UNIVERSITI TEKNIKAL MALAYSIA MELAKA

PSM TITLE (LOW COST HOME AUTOMATION SYSYEM USING SMARTPHONE)

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology with Honours.

by

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DECLARATION

I hereby, declared this report entitled “Low Cost Home Automation System Using SmartPhone” is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electrical Engineering Technology with Honours. The member of the supervisory is as follow:

ABSTRAK

Kertas kerja ini menyajikan rancangan dan model penggunaan kerangka mekanisasi rumah baru yang menggunakan inovasi WiFi sebagai asas sistem yang menghubungkan bahagian-bahagiannya. Dengan peningkatan penggunaan dan ketergantungan yang cepat pada alat gadget yang pintar, syarat untuk menghubungkannya adalah berkenyataan. Banyak kerangka kerja yang ada telah mengembara ke dalam lingkaran Automasi Rumah tetapi dengan jelas telah mengabaikan untuk memberikan jawapan praktikal untuk yang setara. Makalah ini menunjukkan pendekatan untuk memberikan kemudahan Sistem Automasi Rumah (HAS) menggunakan Wireless Fidelity (Wi-Fi). Kerangka kerja yang dicadangkan terdiri daripada dua segmen asas; segmen awal adalah pelayan (pelayan web), yang menghadirkan pusat kerangka yang mengurus, mengawal, dan menyaring rumah klien. Pelanggan dan pengawas rangka kerja dapat (LAN) atau jauh (web) mengawasi dan mengawal kod rangka kerja. Bahagian kedua adalah modul antara muka peralatan, yang memberikan antara muka yang sesuai untuk sensor dan penggerak kerangka komputerisasi rumah. Sama sekali tidak seperti bahagian yang lebih besar dari kerangka robotisasi rumah yang dapat diakses di pasaran, kerangka kerja yang dicadangkan dapat disesuaikan sehingga satu pelayan dapat mengawasi banyak modul antara muka peralatan selagi ia ada di WiFi menyusun kemasukan. Rangka kerja menyokong pelbagai alat robotisasi rumah seperti memaksa bahagian papan, dan segmen keselamatan. Rangka kerja yang dicadangkan lebih baik dari perspektif kesesuaian dan kemampuan menyesuaikan diri daripada kerangka mekanisasi rumah yang dapat diakses oleh seluruh rakyat dengan murah

ABSTRACT

This paper presents a plan and model usage of new home mechanization framework that utilizes WiFi innovation as a system foundation associating its parts. With the quick increment in use and dependence on the striking highlights of brilliant gadgets, the requirement for interconnecting them is real. Many existing frameworks have wandered into the circle of Home Automation yet have clearly neglected to give practical answers for the equivalent. This paper shows an approach to give an ease Home Automation System (HAS) utilizing Wireless Fidelity (Wi-Fi). The proposed framework comprises of two fundamental segments; the initial segment is the server (web server), which presents framework center that manages, controls, and screens clients' home. Clients and framework overseer can locally (LAN) or remotely (web) oversee and control framework code. Second part is equipment interface module, which gives suitable interface to sensors and actuator of home computerization framework. Not at all like the greater part of accessible home robotization framework in the market the proposed framework is adaptable that one server can oversee numerous equipment interface modules as long as it exists on WiFi organize inclusion. Framework underpins a wide scope of home robotization gadgets like force the board parts, and security segments. The proposed framework is better from the adaptability and adaptability perspective than the financially accessible home mechanization frameworks

DEDICATION

I kindly dedicate this project report to my beloved parents and friends. A special thanks to my parents Mr & Mrs Vijiaragavalu who both always being support my ideas and give encourage to do this project. I also being grateful to thanks my classmates and friend who always been backbone to develop this project. Lastly to my supervisor Mr Mazree Bin Ibrahim who give lot of ideas and share his knowledge on doing report

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TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

1.0 BACKGROUND

Presently days home and building robotization frameworks are utilized to an ever increasing extent. From one viewpoint, they give expanded solace particularly when utilized in a private home. Then again, mechanization frameworks introduced in business structures don't just build comfort, yet additionally permit brought together control of warming, ventilation, cool what's more, lighting. Henceforth, they add to a general expense decrease and furthermore to vitality sparing which is absolutely a principle issue today.

