UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF ANTI-THEFT SURVEILLANCE SYSTEM WITH CLOUD BASED PICTURE STORAGE BY USING IMAGE PROCESSING TECHNIQUE

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Electrical Engineering Technology (Industrial & Robotics) with Honours.

by

NURUL AMIELIA HIDAYAH BINTI AZMI
B071310366
910920-11-5082

FACULTY OF ENGINEERING TECHNOLOGY
2016

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **DEVELOPMENT OF ANTI-THEFT SURVEILLANCE SYSTEM WITH CLOUD BASED PICTURE STORAGE BY USING IMAGE PROCESSING TECHNIQUE**

SESI PENGAJIAN: **2016/17 SEMESTER 1**

Saya **NURUL AMIELIA HIDAYAH BINTI AZMI**

mengaku membenarkan Laporan PSM ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.
2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.
3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. **Sila tandakan (✔)

☐ SULIT   (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)

☐ TERHAD   (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972)

☐ TIDAK TERHAD

Disahkan oleh:

Alamat Tetap:

PT 5806 TAMAN BERIL 1,

JLN SANTONG PAKA,

23100 DUNGUN, TERENGGANU

Cop Rasmi:

** Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini perlu dikelaskan sebagai SULIT atau TERHAD.

DECLARATION

I hereby, declared this report entitled "Development of anti –theft surveillance system with cloud based picture storage by using image processing technique." is the results of my own research except as cited in references.

Signature   :……………………………………………..

Author's Name   : NURUL AMIELIA HIDAYAH BINTI AZMI

Date   :12 DECEMBER 2016

APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a Partial fulfilment of the requirement for the degree of Bachelor of Engineering Technology of Electrical Engineering Technology (Industrial & Robotics) with Honours. The member of the supervisor is as follow:

………………………………..

(Project Supervisor)

ABSTRAK

Sistem pengawasan anti- kecurian adalah salah satu sistem alternatif untuk sistem keselamatan yang terdapat pada masa kini dan ianya untuk menggantikan sumber tenaga manusia sebagai pengawal keselamatan dalam tempoh yang panjang. Penyelidikan ini memberi tumpuan kepada sistem pengawasan anti- kecurian yang dilihat sangat penting untuk mengawal keselamatan pada masa kini. Peranti yang digunakan adalah *Raspberry Pi* dan juga kamera *Raspberry Pi*. Sebelum itu, ciri-ciri kegunaan perlu diketahui terlebih dahulu. Anggaran dimensi yang boleh dikesan oleh kamera adalah 78 kaki persegi x 7.2 meter tinggi. Peranti yang digunakan perlulah melalui fasa ujikaji dahulu untuk mengetahui kecekapan dan untuk mewujudkan templet imaj yang diperlukan. Kemudian, kamera akan ditempat kan ditempat yang tersorok dan tidak dapat dilihat secara umum untuk mendapatkan dimensi yang betul. Bahasa pengaturcaraan yang digunakan dalam sistem ini adalah *python* (OpenCV). Kamera yang digunakan akan mengesan sebarang pergerakan yang berlaku didalam dimensi yang telah ditetapkan. Apabila berlaku sebarang pergerakan, kamera akan mengambil gambar dan secara automatik akan dimuat naik ke laman sesawang. Selepas dimuat naik ia akan automatik disimpan sebagai simpanan untuk rekod.

ABSTRACT

Anti-theft monitoring system is one of the alternative systems for security systems available today and it's to replace human labour as a security guard for a long time. This research focuses on the anti-theft surveillance system that is seen as essential to maintain security in the present. The device used is the Raspberry Pi and also Raspberry Pi camera. Before that, the characteristics of usability should be known in advance. Approximate dimension that can be detected by the camera is 78 feet x 7.2 meters high. The device should be used in the experimental phase in order to determine the efficiency and to create the necessary template's images. Then, the camera will be highlighted at the right place and not be seen by the public to get the correct dimension. The programmer language used in this system is a python (OpenCV). The camera is used to detect any movement that occurs in a predetermined dimension. If there is any movement of the camera will take a picture and it will automatically be uploaded to the website. After uploaded, it will automatically be saved as a deposit for the record.

DEDICATIONS

I dedicate this work to my beloved parents for always supporting me, because they are the driving force in my life. Without love them, who am I. Thanks also to them because I always pray for blessing me here. They also supported me from finance to generate jobs.

ACKNOWLEDGEMENTS

First of all I am very thankful to Allah who is most beneficent and merciful. This project has been completed due to the support of many people and I wish to acknowledge them here. I have been deeply appreciated to my supervisor Mr. Muhammad Salihin Bin Saealal who has a contributed to the shape of the project. I thank him for his enthusiasm, encouragement and guidance, for a great working relationship and for the grasp of board concept and attention to detail.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLE

LIST OF SYMBOLS AND ABBREVIATIONS

USB   =   Universal Serial Bus

PC   =   Personal Computer

CCTV   =   Closed-Circuit Television

RISC   =   Reduced Instruction Set Computing

CPU   =   Central Processing Unit

SoC   =   System-on-Chip

CSI   =   Camera Interface Specification

GMM   =   Gaussian Mixture Module

ROC   =   Receiver Operating Characteristic

NP   =   No-Parametric

TCP/IP =   Transmission Control Protocol/ Internet Protocol

PTZ   =   Pan/Tilt/Zoom

JPEG   =   Joint Photographic Experts Group

PNG   =   Portable Network Graphics

TIFF   =   Tagged Image File Format

GTK   =   Graphical Control Element

GUI   =   Graphical User Interface

CHAPTER 1

INTRODUCTION

1.0   Project Background

Theft and robbery are very prevalent nowadays. This is worrying us as a society and it also involves our own lives. To eradicate or resolve this problem we need to design products that can solve this problem. This project is one of the surveillance systems to monitor the area and would be surprised if there is any movement occurs. The images will be uploaded to cloud storage and can be accessed by users anywhere. The project will be designed and analyzed using cameras and Raspberry Pi.

