

**HOME SECURITY ANDROID APPLICATION ALERT SYSTEM USING
RASPBERRY PI**



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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JUDUL: [HOME SECURITY ANDROID APPLICATION ALERT SYSTEM USING RASPBERRY PI]

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HOME SECURITY ANDROID APPLICATION ALERT SYSTEM USING
RASPBERRY PI

AMIRUL SYAZWAN BIN SALMI



This report is submitted in partial fulfillment of the requirements for the
Bachelor of [Computer Science (Computer Security)] with Honours.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FAKULTI TEKNOLOGI MAKLUMAT DAN KOMUNIKASI
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

[2021]

DECLARATION

I hereby declare that this project report entitled
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RASPBERRY PI]**

is written by me and is my own effort and that no part has been plagiarized
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I hereby declare that I have read this project report and found
this project report is sufficient in term of the scope and quality for the award of
Bachelor of [Computer Science (Computer Security)] with Honours.



SUPERVISOR : Ts. Dr. Mohd Rizuan Bin Baharon

Date : 10-04-2021

DEDICATION

To my beloved parents, Salmi Bin Hassan and Rohaya Binti Husain the ones who always support and encourage me to get through every challenge in my life until now and always motivate me with their love.

To my helpful and respected Academic Advisor Dr.Nur Fadzilah Binti Othman and Supervisor TS Dr. Mohd Rizuan Bin Baharon, thank you for the guidance from the beginning until the end of final year project.



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ABSTRACT

Leaving house or an office without any surveillance system is insecure. This situation would attract such a bad activity can be happened such burglary activity. In addition, it also allows unauthorized person to get access to the house or office without anyone aware of such an activity has happened. Thus, a system called Home Security Android Application Alert System is invented to provide security feature to the user's property if they are away from their property. Similar to the normal home security system, this home security system detects the presence of an intruder for this project and rapidly alerts the user by sending an alert notice via the system-connected application.



ABSTRAK

Meninggalkan rumah atau pejabat tanpa sistem pengawasan adalah tidak selamat. Keadaan ini akan menarik seperti aktiviti buruk yang boleh berlaku seperti aktiviti pencurian. Di samping itu, ia juga membenarkan, orang yang tidak dibenarkan untuk mendapatkan akses ke rumah atau pejabat tanpa ada yang mengetahui bahawa aktiviti tersebut telah berlaku ... Oleh itu, sistem yang dinamakan Sistem Keselamatan Aplikasi Android Home Security diciptakan untuk memberikan ciri keselamatan kepada harta pengguna sekiranya mereka jauh dari harta benda mereka. Sama seperti sistem keselamatan rumah biasa, sistem keselamatan rumah ini mengesan kehadiran penceroboh untuk projek ini dan memberi isyarat cepat kepada pengguna dengan menghantar notis amaran melalui aplikasi yang disambungkan ke sistem.

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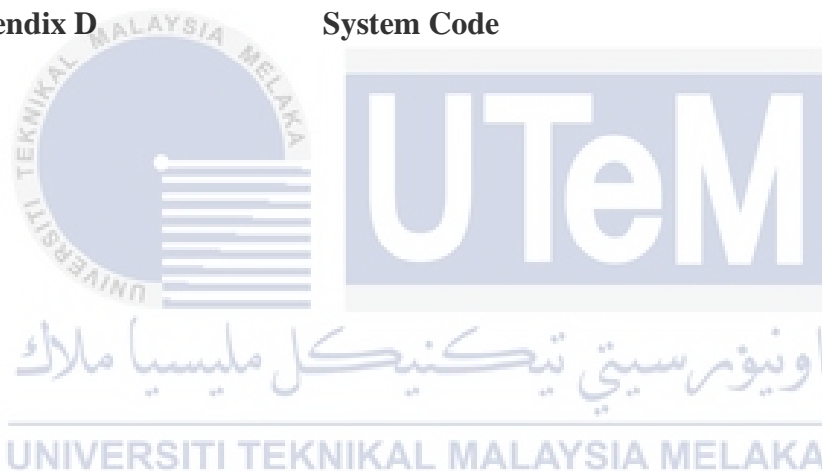
LIST OF ABBREVIATIONS

FYP - **Final Year Project**



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CHAPTER 1: INTRODUCTION

1.1 Introduction

Nowadays, home security system is not very common thing in Malaysia. This is because the majority of Malaysians are unaware of the value and benefits of a home security system. Home security system is a system that program to secure your home, office, room or something important and precious to you from intruder or from a theft. For this project, we built a simple home security system with the use of Raspberry Pi, USB Camera and PIR sensor. The simple home security system that has been built function similarly to standard home security system. For this project, my home security system will detect the presence of intruder and quickly alert the user by sending an alert notification through an application that connected to the system.

Raspberry Pi is a series of small single-board computers. It is a devices that enables people to explore computing, and to learn how to program in language like Scratch and Python. The Operating system that for Raspberry Pi is Linux. Raspberry Pi is capable of doing many thing such as browsing the internet and parent detectors to weather stations and many more.

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared light radiating from objects in its field of view. The most often used of the PIR sensor is for motion detectors, but don't give information on who or what moved. In this project, PIR sensors is used to detect motions of intruders after user left their home and has activate the Home security system and if the intruder break into your house the PIR sensor will detect the intruder motion and will sent alert notification to the user through application that connected to the system.

