocol = url.substring(0, position);*/

                    /**SupportedTypes typesUI = new SupportedTypes(this, protocol);      */
                    /**display.setCurrent(typesUI);      */
        /**}*/

    }


    public void updateGauge(){
                    int current = gauge.getValue();
                    current = (current + GAUGE_MAX/GAUGE_LEVELS);
        gauge.setValue(current);
        }

}
```

Video Player 2

```
import javax.microedition.midlet.*;
import javax.microedition.lcdui.*;
import javax.microedition.media.*;
import javax.microedition.media.control.*;
import java.io.*;

/** VStream Project 2007 */
public class VideoCanvas extends Canvas implements CommandListener, PlayerListener, Runnable {

        private VideoPlayer parent;
        private Display display;

        private Player player;
        private VideoControl videoControl;

        private String url;
        private Thread initializer;

        private Command close;
        private Command rePlay;
```

```java
        private Command stop;


        public VideoCanvas(VideoPlayer parent){
                super();
                this.parent = parent;
                display = Display.getDisplay(parent);
                close = new Command("close", Command.SCREEN, 1);
                /**stop = new Command("stop", Command.SCREEN, 2);*/
                addCommand(close);
                /**addCommand(stop);*/
                setCommandListener(this);
        }


        public void initializeVideo(String url){
                this.url = url;
                initializer = new Thread(this);
                initializer.start();
        }


        public void run(){

                try {
                        player = Manager.createPlayer(url);
                        parent.updateGauge();
                        player.addPlayerListener(this);
                        player.realize();
                        parent.updateGauge();

                        player.prefetch();
                        parent.updateGauge();

        } catch (IOException ioe) {
                        Alert alert = new Alert("IOException thrown", ioe.getMessage(), null,
AlertType.ERROR);
                        display.setCurrent(alert);

        } catch (MediaException me) {
                        Alert alert = new Alert("MediaException thrown", me.getMessage(), null,
AlertType.ERROR);
                        display.setCurrent(alert);
                }

                playVideo();
        }


        public void playVideo(){
                try {

// Get the video control and set it to the current display.
videoControl = (VideoControl)player.getControl("VideoControl");
if (videoControl != null) {
```

```
                              videoControl.initDisplayMode(videoControl.USE_DIRECT_VIDEO,
this);
        }

                        parent.updateGauge();

                        int cHeight = this.getHeight();
                        int cWidth = this.getWidth();
                        videoControl.setDisplaySize(cWidth, cHeight);


                        display.setCurrent(this);
                        videoControl.setVisible(true);
                player.start();


        } catch (MediaException me) {
                        Alert alert = new Alert("MediaException thrown", me.getMessage(), null,
AlertType.ERROR);
                        display.setCurrent(alert);
                }
        }


        /** Paints background color */
        public void paint(Graphics g){
                g.setColor(128, 128, 128);
                g.fillRect(0, 0, getWidth(), getHeight());
        }


        public void playerUpdate(Player p, String event, Object eventData) {
                //add "Replay" option when video is finished
                if (event == PlayerListener.END_OF_MEDIA)
                {
                        if (rePlay == null)
                        {
                                rePlay = new Command("re-play", Command.SCREEN, 1);
                                addCommand(rePlay);
                        }
                }

        }


        public void commandAction(Command c, Displayable s) {
                if(c == rePlay){
                        try{
                                player.start();
                        } catch (MediaException me) {
                                Alert alert = new Alert("MediaException thrown", me.getMessage(),
null, AlertType.ERROR);
                                display.setCurrent(alert);
                        }
                }
```

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```
else if(c == close){

        player.close();
        parent.form.delete(1);
        display.setCurrent(parent.form);
        url=null;
        parent=null;
}

/**else if(c == stop){*/
        /**player.close();*/
        /**parent.form.delete(1);*/
        /**display.setCurrent(parent.form);*/
        /**url=null;*/
        /**parent=null;*/
/**}*/



}


}
```

Video Player 3

```java
import javax.microedition.midlet.*;
import javax.microedition.lcdui.*;
import javax.microedition.media.*;

/** Displays supported media types for a given protocol */
public class SupportedTypes extends Form implements CommandListener
{
        private Command exitCommand;
        private Display display;
        private VideoPlayer parent;


        public SupportedTypes(VideoPlayer parent, String protocol) {
                super("Supported media types for " + protocol);
                this.parent = parent;
                display = Display.getDisplay(parent);

                exitCommand = new Command("Back", Command.EXIT, 2);
                addCommand(exitCommand);
                setCommandListener(this);


                String[] types = Manager.getSupportedContentTypes(protocol);

                for(int i = 0; i < types.length; i++) {
                        append(new TextField("http", types[i], 20, TextField.ANY));
                }
        }


        public void commandAction(Command c, Displayable s) {
                if(c == exitCommand) {
                        display.setCurrent(parent.form);
                }
        }

}
```

