



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DEVELOPMENT OF WIRELESS AND INTELLIGENT HOME
AUTOMATION SYSTEM**

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

by

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910719-01-6007

**FACULTY OF ENGINEERING TECHNOLOGY
2015**

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: Development of Wireless and Intelligent Home Automation System

SESI PENGAJIAN: 2015/16 Semester 1

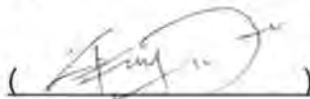
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DECLARATION

I hereby, declared this report entitled “Development of Wireless and Intelligent Home Automation System” is the results of my own research except as cited in references.

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APPROVAL

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ABSTRACT

Control system for wireless home uses android designed with the concept of an automated home control system. The main objective of this system is developed to facilitate home users, especially domestic electrical appliances with simple controls. In addition, it can save the cost of electricity for lighting can be controlled to suit the user. Generally, most home appliances controlled from a distance using a remote control. Has created a system for controlling home lighting from a certain distance, which replaces the remote control using mobile smart phone (smartphone). To make the smartphone to function as a remote control, an application was developed using android technology. App Inventor software used for designing applications intended. Hardware microcontroller Arduino UNO R3 which is used to connect the smartphone to the electrical equipment. The system has been tested by developing a mini model and take into account the situation in the domestic home. The test is based on the level of control for wirelessly using Bluetooth and the distance between the lamp and the smartphone. The results of this test, the system can be used on equipment or other home appliances for the purpose of controlling or adjustment. In addition, the security system was also highlighted in a typical system, using the global system for mobile (GSM), it can be warned and notified to the consumer where there is a gas leak or the presence of a person in the vicinity of the residence.

ABSTRAK

Kawalan sistem rumah secara tanpa wayar menggunakan Android direka dengan berkonsepkan sistem kawalan rumah berautomasi (selepas ini disebut sebagai IHAS sistem). Objektif utama sistem ini dibangunkan adalah bagi memudahkan pengguna di kediaman domestik khususnya mengawal perkakasan elektrik dengan mudah. Selain itu ianya boleh menjimatkan kos penggunaan elektrik kerana lampu boleh di kawal mengikut kesesuaian pengguna. Secara amnya, kebanyakan perkakasan rumah di kawal dari jarak tertentu dengan menggunakan alat kawalan jauh. Sistem IHAS dicipta bagi mengawal lampu rumah dari jarak tertentu dengan menggantikan alat kawalan jauh iaitu dengan menggunakan telefon pintar mudah alih untuk menjadikan smartphone berfungsi sebagai alat kawalan jauh, satu aplikasi telah dibangunkan menggunakan teknologi Android. Perisian App Inventor digunakan bagi merekacipta Aplikasi yang dimaksudkan. Perkakasan kawalan mikro iaitu Arduino UNO R3 digunakan bagi menghubungkan smartphone kepada perkakasan elektrik. Sistem ini telah diuji dengan membangunkan model mini serta mengambil kira situasi di dalam rumah domestik. Pengujian adalah berdasarkan tahap kawalan secara tanpa wayar menggunakan bluetooth serta jarak diantara lampu dengan smartphone. Hasil daripada pengujian ini, teknologi sistem ini boleh digunakan kepada peralatan atau perkakasan rumah yang lain bagi tujuan pengawalan atau pelarasan. Selain itu, sistem keselamatan juga turut ditekankan dalam sistem IHAS, dengan menggunakan global sistem mobile (GSM), ia dapat memberi amaran serta notifikasi kepada pengguna di mana terdapat Kebocoran gas ataupun kehadiran seseorang yang berada di sekitar kediaman tersebut.

DEDICATION

I dedicate to my parents and all the friends. Firstly I fell very lucky because get supported from my parent helping me in term financial, to buy some equipment and material to finish this project. I also proud get help my brother give moral support idea and solution went I in a problem. I dedicate this work and special thanks to Fahmi, and my friend as help together to complete this project.