In conclusion, Home security system is a system that function to secure your room, home, or office from intruder. Home security system will detect and notify you if the intruder tried to break in into your property through simple application that connected to the system. This give time to user to make report to the police and arrest

the intruder before too late. This home security system also come with USB camera so that you have evidence who try to steal your property.

1.2 Problem Statement

The main problem in doing this project is some of the CCTV is more expensive than home security system and CCTV system did not provide alert notification features and also common CCTV features monitoring and alarm triggering if intruder break into user house without any emergency security respond implemented. This would be huge loss for user if they buys a very expensive CCTV that only have some basic features in it. Moreover, busy user unable to known the condition and the safety of their house when user is away from their house for certain days or business trips. Last but not least, the complexity of installing and the high cost configuration of the previous version of home security system leads to the not receive much demand and attention from user.

Table 1-1 Summary of the problem statement

PS	Problem statement
PS1	The cost of CCTV system is expensive and not included with alert notification function.
PS2	The CCTV consists of simple security features such as monitoring and alarm triggering but the emergency security respond is not integrated in the implementation

1.3 Project Research Question

Project research question is used to identify how much cost to develop a low budget home security system with implementation of several security features. How to insert the security features that connected successfully to the home security system. Furthermore, how to develop a successful home security system with PIR sensor, USB camera and raspberry Pi and send alert notification through simple application that connected to the home security system that have been build.

Table 1-2 Summary of the Project Research Question

PS	PRQ	Project Research Question
PS1	PRQ1	How to design a low cost home security system?
PS1	PRQ2	How to integrate alert notification system to low cost home security system?
PS2	PRQ3	How to enhance the home security system feature?

1.4 Project Objective

Project objective specifies the enhancements that what you want to achieve at the end of this project. This enhancement is dependent on the problem statement and the project question of this project.

Table 1-3 Summary of Project Summary

PS	PRQ	PO	Project Objective
PS1	PRQ1	PO1	To design a low cost Home Security Application Alert System using Raspberry PI and PIR sensor.
PS1	PRQ2	PO2	To integrate the home security alert system with video message using Telegram.
PS2	PRQ3	PO3	To enhance the security features of Home security system by adding PI camera module.

1.5 Project Scope

Project scope is a certain work that has to be done in order to deliver final result such as product or services with specified features and functions. It ~~also will~~ give you

the early view of the project. In this project, project scope will define the targeted user and some module of the Home Security Application Alert System.

1.5.1 Users

The target user of this project is the house owner that who want to monitor and secure their property using motion detector and camera and if the motion detector sensor detect motion in the owner house while owner are away the system will sent alert notification to the owner through simple application that connected to the system on their smartphone.

1.5.2 System Scope

1.5.2.1 Hardware

(a) Raspberry Pi

The Raspberry Pi Foundation created a series of small single board computer in the UK. It is a credit card sized machine with a low cost price tag. It is a small machine that helps people to learn more about computer, the computer language like Python or create hardware program, automate their home, and Raspberry Pi also use in the industrial applications.

(b) USB camera

A USB camera is a video camera that feeds or streams an image or video to or from a device to a computer network, such as the Internet, in real time. USB camera are small cameras that usually sit on a desk, connect to a user's computer, or are built into the hardware.

(c) PIR sensor

A passive infrared sensor (PIR sensor) is a type of electronic sensor that measures the amount of infrared (IR) light emitted by objects in its field of view. They're most commonly found in PIR-based motion detectors. PIR sensors are widely used in security alarms and automatic lighting systems.

(d) **Female to Female jumper**

A jump wire (also known as a jumper, jumper wire, jumper cable, DuPont wire or cable) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or often without – simply "tinned"), that is typically used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

1.5.2.2 Software

a) **Android Studio Software**

Android Studio is Google's official integrated development environment (IDE) for the Android operating system. It is based on JetBrains' IntelliJ IDEA software and is developed specifically for Android development. It can be downloaded for Windows, MacOS, and Linux-based operating systems.

b) **SQLite**

Since Android was created, all application developers have been using SQLite to store our local data. Often directly with SQL statements, often with an Object-Relational Mapper (ORM) as an abstraction layer. SQLite is an open source software and it is easy to use SQL database and SQLite database is very popular database software among application developer.

1.5.2.3 Modules/Functions

In software, a module is a component of the program. The package is made up of one or more modules that were created separately and will not be integrated until the program is linked.

I. **Motion Detector Module**

This module is to detect any motion or movement that the sensor can detect on real time

II. Camera Module

This module will pair with the PIR sensor to capture the image of any motion or movement.

III. GUI

Simple android application that will be built to notify user if their safe or not.

1.6 Project Contribution

The estimate performance from this project is described by the project contribution. This section may be referred to as the project objective.

Table 1-4 Summary of the Project Contribution

PS	PRQ	PO	PC	Project Contribution
PS1	PRQ1	PO1	PC1	To capture the image of the motion that have been detected by the PIR sensor
PS1	PRQ2	PO2	PC2	The Raspberry Pi can connected successfully to the PIR sensor, USB Camera and Internet
PS2	PRQ3	PO3	PC3	A successful Home Security Application Alert System with an android program that notify user if the system detect any sign of motion or movement.