APPENDIX D:

User Manual Guide

USER MANUAL GUIDE

**VIDEO STREAMING USING CELL PHONES FOR PROPERTY
SURVEILLANCE**

Switch On the Apache Server:

1. On the Apache server. The prompt windows as shown in Figure 1 will be displayed
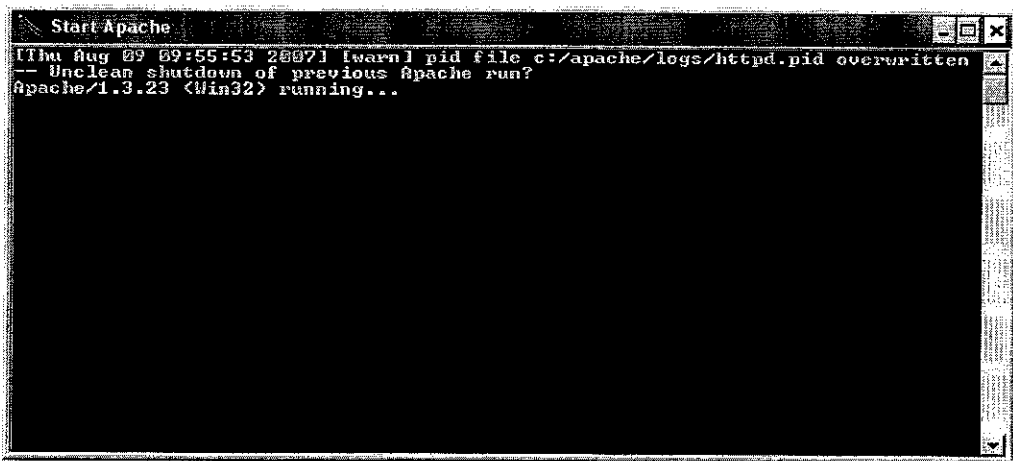   once it's running.

Figure 22

Infrared Setting:

1. Connect the circuit (Infrared Receiver) with the computer using the parallel port.
2. Click on the remote and make sure that the LED is on. Make the IR rays transmit
    the signal continuously to the IR Receiver in the circuit.
3. Open the Vstream project that has been executed.

Configuration Setting:

1. Choose the Phone Connection Properties in "Device" column as telephone modem
    that you have installed it before. (e.g. Modem Nokia 6280 USB)
2. Click "Edit" button if you want to add the new recipients' address or telephone
    number.
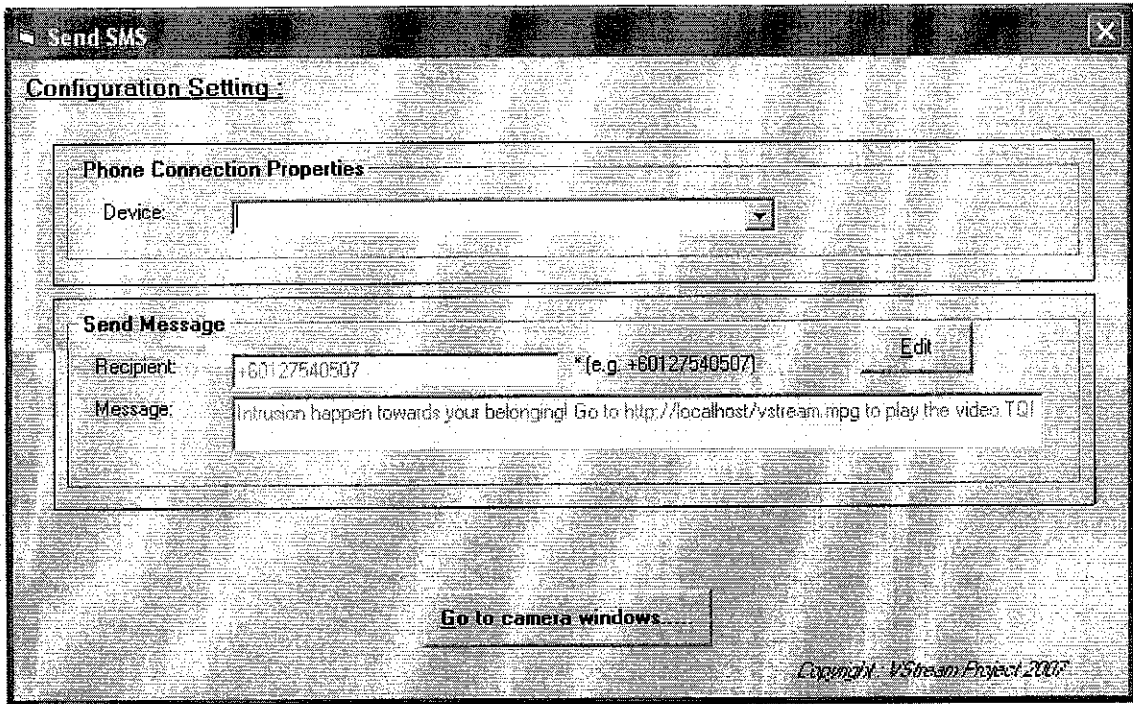3. Click button "Go to camera windows" to go to the next screen.

