Faculty of Electrical and Electronic Engineering Technology

IOT BASED SMART SECURITY ALARM SYSTEM BY USING PASSIVE INFRARED SENSOR

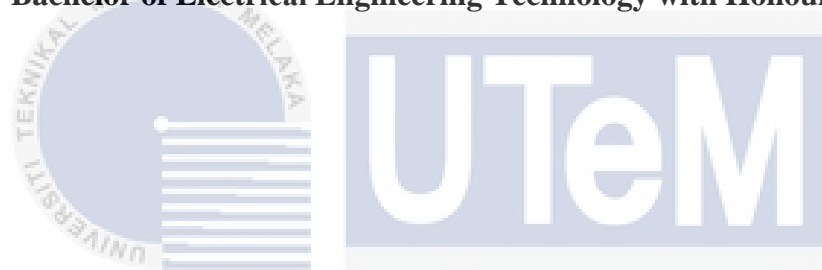**MUHAMAD KAMIL FITRI BIN MUHAMAD FAUZI**

Bachelor of Electrical Engineering Technology with Honours

2021

IOT BASED SMART SECURITY ALARM SYSTEM BY USING PASSIVE INFRARED SENSOR

MUHAMAD KAMIL FITRI BIN MUHAMAD FAUZI

A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electrical Engineering Technology with Honours

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2021

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PROJEK SARJANA MUDA II

Tajuk Projek   :IOT BASED SMART SECURITY ALARM SYSTEM BY USING
PASSIVE INFRARED SENSOR

Sesi Pengajian : 2021/2022

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I declare that this project report entitled "IOT BASED SMART SECURITY ALARM SYSTEM BY USING PASSIVE INFRARED SENSOR" is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Date   :   1/02/2021

APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering Technology with Honours.

Signature   :

Supervisor Name   :   AZHAR BIN AHMAD

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Co-Supervisor   :

Name   (if any)

Date   :

DEDICATION

This project is entirely dedicated to my cherished mother, Kamariah Binti Ahmad, who already has served as a source of inspiration and strength throughout the journey. Without her, I may not be able to complete my project properly and magnificently amid pandemic covid-19.

To my brothers, sisters, relatives, and friends who encouraged and advised me to complete this endeavour.

Finally, I dedicate this project to the Almighty God, thanking Him for His direction, strength, mental power, and abilities in providing me with the chance to complete this project in a healthy manner.

ABSTRACT

In this era of globalization , Security is a critical problem in our daily life, and everyone desires to be as safe as possible in their living environment. Living or working in a place is one of the most crucial matters for every human being. Besides, the crime of theft is increasing day by day in our society which makes people aware and need to find technology which can make theirs living place more safety and system security has even become essential . As technology development become wide and the world is moving forward, alot of people in this revolution are clevers with the modern technology and everythings are at theirs fingertips now . This project is presenting of software and hardware to make people feel more secure with our security alarm system which name is Iot Based Smart Security Alarm System by using Passive Infrared Sensor . The project's goal is to build a project to strengthen the security system for the home and workplace, particularly in the event of a burglary. The hardware is to use Arduino UNO and ESP8266 WIFI Shield to run the coding for the PIR sensor . When PIR sensor detect the intruders coming , The LED will light up and the buzzer will make sounds. Then, the user will get the alert through notification by using blynk application . By employing these methods , the user will get more secure and can living more comfortable and safely .

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ABSTRAK

Dalam era globalisasi ini, Keselamatan adalah masalah terpenting dalam kehidupan seharian kita dan setiap orang mungkin ingin untuk mendapatkan tempat tinggal mereka . Tempat tinggal atau tempat kerja adalah salah satu kebimbangan utama bagi setiap manusia untuk tinggal di sana . Selain itu, jenayah pencurian semakin meningkat dari hari ke hari dalam masyarakat kita yang membuat oeang sedar dan perlu mencari teknologi yang dapat menjadikan tempat tinggal mereka lebih selamat dan keselamatan sistem menjadi penting . Seiring perkembangan teknologi menjadi semakin luas dan dunia semakin maju, banyak orang dalam revolusi ini pandai menggunaan teknologi moden dan kini semuanya ada di hujung jari mereka . Projek ini menyajikan perisian dan perkakasan untuk membuat orang merasa lebih selamat dan sistem penggera keselamatan kami yang namanya Sistem Penggera Keselamatan Pintar Berbaris iot dengan menggunakan Sensor Infrared merah Pasif . Objektif projk ini adalah untuk merancang projek untuk meningkatkan sistem keselamtan kediaman dan pejabat terutamanya dari kes-kes kecurian . Perkakasnya adalah menggunakan Arduino UNO dan ESP8266 WIFI Shield untuk menjalankan pengrekodan untuk sensor PIR . Apabila sensor PIR mengesan penceroboh yang datang , led akan menyala dan menghasilkan bunyi oleh alat pendengung. Kemudian, pengguna akan mendapat makluman melalui pemberitahuan dengan menggunakan aplikasi 'blynk' . Dengan cara ini, pengguna akan menjadi lebih selamat dan dapat hidup dengan lebih selesa dan selamat .