Existing, settled frameworks depend on wired correspondence. Models incorporate BACnet, LonWorks and KNX. Utilizing a conventional wired robotization framework doesn't represent an issue as long as the framework is arranged previously and introduced during the physical development of the building. Assuming, in any case, previously existing structures ought to be increased with mechanization frameworks, this requires a lot of exertion furthermore, mush cost since cabling is vital.

Clearly, remote frameworks can come to help here. In the previous scarcely any years, remote innovations came to their achievement. Remote based frameworks, utilized each day and all over the place, go from remote home systems and portable telephones to carport entryway openers. Starting today, minimal relative research of remote

mechanization principles has been finished, albeit such information would give significant data to everybody searching for the most appropriate framework for given necessities.

Home Automation is a day to day reality, where it bargains from robotizing the fundamental errands like controlling the light on/off to the entangled computerizations like mechanizing huge creation machines in ventures. it is a system of physical gadgets, controller module and portable application; which can be called as an internetwork of various areas of innovation. The home computerization strategy incorporates the endeavors of different spaces like IoT, cloud, implanted innovation and cell phones. IoT being the wide space for inquire about from hardly any years, the home computerization is the best developing application under IoT. Android is another region with most noteworthy mechanical development dependent on it; individuals have related every single undertaking of their everyday practice with advanced cells so it would be an productive approach to make connection among clients and the actualized framework.

The framework proposed incorporates the equipment switch module comprising an arduino microcontroller which is the principle controller and the module is furnished with a Wi-Fi module to give passage to the switch. The application interfaces with this passageway through the server, which at that point speaks with the arduino to get the affirmation. When it is confirmed the arduino will trigger the signs to the electronic machines in the house dependent on the info given by the client from the application. The framework gives the force subtleties which help the client to have proficient rationale of controlling the types of gear.

1.1 PROBLEM STATEMENT

Home mechanization frameworks face four principle challenges, these are significant expense of possession, firmness, poor reasonability, and trouble accomplishing security. The primary targets of that exploration is to plan and to execute a modest and open source

home robotization framework that is fit for controlling and mechanizing the vast majority of the house apparatus through a simple sensible web interface to run and keep up the home mechanization framework. The proposed framework has an extraordinary adaptability by utilizing WiFi innovation to interconnect its dispersed modules to home computerization server. That will diminish sending cost and will build the capacity of overhauling, and framework reconfiguration. Framework will utilize secure remote LAN associations between conveyed equipment modules and server, and secure correspondence conventions among clients and server.

1.2 OBJECTIVE

Upon analysing the problem statements mentioned above, the primary objectives are:

1) User friendly interface: User can easily manage system locally or remotely home automation system, through easy Blynk App interface.

2) Security and authentication: Only authorized user can login to the system (locally, or remotely) in order to manage, control, & monitor. If system detects intruders it should immediately alert the system owner and lock login capability for a while.

3) Low Cost: System that can be build with the everyday earnings of a regular worker and not just for the riches. An affordable system is vital for the longevity for the system marketing.

4) System Scalability: Scalability is the ability of a system, network, or process, to handle growing amount of work in a capable manner or its ability to be enlarged to accommodate that growth. For example, system upgrade/downgrade by adding/removing hardware interface module should be easy and systematic task.