ACKNOWLEDGMENTS

I would like to express my gratitude to Universiti Teknikal Malaysia Melaka (UTeM) for giving me the opportunities to further my studies here.

I would like to express my profound gratitude to Khalil Azha Bin Mohd Annuar for his supervision, encouragement, suggestions and trusted throughout the duration of this research.

Also I would like to express my big thanks to all my colleagues for their support and time during my research study.

Last but not least, I would like to thank my parents, and my family for giving me their full support, understanding and patience. Without their support, I would not have been able to finish my research project.

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LIST OF SYMBOLS AND ABBREVIATIONS

Tx	Transmitter
Rx	Receiver
GND	Ground
I/O	Input and Output
GSM	Global System For Mobile Communications
PIR	Passive infrared
DC	Direct Current
AC	Alternating Current
LED	Light Emitting Diode
V	Voltage (Volt)
I	Current (A)
WIFI	Wireless Fidelity
SCADA	Supervisory Control and Data Acquisition
IHAS	Intelligent Home Automation System
RF	Radio Frequency
MIT	Massachusetts Institute of Technology
PIC	Peripheral Interface Controller
LPG	Liquefied petroleum gas
ISIS	Integrated Spectrographic Innovative Software
PCB	Printed Circuits Boards
WHO	World Health Organization
SMS	Short Message Service

CHAPTER 1

INTRODUCTION

This chapter discusses the background, scopes and objective of this project. The problem statement states the reason why this project is carried out. The organization of the thesis is outlined at the end of this chapter.

1.0 Background

Home automation system is a system in which controls the actual performance of the property home equipment for instance illumination connected with lighting of light, speed of fan, heat connected with air-condition and so forth. Using improve in variety of adjustable appliances for the home along with their own discussion together with other people by using touch screen phone could make the important performance on the residence automation system. It increases the quality of life people by providing comfort, energy efficient and security features.

Home security is became one of the major issue in the nowadays. Consumers are worried connected with causing residence by itself without a appropriate protection. This is one of the factor to the development of various security systems. Array of the actual instant sensor on a some feets along with opening the property protection system away from the property. It is key limitation for that at this time offered protection system. According to each of our explored, it will find simply there are android application that have the actual performance connected with each residence automation along with security inside a one particular system.

Other than that, with hardware as well as software improvement of smartphone that leads to huge popularity of the Smartphone among the people. Around one billion smartphone device are dispatched in 2013. Smartphone have variety applications to solve the problem in various domain for example education, news. Smartphone

provides some important functionality is as follows. First they have good processing power, and Second the ease of access of Smartphone.

Instant engineering are becoming most in-demand worldwide as well as the people get pleasure from this instant way of living presents these individuals relive on the recognized “cable chaos” in which can increase below their own cubical. Currently while wireless technology, a digital gadgets type some sort of circle that the individual along with gadgets may talk collectively. Working above unlicensed, internationally offered frequency connected with only 2.4GHz, it could possibly link a digital gadgets inside of an array of 10m for you to 100m in the rate all the way to 3 Mbps based on the Wireless system course. It is create a low cost safeguarded cellular telephone along with accommodating with regard to residence automation system. Appliances at home are generally linked with the actual Arduino Uno board.

The communication between the cell phone and the Arduino Uno board is wireless. This project will discuss the development of a security system that integrates with an Android mobile device using GSM shield. Home security has been a major issue where crime is increasing or leak of gas at home and everybody wants to take proper measures to prevent intrusion. In addition, there is need to automate home so that the user can take the advantage from technological advancement. This project presents a model that will provide security to their home, office or cabin etc via SMS using GSM technology.

1.1 Problem Statement

According to World Health Organization (WHO), there are already 1 billion people experiencing disability globally in year 2012. The amount has occupied 15% of the world’s population and growing due to population ageing. The implementation of Intelligent Home Automation System (IHAS) at home is one of the great steps towards the integration of severely physically disabled and elderly people. The system is being developed to overcome the problems described above, allowing the end-user to perform home appliances control and accomplish some daily life important tasks by control with smartphone. The application designed for portable smart phones through

a bluetooth wireless network provides users with a simple interface to interact with appliances at home.

