//GUIDE TO THE PREPARATION OF THESIS

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UNIVERSITI KUALA LUMPUR

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Report Submitted to Fulfil the Partial Requirements For the Bachelor of Computer Engineering Technology   
Universiti Kuala Lumpur

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DECLARATION

I declare that this report is my original work and all references have been cited adequately as required by the University.

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We have supervised and examined this report and verify that it meets the program and University’s requirements for the Bachelor of Computer Engineering Technology.

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**ABSTRACT**

The project is targeted to be used in the rental office. Like other rental spaces such as Airbnb and hotels. The project will be focusing on office or working space instead of those homestays for vacations rentals. The main objective of this project is to control electrical appliances via cloud-based or wireless. A mobile application and a smart home assistant will act as the control devices. Users can control the electrical appliances via these two methods. These control features can only be used by verified users. The system will be embedded with a power monitoring system which can be monitored via the IoT dashboard. The project will be focused on small office home office (SOHO).

ABSTRAK

Projek ini disasarkan untuk digunakan di pejabat sewa. Objektif utama projek ini adalah untuk mengawal perkakas elektrik melalui wayarles. Pengguna dapat mengawal perkakas elektrik tersebut dengan dua acara iaitu menggunakan telefon pintar ataupun pembantu rumah pintar. Hanya pengguna yang sudah mendapat pengesahan sahaja boleh mengakses system kawalan tersebut. Selain itu, projek ini juga bertujuan untuk memantau penggunaan elektrik. Projek ini ditumpukan kepada pejabat-pejabat kecil.

**CHAPTER 1: INTRODUCTION**

* 1. **Introduction**

This chapter introduces the problem and indicates the importance and validity of the project. It lays out the background information and the research questions. The study’s aims and objectives as well as its justification and importance, are all included in this chapter.

* 1. **Background of the project**

Technology is rapidly changing and evolving nowadays. Many years ago, monitoring systems could not be managed without human intervention, but recent technological advancements, particularly on the Internet of Things (IoT), have given building monitoring and systems a new face. The phrase “Smart Office Home Office” (SOHO) refers to the building that links the main electrical equipment to the internet. This system will allow the user to remotely access, monitor and control it. The phrase “remotely” refers to the ability to manage and monitor all equipment and appliances via a communication system from within or outside the building as in Figure 1.1.

Diagram

Description automatically generated

Figure 1.1 The functions of Internet of Things.

A building automation system is a system that employs interconnected devices to provide remote monitoring, control, and management of domestic appliances. Lighting, heating, ventilation, air conditioning and security are examples of systems. It gives users protection, comfort, and energy efficiency by allowing them to control and manage smart appliances from their smartphone, tablet or computer. A smart building, as part of the Internet of Things (IoT), frequently collaborates, sharing consumer data and automating actions based on the owner’s preferences.

This project creates a smart area that can be controlled and monitored using the Arduino MKR1000 which is one of the Arduino IoT boards and a low-cost microcontroller, the ESP-WROOM-32. Both microcontrollers will provide connectivity between the appliances, sensors, and the internet. To allow this system to function, electrical appliances such as lamps are linked to the relay as project outputs. This is due to the high-power requirements for the appliance to operate. The goal of this project is to create a smart office environment that can be operated using the internet. This system may also be monitored through smartphones as well as the IoT dashboard.

The key features of the system include monitoring and controlling electrical appliances. The system implements the use of home automation such as voice recognition and mobile applications to control the appliances. For controlling electrical appliances, Google Assistant will be used to receive and issue commands to microcontroller. The concept of home automation is executed, where the appliances in the buildings relate to each other over the internet to allow human-machine interactions. The project also implements the use of a temperature sensor which will be used to inform the user of the current room temperature. Arduino MKR1000 and ESP32 are mainly being used because of its functionality which can be used to connect to the internet easily and one of the low-cost and low power consumption microcontrollers.

The Google Assistant application is enabled by giving or using a command to the electrical appliances for the task at hand. The Sinric Pro is a web-based application for controlling the Arduino MKR1000 and ESP32. The IF This Then That (IFTTT) application is a tool for automating everything from favourite apps and websites to connected accessories and smart appliances.

This project demonstrates the design and implementation of a building automation system that allows electrical appliances to be controlled and monitored remotely. The project can also control and manage electrical appliances using Google Assistant and smartphones. The microcontrollers will send the command to the electrical appliances after the Google Assistant receives it from the user. This technology can make life easier for people by reducing the amount of movement required to control and manage electrical appliances.

Based on the project reviewed, a few enhancements have been made to applied to the proposed project. The project will be aimed to be used in the //