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IN THE NAME OF ALLAH , THE MOST GRACIOUS , THE MOST MERCIFUL

First of all, gratitude and praises to the Almighty God for His guidance and blessings throughout my of blessings throughout my career to successfully finish the study and projects in BDP 1 and BDP 2.

I would like to convey my heartfelt appreciation to my research supervisor, Azhar bin Ahmad, for his unwavering support of my bachelor's studies and research, as well as his patience, encouragement, passion and extensive knowledge. His advice wa invaluable during the research and writing of this thesis. I could not have asked for a better supervisor for my bachelor's degree.

Finally, I would like to express my gratitude to my mother, Mrs, Kamariah and my dear friends. Any attempt at any level cannot be satisfactorily completed without the support and guidance from them .

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LIST OF ABBREVIATIONS

IoT	-	Internet of Things
PIR	-	Passive Infrared Sensor
GSM	-	Global System Mobile
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LIST OF APPENDICES

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CHAPTER 1

INTRODUCTION

1.1   Background

Today, the modern home integrates many conveniences of technology. Technology based home security and automation have become commonplace. House is a residential building , an asset and a place to store wealth as well . Security becomes one of mandatory considerations in keeping the house from undesirable events and accidents. When activities like locking doors, turning on/off lights, and adjusting air conditioning may now be performed remotely. Home automation, according to Kaurn, may be advantageous for individuals who need to use home appliances while away from home and can considerably enhance the lives of the disabled. Because of this technology, our everyday lives will be made easier and we will not have to think about home as much. This application has been investigated and developed since the days of landline phones, but it has become much more successful with the introduction of internet-capable mobile devices.

Figure 1: Internet of Things Diagram

Passive Infrared Sensor will sense the movement of an object with 7m radius and ARDUINO UNO R3 is used to control the entire process of the project. This prototype is designed in such a way that any people interested to sense the Passive Infrared Sensor sense the movement and triggered the output which is send a message through the mobile phone. The user may check the alerts and status of the IoT system from anywhere, even if Internet connectivity is not generally available (because the mobile phone is not required to be linked to the internet, just the board is required to have access to Wi-Fi). Existing infrared (IR) and Bluetooth remote controllers are appliance specific and cannot be used interchangeably. Electrical appliances that are Bluetooth-enabled and controlled by Bluetooth-enabled smart phones cannot be managed from a remote location. As a result, actions like turning on an air conditioner when you get home are impossible to accomplish with such gadgets. Our research, on the other hand, offers a low-cost and uncomplicated method to wireless home automation and home security systems. This project aims to alleviate the difficulty that current home security/surveillance systems have in communicating information about the situation to users when they are not at home. The next portions of the paper are organised as follows: a comparative examination of the proposed system and present solutions is provided, as are the benefits of the proposed system over the existing ones. The technique and results go into further detail into the operation of the system's many components and its overall operation. A flowchart illustrating how the system works is also included in the approach. In chapter 4, we examined several more modifications that may be made to improve the quality and user usability of the present prototype. The last chapter will be the completion of the entire project system.

1.2 Problem Statement

When property security is released, a number of issues develop. The first issue is that customers are unaware of thief prevention, despite the fact that it is one of the most common house crimes nowadays. As a result, this gadget will serve as security for themselves and will notify the user if any motion is detected. As a result, they will be more secure, and the number of incidents involving intruders may be reduced. Because no security equipment is installed inside the house, office, or other location, the user will suffer numerous losses of valuable property. This is because there is no security safeguard that works well when the user is not there. Furthermore, the cost of the security device is one of the reasons why users are unable to complete the security system. Most clients are quite busy with various job backgrounds, and they do not have much time to check their self-belonging owing to their hectic working hours. With this gadget, users may receive device notification alerts as well as proof of intrusions. To address all of these concerns, this project presents HRSmartSec, an Android-based smart security system based on IoT and Firebase that will be built as a low-cost, low-maintenance innovative monitoring security system. It will be more secure and easier to set up to track people movement without their awareness.

