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**"Design and Development of CCTV Using Webcam"**

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

# **Design and Development of CCTV using Webcam**

Thesis submitted in accordance with the partial requirements of the  
Universiti Teknikal Malaysia Melaka for the  
Bachelor of Manufacturing Engineering (Manufacturing Design) with Honours

By

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DESIGN AND DEVELOPMENT  
OF  
CCTV USING WEBCAM

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## **APPROVAL**

This PSM submitted to the senate of UTeM and has been as partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Design) with Honours. The members of the supervisory committee are as follow:

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(NURAZUA BINTI MOHD YUSOP)  
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## **ABSTRACT**

CCTV act as a surveillance device in areas which need security such as bank, airport, shopping complex and many more. Many companies use it for several uses even for monitoring the worker. However this purpose is high cost because CCTV camera in market nowadays is quite expensive. So, by using other type of camera which is cheaper, easy to install, various type in market and the display quality is good is the best solution. The usage of webcam can synchronized to be applied as CCTV camera device. The aspect of this project emphasize on the quality of display and other aspects.

## **ABSTRAK**

CCTV merupakan suatu alat untuk sistem pengawasan bagi satu kawasan yang biasanya memerlukan pengawasan berterusan seperti bank, lapangan terbang, pusat membeli-belah dan lain-lain lagi. Sesebuah syarikat menggunakan sistem ini untuk mengawasi pergerakan pekerja mereka sewaktu bekerja. Namun begitu, harga pasaran bagi sistem CCTV ini agak tinggi dan menyebabkan penggunaannya akan melibatkan kos yang tinggi. Oleh itu, sebagai jalan penyelesaian, sistem ini memerlukan sejenis kamera yang lebih murah, mudah dipasang, pelbagai jenis di pasaran serta paparan gambar yang lebih berkualiti. Oleh itu, penggunaan webcam adalah bersesuaian untuk dijadikan sebagai kamera untuk sistem CCTV ini. Aspek utama dalam projek ini adalah kualiti gambar yang dipaparkan serta aspek-aspek lain yang berkaitan.

## **DEDICATION**

I would like to dedicate this project to my beloved parents and family who I missed and remembered always.



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# LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

CAD	Computer-Aided Design
CAE	Computer-Aided Engineering
CAM	Computer-Aided Manufacturing
CCD	Charge-Couple Device
CCDP	Closed-Circuit Digital Photography
CCTV	Closed-Circuit Television
CMOS	Complementary metal–oxide–semiconductor
DC	Direct Current
DVR	Digital Video Recorder
FTP	File Transfer Protocol
GPS	Global Positioning System
GUI	Graphical User Interface
HTTP	Hypertext Transfer Protocol
IDE	Integrated Development Environment
IP	Internet Protocol
IPD	Integrated Product Development
JPEG	Joint Photographic Experts Group
JRE	Java Runtime Environment
LED	Light-Emitting Diode
MPEG	Moving Picture Experts Group
PC	Personal Computer
PSM	Projek Sarjana Muda
SDK	Software Development Kit
TV	Television
USB	Universal Serial Bus
UTeM	Universiti Teknikal Malaysia Melaka

# **LIST OF APPENDICES**

Appendix A : Types of WebCam use in project

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Background**

Projek Sarjana Muda (PSM) is compulsory to the final year students in Universiti Teknikal Malaysia Melaka (UTeM) in order to complete their degree in the engineering course. PSM allow these students to do research and project based on the subjects learned in the classes, the experience they get during their industrial training and any cases related with the project.

Nowadays, the technologies of imaging have developed more advances in late these 10 years. Imaging technology is the application of materials and methods to create preserve or duplicate images. Webcam and CCTV is apart of imaging technology. Their function is to display of image and for the application is depend on their purpose.

Generally, CCTV is often used for surveillance in areas which need security such as banks, casinos, airports or military installations. For webcam, it is used to send periodic images or continuous frames to a website for display and typically captures the images as JPEG or MPEG files and uploads them to the web server. Combination of these two technologies becomes a useful product with a great solution for user especially the cost of product.

## **1.2 Problem Statement**

At Universiti Teknikal Malaysia Melaka (UTeM) especially at Industry Campus, the lecturer's room's door has been designed with transparent glass (window) which is faced to the corridor and most of lecturers close the window by pasting some paper or wallpaper. However, the problem encounter when lecturer cannot see who knock their door. Even this not such a big problem, however it still difficult for lecturers to know who is their guest.

## **1.3 Objective**

1. To design and develop the CCTV by using webcam to the lecturer's room.
2. To prevent the lecturer's room from any burglary or unwanted person.
3. To find out the most suitable low-cost CCTV system for offices or lecturer's room.
4. To ease the user (lecturer) for identifying the guest/student by using webcam before let they open the door.