Figure 23

Video Capture:

1. Once the Capture Video screen appears you will see the display video at the right hand of the screen as shown in Figure 3.
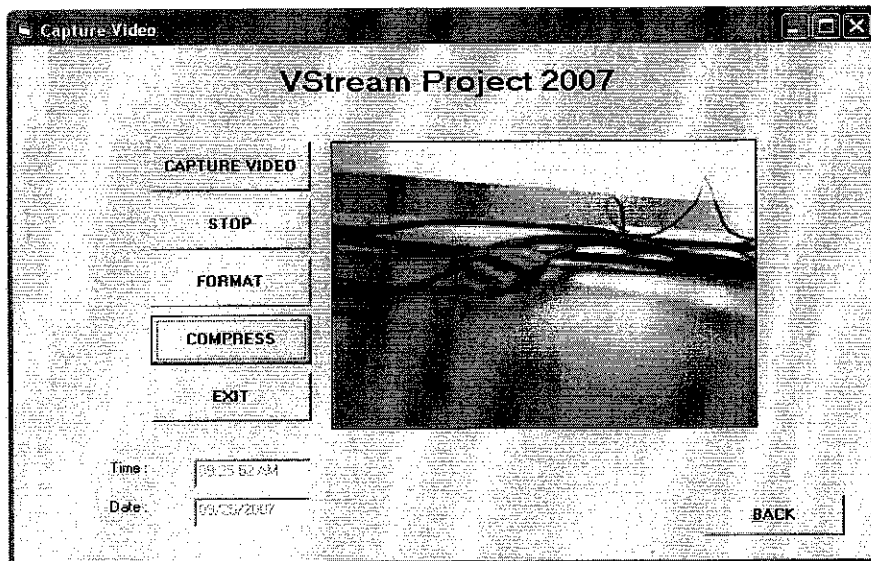

Figure 24

2. Click "Compress" button and set as "Microsoft MPEG-4 Video Codec" as shown in Figure 4.
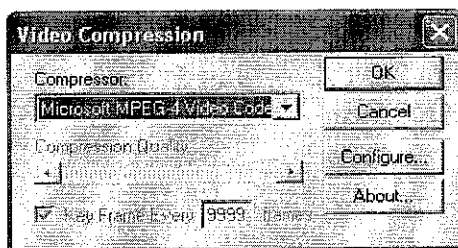

Figure 25

3. Once you cut the IR rays (by not clicking the remote control button) the system will start capture the video for 15 seconds and save to the apache server as vstream.mpeg in C:\apache\htdocs.
4. SMS will be sending to user cell phones with the quote "Intrusion happen towards your belonging! Go to http://localhost/vstream.mpg".

Play the video using emulator

1. Open the J2ME Wireless Toolkit 2.2 and select VideoPlayer program.
2. Click the "Play" function.
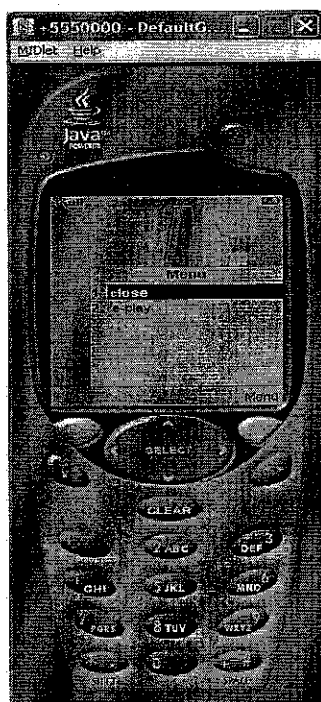3. User will see the video that have been capture by the system through the emulator using this address: http://localhost/vstream.mpg as shown in Figure.

Figure 26

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