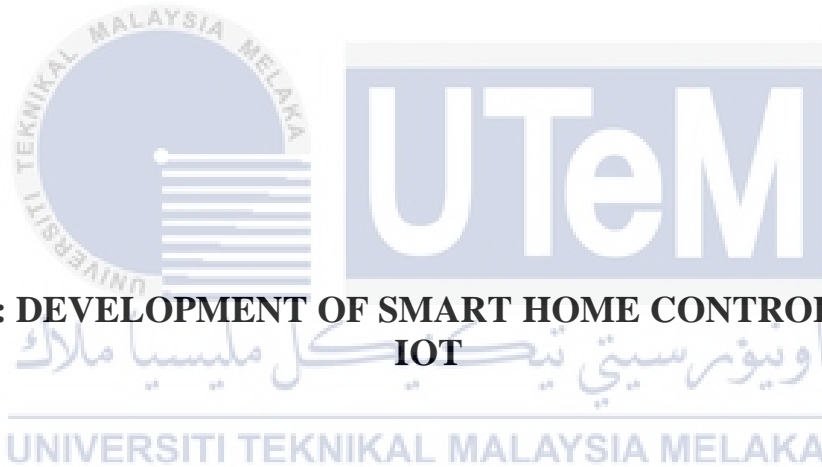




Faculty of Electrical and Electronic Engineering Technology



TITLE: DEVELOPMENT OF SMART HOME CONTROLLED BY IOT

MUHAMMAD AKMAL ARIF BIN MOHD ADAM

Bachelor of Electrical Engineering Technology (Industrial Power) with Honours

2023

TITLE: DEVELOPMENT OF SMART HOME CONTROLLED BY IOT

MUHAMMAD AKMAL ARIF BIN MOHD ADAM

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



Faculty of Electrical and Electronic Engineering Technology

اويورسي تي بيكيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2022

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DECLARATION

I declare that this project report entitled “DEVELOPMENT OF SMART HOME CONTROLLED BY IOT” 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 :

Signature :



Co-Supervisor :

Name (if any)

Date :

DEDICATION

*To my beloved mother, Suhaila, and father, Mohd Adam,
and
my sister, Izzaty*



ABSTRACT

As the electrical engine was the vector of technical progress in the Industrial Age, the Internet is the decisive technology of the Information Age. This worldwide network of computer networks, which is mostly built on wireless communication platforms nowadays, allows ubiquitous multimodal, interactive communication in chosen time and space. Smart home technology refers to a variety of commonplace household equipment that may communicate with one another and with the Internet. Owners can use this connectivity to programme simple everyday routines and, in certain situations, control device performance from afar. Smart homes, while designed for convenience, also carry the promise of enhanced independence for the elderly and those with impairments. As we know that we are having same problem which is we does not our current usage of electricity in our house, safety when we are away from our home, is it we already switch off the light fans and lightings when going out or even we having a lazy mood to turn on fan and light when already sit down at the couch. Hence, in this project all the problems will be solve.

ABSTRAK

Memandangkan elektrik adalah vektor kemajuan teknikal dalam Zaman Perindustrian, Internet adalah teknologi penentu zaman maklumat. Rangkaian rangkaian komputer di seluruh dunia ini, yang kebanyakannya dibina pada platform komunikasi tanpa wayar pada masa kini, membolehkan komunikasi interaktif multimodal di mana-mana dalam masa dan ruang yang dipilih. Teknologi rumah pintar merujuk kepada pelbagai peralatan rumah biasa yang boleh berkomunikasi antara satu sama lain dan dengan Internet. Pemilik boleh menggunakan ketersambungan ini untuk memprogram rutin harian yang mudah dan, dalam situasi tertentu, mengawal prestasi peranti dari jauh. Rumah pintar, walaupun direka untuk kemudahan, juga menjanjikan kebebasan yang dipertingkatkan untuk warga emas dan mereka yang cacat. Seperti yang kita tahu bahawa kita mempunyai masalah yang sama iaitu kita tidak menggunakan elektrik semasa di rumah kita, keselamatan ketika kita jauh dari rumah kita, adakah kita sudah menutup kipas dan lampu ketika keluar atau kita mempunyai mood malas nak pasang kipas dan lampu bila dah duduk kat sofa. Oleh itu, dalam projek ini semua masalah akan diselesaikan.

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CHAPTER 1

INTRODUCTION

1.1 Background

This is a new era everything needs to be link to internet and it like a new norm everything need to be connected to internet to get latest information and always in trend with everyone else. As we know that more technology being connected to internet which everything being controlled by just a tap on screen from far away such as smart car which we able to control air conditioner even we are not in the car, smartphones literally is a small compact computer that can handle any task just like computers. Internet just like a new basic need for human to do interaction and connecting with others to get the easiest and faster alternative.

1.2 Problem Statement

Nowadays all thing has been optimized to be smart in term of efficiency, control and update to make sure our daily life easier and efficient. There have many new smart technologies has been created where we can control it just by our phone or an application. Sometimes we having some problem such as we were forgot to switch off lights, fan, our house safety in many aspects or during late night a woman wanted going back to her house while the environment was dark so she can ensure that her car porch is save from any intruder by turn on her porch lamp by using smartphone to ensure it is saved to enter the house. Besides that, people want a perfect ventilating and stable optimum temperature of the house and we want to reduce any fatal accident like burning house and any intruder.

1.3 Project Objective

The objective project is to make our daily life are more practical in term of we can control everything in the house system even we are away from home or even at the house. Besides that, this is an invention a way of convenience which we can control and know any data that link to IOT by our phone of the house system such as;

- a) To design a smart home for controlling house system such as lighting, fan and security system.
- b) To develop monitoring system using INTERNET OF THINKING (IOT).
- c) To analyze energy efficiency by using the smart home controlling system.