## **1.4 Scope**

Generally, this project focuses to the advantages of using webcam as CCTV for lecturer's room. The low-cost design is needed in this project whilst user friendly. The mechanical design for the webcam is the most important part of this project. However, the system must be easy to use and not too complicated for user (lecturer). This project also can be proposed to the management office especially to managers' rooms or directors' rooms.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

In this project, the main focus is about the purpose of Closed-Circuit Television (CCTV) system and the functional of webcam besides its general uses. All the factors need to be considered to make this project success and fulfill the objectives. The other important thing in this project is the programming for webcam. This project will use Java™ by using the NetBeans as its platform for the development of Java™ desktop applications.

#### **2.2 Closed-Circuit Television**

Closed-circuit television (CCTV) is the use of video cameras to transmit a signal to a specific, limited set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point wireless links. CCTV is often used for surveillance in areas which need security, such as banks, casinos and airports or military installations. Increasing the usage of CCTV in public places has caused debate over public security versus privacy. In industrial plants, CCTV equipment may be used to observe parts of a process and also can be remote from a control room, or where the environment is not comfortable for humans. CCTV systems may operate continuously or only as required to monitor a particular event.

### **2.2.1 History**

The first CCTV system was installed at Test Standr VII in Peenemünde Germany in 1942, for observing the launch of V2-rockets. CCTV recording systems are often used at launch sites to record the flight of the rockets, in order to find the possible causes of malfunctions. Film cameras are also used for this purpose. Larger rockets are often fitted with CCTV allowing pictures of stage separation to be transmitted back to earth by radio link. CCTV is also used to observe the launch pad before the launch, especially when no person cannot be there because of safety reasons.

### **2.2.2 Industrial processes**

Nowadays, industrial processes which take place under critical conditions and maybe dangerous for humans are today often supervised by CCTV. For example the processes in the chemical industry, the interior of reactors or facilities for manufacture of nuclear fuel. The use of thermo graphic cameras allows operators to measure the temperature of the processes. The usage of CCTV in such processes is also sometimes required by law.

### 2.2.3 Crime registration



Figure 2.1: Eric Harris and Dylan Klebold, in the Columbine High School Massacre via CCTV cameras.

CCTV for use outside government special facilities was developed as a means of increasing security in banks. Today it has developed to the point where it is simple and inexpensive enough to be used in home security systems, and for surveillance. Surveillance of public areas in the United Kingdom by CCTV was developed partly in response to IRA bombings. Experiments in the UK during the 1970s and 1980s (including outdoor CCTV in Bournemouth in 1985), led to several larger trial programs in the early 1990s. These were deemed successful in the government report "CCTV: Looking Out For You", issued by the Home Office in 1994, and paved the way for a massive increase in the number of CCTV systems installed <sup>[1]</sup>. Today, systems cover most town and city centers, and many stations, car-parks and estates. The exact number of CCTV cameras in the UK is not known but a 2002 working paper by Michael McCahill and Clive Norris of Urban Eye, based on a small sample in Putney High Street, estimated the number of surveillance cameras in private premises in London is around 400,000 and the total number of cameras in the UK is around 4,000,000 <sup>[1]</sup>.

Claims that they reduce or deter crime have not been clearly borne out by independent studies; though the government claims that when properly used they do result in deterrence, rather than displacement. One clear effect that has been noted is a reduction of car crime when used in car parks. Cameras have also been installed in taxis to deter violence against drivers, and also in mobile police surveillance vans. In some cases CCTV cameras have become a target of attacks themselves. Middlesbrough council has recently installed "Talking CCTV" cameras in their busy town-centre. It is a system pioneered in Wiltshire which allows CCTV operators to communicate directly with the offenders they spot. This idea is first known to have appeared in George Orwell's famous novel Nineteen Eighty-Four<sup>[1]</sup>.

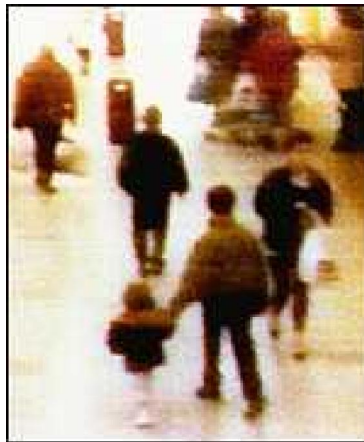


Figure 2.2: The two-year-old Jamie Bulger being led away by his killers, recorded on shopping centre CCTV.

The use of CCTV in the United States is less common, though increasing, and generally meets stronger opposition. In 1998 3,000 CCTV systems were found in New York City. There are 2,200 CCTV systems in Chicago<sup>[1]</sup>.