With increasing age, people tend to forget things which may create safety problems for them. Tragedies happen such as thefts especially late at night or when leaving the home. This is probably because the house does not provide any secure system. Home security has been a major issue where crime is increasing. People are scared of leaving home alone without a proper security. This leads to the development of various security systems.

1.2 Project Objectives

The objectives of this project are as follows:

- i. To develop wireless home automation system
- ii. To develop home security system
- iii. To analyze the performance of the wireless and intelligent home automation system

1.3 Work Scope

- i. Using Arduino Uno as a controller to control by switch off electrical appliances
- ii. Bluetooth module HC-05 as wireless for system range of 10m
- iii. Six electrical appliances using one fan and five lamp
- iv. Using GSM shield for sms system as feedback to security system
- v. Using two security system such as motion detector and gas leakage detector

1.4 Thesis Outlines

This thesis consists of five chapters. The following chapters are the outline of the implementation of smart home automation control system.

Chapter 1 will discuss briefly the overview of this project such as introduction, problem statement, objective and scope of the project, flow of project and thesis outlines.

Chapter 2 contains the exploration as well as details about the actual task with a various crucial methods associated with intelligent household automation system, technology as well as equipment utilised in case study. This chapter additionally includes particulars within software and hardware design. The background with the GSM protect as well as arduino uno are reviewed within this chapter.

Chapter 3 focus on far more regarding method utilised so as to resolve the actual task problem. The method must be adopted to have a superior performance.

Chapter 4 focus on the results as well as analysis comprehensive in planning the actual intelligent home automation system. The actual electronics as well as software result are going to be reviewed within this chapter. All design circuit, analysis, declaration as well as design are manifested within this chapter. The results presented in this thesis are based on the design procedure that has been stated before.

Chapter 5 will discuss about the discussion, problem, conclusion and suggestion of this project. Any comment or suggestion can be attached in order to improve the project in the future.

CHAPTER 2

LITERATURE REVIEW

This chapter will contains the research and information from thesis or journal about the concepts that related to intelligent home automation system and there are several important things need to be taken for study case that should be focuses. This chapter also includes the details of the component that used for designed the home automation system and the comparison of each other. All the information have been researched from different resource as the references in order to take out the basic idea in producing the best yield for that discussed in this chapter.

2.1 Introduction

This section provides a previous study of related work regarding the application of SMS services in a various fields. Some of previous researches have been analyzed to get details concerning existing current GSM and also the works by using of arduino to control program that has been recently carried out. It's important to learn and know how the application and components had been used in the SMS controlled system development. This really is to ensure the learning increasingly being executed add at particular a higher level software, thus the item be successful and extremely useful in order to carry out.

2.2 Methods Comparison

There are some comparison for the methods that has been used from the previous project that related to intelligent home automation system. The research had been done and there are several summary of the thesis, journal, web or books was recorded as in table 2.1.

Table 2.1 : The Methods Comparison from thesis, journal, web or books

No	Title	Reference	Project Description
1	Smart Home	Kong siow lian, Final year project (April 2010) FKEKK, UTeM	These projects were provided by the embedded controller, the vortex86sx embedded controller and view via web automation server
2	PLC base smart home module for remote access & control of electrical appliances via GSM modem	Sarvana kumar S/O soorinarayanan, final year project (May 2008) FKEKK, UTeM	Controlling home appliances through programmable logic controller (Real time smart relay) remotely, using the Global system for mobile communication Modulator & Demodulator (GSM modem).
3	Smart Controlled Electrical Appliances Via Bluetooth	Muhammad Hariz Bin Ahmad Johari, Final year project (June 2015) FTK, UTeM	Focuses on Arduino UNO that control electrical appliances and monitoring system via Bluetooth.