1.3 SCOPE

The home automation industry has been around for few decades but it is still not a necessary to have the technology in every home. Homes can be interfaced with sensors including movement sensors, light sensors and temperature sensors and give mechanized flipping of gadgets dependent on conditions. More vitality can be moderated by guaranteeing control of the house before turning on gadgets and verifying brilliance and turning lights if redundant. The framework can be coordinated intimately with home security answers for permit more noteworthy control and wellbeing for property holders. The subsequent stage is stretch out this framework to mechanize a huge scope condition, for example, workplaces and industrial facilities. Home Automation offers a worldwide standard for interoperable items. Normalization empowers shrewd homes that can control machines, lighting, condition, vitality the executives and security just as the expandability to associate with different system.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

This part covers the part of writing survey, the standard rationale is to essentially audit different logical works and endeavours which have been effectively completed by various exceptional specialists in this field of study. The scope of the literature review could be familiar to the exposure of the usage of the home automation system using Wi-Fi for monitoring purposes and the entirety of the data that has been collected could be accordingly closed. In light of the writing survey, the investigations and technique for examining will create the favoured result of this task.

2.1 OVERVIEW OF HOME AUTOMATION SYSTEM

Home computerization or domotics is building robotization for a home, called a shrewd home or savvy house. A home computerization framework will control lighting, atmosphere, theatre setups, and apparatuses. It might likewise incorporate home security, for example, get to control and alert frameworks. At the point when associated with the Internet, home gadgets are a significant constituent of the Internet of Things ("IoT").

A home mechanization framework ordinarily interfaces controlled gadgets to a focal centre point or "entryway". The UI for control of the framework utilizes either divider mounted terminals, tablet or personal computers, a cell phone application, or a Web interface, that may likewise be available off-webpage through the Internet.

While there are many contending sellers, there are not many overall acknowledged industry guidelines and the shrewd home space is vigorously divided. Makers regularly forestall free executions by retaining documentation and by case.

The home computerization showcase was worth US$5.77 billion of every 2013, anticipated to arrive at a market estimation of US$12.81 billion constantly 2020.

2.2 PREVIOUS RELATED WORK

Past-related work is essentially about the scientist who have did likewise with the venture, which had plan. There are a few analysts around the globe had did nearly the comparable venture, yet there are contrasts in the hardware and technique they have prepared to do the task. To finish this part needed to choose ten most comparable article and sum up it. The article, which picked at were completely recorded on the reference.

2.2.1 “Design and Implementation of a WiFi Based Home Automation System” by Ahmed M. Elshafee, and Karim Alaa Hamed.

A couple of researchers from Ahram Canadian University, Faculty of Computer Science and IT consisting of Ahmed M. Elshafee, and Karim Alaa Hamed has

proposed a design and implementation of home automation system. In this paper proposes a minimal effort, secure, universally open, auto-configurable, remotely controlled arrangement. The methodology talked about in the paper is novel and has accomplished the objective to control home machines remotely utilizing the WiFi innovation to interfaces framework parts, fulfilling client needs and prerequisites.

The researchers proposed framework is a dispersed home automation framework, comprises of server, equipment interface modules. Server controls equipment one interface module, and can be without any problem designed to deal with more equipment interface module. The equipment interface module thusly controls its alerts and actuators. Server is an ordinary PC, with worked in WiFi card, acts as web server. The web server programming is created utilizing asp.net innovation, so web server should bolster asp application and.net outline work 4.0, for windows Operating system.

The primary elements of the server is to oversee, control, and screen doubted framework parts, that empowers equipment interface modules to execute their doled out assignments (through actuators), and to report server with activated occasions (from sensors).

The proposed home mechanization framework comprises of three primary modules, the server, the equipment interface module, and the product bundle. The accompanying figure (1), shows the proposed framework format.