Software that will be used is python and Linux. Raspberry Pi is, low-cost palm-sized single board computer developed by the Raspberry Pi Foundation in 2012. The Regular Linux OS running on this unit with raspberry pi and built the OS is not required. Therefore, this unit can use USB peripherals without taking into account the specifications of the hardware segment and it can operate in the same way as a normal PC. Raspberry will be connected to the camera for this system. This system should be connected to the Internet or Wi-Fi then the image will be automatically uploaded to the dropbox and it can help to save energy.

1.1 Problem Statement

Nowadays, safety is important in our lives because of increased crime. One of the technologies that we use for security is CCTV. CCTV is one of the systems designed video can only be viewed by users certain images are not published, but can be recorded or viewed on a specific monitor. But there are some disadvantages or drawbacks of such CCTV, CCTV will record everything, all the time and every day and this requires a huge saving and here there is a loss in terms of time and storage. CCTV also uses the high installation costs and also the cost of repairs is relatively high and also take time to repair. The use of CCTV can also be identified using high electrical energy.

1.2 Objectives

The main goal of this project is :-

    I.   To design surveillance system that can capture any movement.

    II.   To develop algorithms that can upload the captured images to the cloud.

1.3 Project Scope

For this project, will detect any movements that occur in the view of camera during at 7 pm night until 7 am morning. This project is mean for 7.2 meter square x 78 square feet and they are communicate with internet or Wi-Fi. A project involves several part including:-

i.   Raspberry Pi

Raspberry Pi is advanced RISC machine processed lightweight computer minimized on to a single board.

ii.   Camera

The Raspberry Pi Camera Module is a custom designed add-on for Raspberry Pi. It attaches to Raspberry Pi by way of one of the two small sockets on the board upper surface.

1.4   Report Outline

This report comprises five chapters which listed as below:

Chapter 1 : **Introduction –** This chapter introduces of this project, discusses the problem causes and overcome the solution. As well as an overview of an anti-thief surveillance system.

Chapter 2   : **Literature Review -** This chapter of the journal obtained and conclusions and compare with the project to be based on similar project before this uses different equipment and method.

Chapter 3 : **Methodology –** This chapter provides a sequential flow of the project implementation, design consideration, as well as approaches and methods used on the project.

Chapter 4   : **Result and Discussion -** This chapter, they examine and analyze the results obtained and discuss the results either achieved or not.

Chapter   5   : **Conclusion and Recommendation -** This chapter provides an overview of the project. Strengths and advantages of the project will be presented as well. Furthermore, some suggestions for future work will be recommended.

1.5   Conclusion

At the end of this chapter, It can identify ways to resolve the time available for security. It was also able to identify the components that should be used, the software needed to use it, can know the specifications for all components. It also can improve my knowledge to solve problems that are the officials who nowadays. The anti - theft system is any device or method that can be used to prevent or inhibit the unauthorized distribution of goods that are considered valuable. Theft is a crime of the most common and the most time and a very high percentage. Anti - theft device using motion detection is acceptable in terms of accuracy, efficiency and reliability It is strongly recommended that further studies be carried out to create anti - theft devices that use motion detection in a controlled environment such as museums, banks, residential areas and rooms, such as a bedroom or a pound of teachers or lecturers to determine the effectiveness of the anti - theft device.

CHAPTER 2

LITERATURE REVIEW

2.0   Introduction

This chapter presents literature review on the development of surveillance system using image processing technique. The development of the different surveillance system using image processing technique to detect any movement. The advantages and disadvantages of each surveillance system are also presented and compared. This chapter also presents the development of surveillance system that will be utilized in this project.

2.1   The Surveillance System

Surveillance system is the checking of the conduct, exercises, or other evolving data, for the most part of individuals for motivation behind impacting, overseeing, coordinating, or securing them. This can incorporate perception from a separation by method for electronic hardware, (for example, CCTV cameras), or capture attempt of electronically transmitted data (Wi-Fi or telephone calls) and it can incorporate basic, moderately or low-innovation strategies, for example, human knowledge operators and postal interference. Surveillance system is utilized by governments for insight, the aversion of wrongdoing, the assurance of a procedure, individual, gathering or question, etc.

Figure 2.1.1: Example for surveillance system.

Here are a few example of application that depends on surveillance system:

- Real time alerts
- Automatic forensic video retrieval
- Situation awareness

2.2   Previous Development For Home Surveillance

Zoran Zivkovic and Ferdinand Van Der Heijden (2005) has a build up an effective versatile thickness estimation per picture pixel for the undertaking of foundation subtraction. This paper examine around an observation framework that utilized the Gaussian Mixture Model (GMM) and non-parametric strategy. A Gaussian Mixture model (GMM) was proposed for the foundation subtraction. The main commitment of this paper is an enhanced GMM calculation in view of the late result from zivkovic and van der Heijden. We contrast the enhanced GMM calculation and the first calculation with a settled number of parts. In figure 2.2.1, we show the change in the division comes about (the ROC bends) and in the preparing time. The reported handling time is for 320 x 240 picture and measured on a 2 GHz PC. The ROC bends are accounted for in the last section of figure 2.2.1. We used Gaussian kernels for the kernel-based method and uniform for the balloon method. The much more straightforward new strategy was continually giving better division. This decision was made here on the grounds that the normal preparing time for this number specimens was like the normal handling time for the GMM technique.