1.4 Scope of Project

To avoid any uncertainty of this project due to some limitations and constraints, the scope of the project is defined as follows:

- a) Investigate the best sensor that can be used for the system.
- b) Using a stable application in phone to ensure the system are optimized.
- c) Investigation of data transfer to the cloud system of an app.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Nowadays, what can be observed to all country over the world including Malaysia having a rapid development of infrastructure and this action are gaining an increment of energy demand and maybe after many years of using energy carelessly 1 day the world does not have enough natural resource to fulfil the demand. Many awareness campaign was given to public to give concern about reducing the intensity of electricity consumed but until now a suitable solution still unfound. Besides that, we are living in a new era which needed to be always updated and can control everything including our home need to be have all criteria should have in a smart system.

Hence, this project help to develop a smart home controlled by IOT and monitoring electric consumption by controlling all auxiliary inside the house by using smartphone. By using this system, it will help user to control all appliances in the house. This project may face some problem need to be solve such as massive amount of data need to be collected and upload it to the cloud and then connected to internet. Therefore, this project needs to be design accurately as possible to ensure there no flaws and having any data loss collected from smart home system.

2.2 Internet of Things (IOT)

Due to the integration of multiple devices with diverse owners and makers, Internet of Things (IoT) systems are vulnerable to a wide range of threats. IoT applications frequently involve components in clouds and fogs, as well as being part of broader cyber-physical systems; in other words, these systems are extremely complex, which adds to their security issues. Patterns are a good approach for this purpose because of their abstraction power, the design of IoT-based apps must be able to handle this complexity and heterogeneity, patterns are a suitable approach for this purpose because of their abstraction power. The Internet of Things (IoT) is a collection of things (items) with unique IDs that may connect and collaborate to achieve shared goals, such as sensors, actuators, smart phones, and so on. IoT systems have broadened the scope of applications by offering centralized control of a wide range of devices [1].



Figure 1: INTERNET OF THINGS

2.2.1 Smart Home Concept

Smart Home Systems have numerous advantages, including reducing environmental impact, lowering energy costs, and enhancing building security and safety. The technologies not only control building processes, but they also transform data to help customers figure out but also provide them some control over them. over it when it's necessary Building occupants can control their energy consumption with smart controls. Only deliver energy in the form of heating, cooling, conditioned air, and lighting when there is a need from the user.

Users should be able to control when and how much energy they utilize. After the construction or renovation is completed, the behavior is adjusted to achieve the expected end functions of the building, such as turning on the heating/thermostat when it is cold, opening the windows for ventilation, turning on the air-conditioning if it is too hot, turning on the lights, and so on. The difference between the calculated final energy demand (i.e the building envelope and the installations) and the real measured final energy demand is large due to occupant behavior. Self-learning automation systems that alter the control algorithm based on the occupants chosen settings could be a solution. When considering a "Smart Home," information and feedback to building inhabitants should be considered” [2].



Figure 2 Smart home concept

2.2.1.1 Smart Home devices

Some products, such as the Blink smart camera, smart thermostat, fire sensors and smart lighting fixtures, interact wirelessly with an IoT hub. The reason for this is the device's energy efficiency, since they use the battery as the end device's power source, which gives them advantages in terms of mobility and independence from electricity as a power source. A wireless access point connects the IoT hub to Wi-Fi assessed to be a suitable collection point for traffic generated by IoT devices based on the foregoing wireless access point for traffic generated by IoT devices has been determined to be a wireless access point. Traffic in the communication network cannot be gathered directly due to the established modes of operation and features of computers, and thus wireless Wi-Fi networks. (Ivan et al., 2020)

In the "Internet of Things," where everything has an assigned IP address and can be watched and accessed remotely at anytime from anywhere, home automation, also known as "Smart Home," is a crucial element. It is the method by which additional gadgets and household equipment are networked to govern every element of a smart home. Home automation systems have traditionally been used to manage lighting and basic appliances. Recently, technology has made it possible for us to fully control our smart home appearances from anywhere, bringing the concept of a globally connected world to life [9]. Home automation can specify when, why, and how a gadget should react. It offers comfort, total control, and cost savings. (Jaabar et al., 2018).

2.3 Design And Development of Smart Homes

The sophisticated lighting control system is one of the advantages of Smart Home. The user is no longer required to manually turn on or off electrical appliances. For instance, the user has two alternatives when entering the bedroom: either the light will turn on and off automatically when the user enters and exits the space, or the user can control the switching from the application using his smartphone. In order to reduce power consumption, the brightness of the light can also be adjusted. In addition, the user has the option of changing the room's settings based on sensor data (temperature, humidity, etc.), such as controlling the fan's speed from a mobile application or having the speed automatically change in response to changes in the room's temperature. The energy efficiency can be increased in this way because when electrical equipment is readily or automatically shut off when not in use, more energy is saved and the cost of electricity is reduced.

Additionally, the user can utilize a smartphone, tablet, or laptop to manage electrical appliances and check on the state of the home from anywhere. For instance, if the user has already arrived at his or her office and has neglected to turn off the fan, he or she can do it using a smart device. In order for the user to know whether their house is flooded or the air around them is harmful, smoke, carbon monoxide, and flood sensors can also be added. In these cases, the user can choose to stay at home.

When a security event occurs, the user will receive a notification on their phone. They do not need to worry if a burglar tries to break into their home because they can keep an eye on things from their phone using the motion sensor, and if any movement is noticed, the alarm will sound. The security system is the component that will help protect our home from attackers the most. We can deter the thief from breaking into the residence by installing wired security cameras as part of a security system. All the elements of a smart house,