1.3 Project Objective

Basically, the main objective to run this project done has a specific purpose . The objectives of our study are as follows :

    a)   To design a project to improve the security system for the residence and office especially from the burglary cases .

    b)   To develop a monitoring system using IoT for the users of the security system by prototype and simulation .

    c)   To use Arduino UNO and ESP8266 WIFI Shield to run the coding for the PIR sensor and to alert the user through notification .

1.4   Scope of Project

This project concentrates on a development of a passive infrared motion detector for house security system. The mobile station, the microcontroller unit with ESP 8266 WiFi Shield, sensors and the buzzer system, and software programming are used to build the entire project. The microcontroller board is the Arduino Uno Board. The cell phone is used as a controller to send instructions and as a receiver to receive replies and alerts from the microcontroller unit, whilst the Arduino Board is in charge of operating the various pieces and serves as the system's brain. The communication between the microcontroller unit and the mobile station is handled by the ESP 8266 WiFi Shield. Software programming is based on microcontroller instruction sets. It includes a C language application intended for a security system as an interaction to run the electrical system.

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CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

The literature review chapter reviews, researches, and examines on previous discussions and journal papers on IoT Based Smart Security Alarm System Using Passive Infrared Sensor. This chapter will be used in the future as a guide to assist with the experience of the problem during the implementation as to ensure this project is processing smoothly and successfully .

2.2   Research , Ideology and Concept of previous works .

2.2.1   IoT based Advanced and Smart Home Security System using Arduino

From the research that I have been going through , there are some journal that I picked from the google which the titles are same goes to me . About the first journal that author by Dr. U.S. Yadav[1], Tanupriya[2], Er. Shubham Singh[3] in 2020 was aim to provide a better way to safeguard the houses/buildings from fire and theft . By doing the system, it will prevent the theft from break in because of the safety and security were improving. The system can not only be used in houses but also in offices, complexes as well as industries. We can make the system more precised by reducing false alarms. Further, many advanced technologies can be connected to the system in order to use it at any big or small place like banks, malls, hotels, etc.

The technology may be utilised not just for safety but also for security. It is an autonomous wireless system, therefore it is simple to operate. The system is simple to set up and reasonably priced. The system operates accurately, and the manual switches allow for more efficient usage of the system as needed.

Besides being automatic, the system can also be controlled manually with the help of these manual switches. Manual switch 1 is pressed in case of theft in the house/building. An alert will be sent to the police and the other saved contacts.   Besides the system being fully automatic, it can also be controlled manually. Manual switches i.e. manual switch 1 and manual switch 2 can be pressed by the user in case of intrusion and fire respectively. This four-level scheme is depicted in detail below :
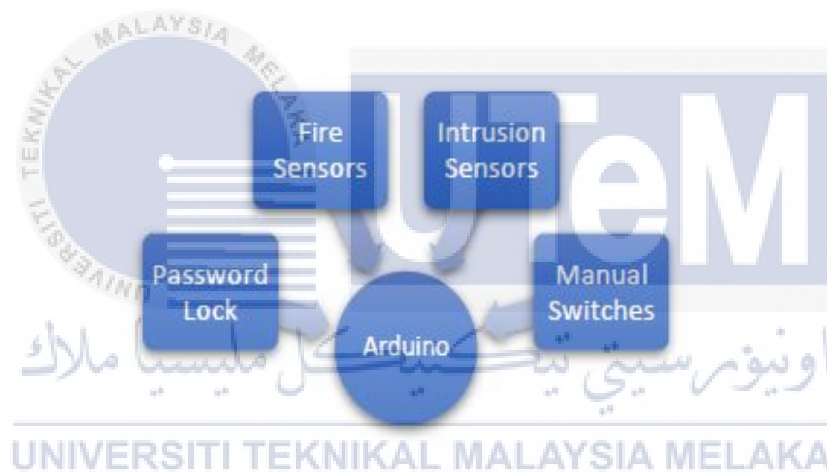

Figure 2: Four level system

2.2.2   IoT based Smart Security System using PIR and Microwave Sensors

This journal was released by Muhammad Zeesham Saeed , Raja Raheel Ahmed , Omar Bin Samin and Nusrat Ali on 2019 . It explains the crime rate and, in order to deal with such scenarios, sophisticated monitoring systems are essential to safeguard properties even when the owner is not there. There are several security systems available, but the most of them are either prohibitively expensive or need a large amount of storage space for storing surveillance footage. As a result, the author discusses technological advancements and the availability of smart and adaptable systems. This paper's IoT principles provide an intelligent home security system.