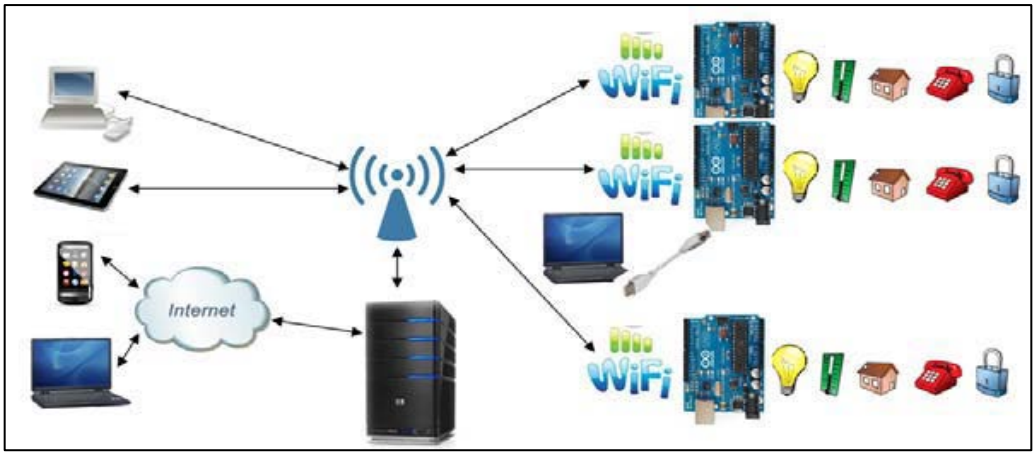

Figure 2.1 The proposed home automation system layout

Equipment interface modules are straightforwardly associated with sensors and actuator through direct wires associations. Equipment interface modules has the capacities to control vitality the executives frameworks like lighting, indoor regulators and Central air warming, ventilation, and cooling frameworks, and security frameworks entryway locks, cameras, movement identifiers, fire cautions.

The three primary components work together and communicates with each other to complete the system and work as a single unit. Even though all the three primary components works as a single unit but each individual plays an important role to maintain the system.

2.2.2. “INTELLIGENT HOME AUTOMATION SYSTEM” by Mak Kwan Wuey

The writer from Faculty of Engineering and Science Universiti Tunku Abdul Rahman has written a paper for the home automation system that develops system is that there is a need for cheap and easy to implement home automation system. Incorporated Home Automation System permits clients to connect with physical gadgets from their PC. Additionally, IHAS has built up a typical strategy of correspondence for gadget producer. IHAS can mechanize organizer arrangement, which is a fitting and-play highlight to the end clients.

The writer is written that The IHAS Application which dwells in the PC associates with a XBEE through USB association and discusses remotely with end gadgets. For instance, the light module gets order from the IHAS to diminish the lights to 50 %. IHAS Application likewise gets sensor information from different modules, for example, inhabitance sensor and light sensors.

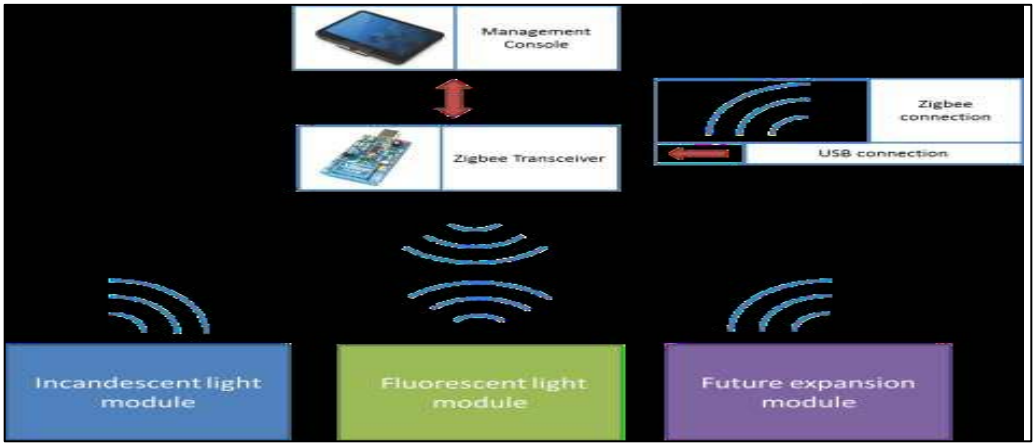

Figure 2.2 Overall Block Diagram for Intelligent Home Automation System

The paper also consist few more consoles including the management console. In the administration support, front end comprises of UI to let clients interface with IHAS without any problem. Sensor calculation is the means by which IHAS will react when sensor information is gotten by IHAS, though correspondence backend convention manages how to speak with the genuine gadgets. Information from customized RFID settings could be put away on another subsystem.

The researcher also had written that joining of IHAS with business framework is anticipated future improvement, just as building up a committed cell phone customer for IHAS that offers better client experience. By and large dependability of IHAS likewise should be upgraded. Additionally, IHAS could likewise gives time the executives in future discharges. In conclusion, more gadgets support and refreshed and progressively smoothed out UI is additionally gotten ready for IHAS. The main purpose of this system is to create low cost intelligent home automation system that can monitor the applications

2.2.3 "Home Automation System A cheap and open-source alternative to control household appliances" by Bassam Ruwaida and Toni Minkkinen.

The researchers stated that this venture spins around making a home automation system model with the principle center being the capacity to bolt/open an entryway through the web. The system comprises of a focal gadget, a server and an Android application.

The researchers have used a Rasperi Pi as the main microcontroller and the capacity to pivot the engine in the two bearings is accomplished by the utilization of a H-Bridge. The server oversees clients and gadgets, and handles the correspondence between the application and the focal gadget. Clients and gadgets are put away in a database on the server. The application is a front end which presents the client with a rundown of gadgets to connect with.

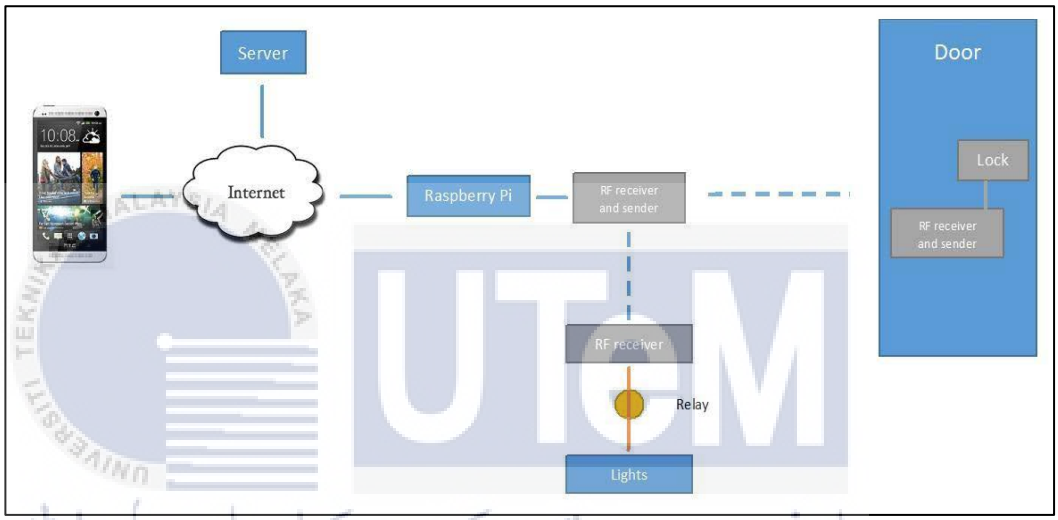

Figure 2.3 The structure of the planned project

Figure 2.3 represents the structure of the planned product where everything is controlled wirelessly. The product aims at being able to work with many house appliances such as door lock and lights for example, though the lights are a secondary objective. The writer then explained why they choose Raspberry Pi as the main microcontroller the fact that it consumes less energy/power due to its ARM processor, while it still hosts an entire operating system. This allows it to run several services (e.g. networking, hardware control) simultaneously.