PIR and microwave sensors are used in the systems to detect intruders and transmit alarm notifications to the user via the Global System for Mobile (GSM). If the GSM service is unavailable, the system will still send an alert to the user through email. If the system loses power, it can remain operational for up to 10 hours due to the system's battery bank.
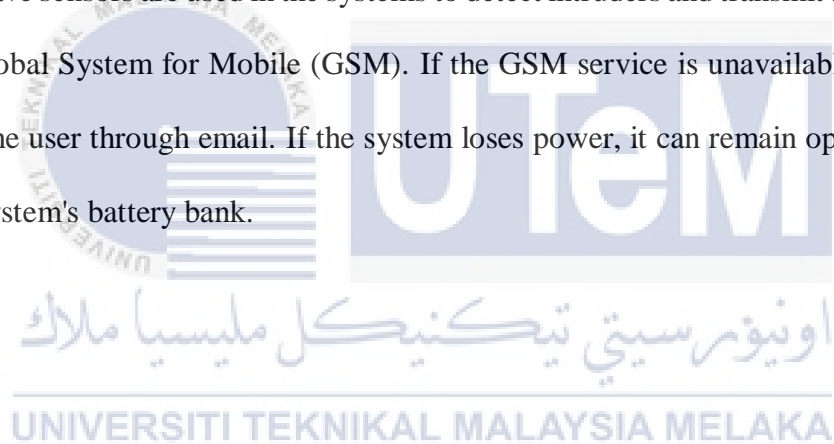
2.2.3   Iot-based Integrated Home Security and Monitoring System.

This researcher discusses ways to create home safety not only in metropolitan areas but also in suburban areas, particularly for those who spend more time outside than inside their homes. The article analyzes the design and construction of an IoT-enabled integrated home security and monitoring system using the Arduino and NodeMCU ESP8266 as controllers. To open the door, the system employed an RFID reader, a numerical code, and an email notification system., While the monitoring system employed a PIR sensor to detect an intruder, a DHT-22 sensor to measure room temperature and humidity, a rain sensor to detect rain, a fire sensor to detect a stove fire, and LDR sensors to monitor lighting conditions. We also set the light bulb and solenoid valves used as actuators, and the findings showed that the system can remotely monitor the state of the home and control the output light and solenoid valves through the internet using the blynk app on a smartphone.
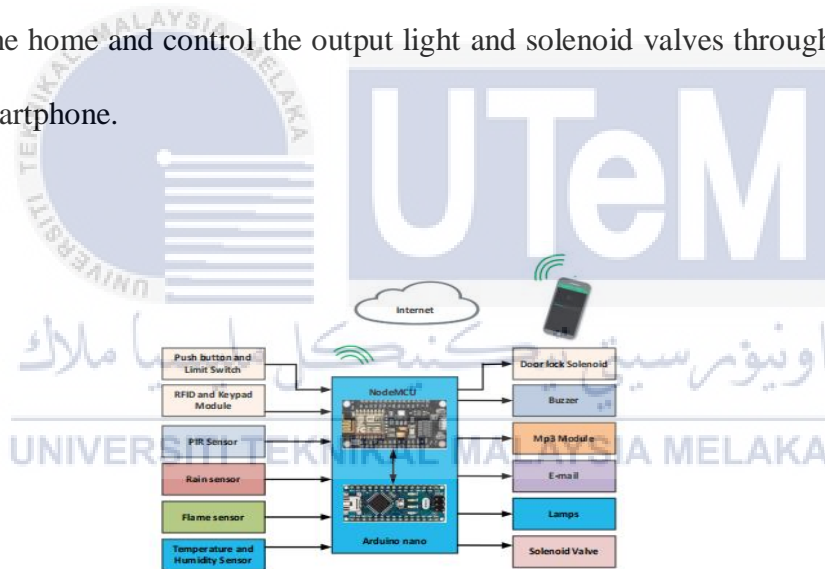

Figure 3: NodeMCU and Arduino Function