SMART HOME APPLICATION

AHMAD FALIQ BIN AMRAN

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SMART HOME APPLICATION

AHMAD FALIQ BIN AMRAN

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

This report is submitted in partial fulfillment of the requirement for the

Bachelor of Computer Science (Computer Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2017

DECLARATION

I hereby declare that this project report entitled

Smart Home Application

is written by me and is my own effort and that no part has been plagiarized without citations

STUDENT : Ahmad Faliq Bin Amran Date: 16 August 2017

SUPERVISOR : En. Muhammad Syahrul Azhar Bin Sani Date: 16 August 2017

DEDICATION

This theory is devoted to ALMIGHTY ALLAH who is the most forgiving and accommodating and my valuable and my darling guardians, my mom, siblings and companions particularly on the grounds that they truly help to finish this task proposal. There are individuals whom prep me and show me the lifestyle for this unqualified love, moral and money related help and furthermore for their care and petitions. May ALLAH dependably showered HIS approval upon them.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ACKNOWLEDGEMENTS

First of all I would like to express my highest gratitude to Allah s.w.t because without His will I will not able to complete this project and He also who always give all the way for me to make sure I am able to do this project. A special gratitude and also a billions of thank you to my supervisor, Mr. Muhammad Syahrul Azhar Bin Sani which always guiding me throughout this project and also never tired from answering my question plus give me the strength for me not to give up while doing this project. Last but not least my friend that always give me a hand and also give me the spirit whenever I need it the most.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ABSTRACT

By and by a day's such countless advancements are ending up influencing our lifestyle more to comfort, lavish and secure. Especially in flexible field such enormous quantities of use are being made to give us more information and redirection. This endeavor is arranged with mix of three latest and most asking for propels that are Android, Arduino and GSM structure. Android is a Linux based working system plot fundamentally for PDAs and it is an open source. There are such a noteworthy number of utilizations are starting at now made on Android and various applications are being delivered at free of cost for its customers. We can in like manner develop our own particular changed applications with free of cost or slightest cost by our essentials. In this assignment we are using Smart Home Application to control home mechanical assembly like lights, fan and door secure home with get on adaptable application or voice affirmation. At whatever point we work this application, it will sit tight for voice commitment for a long time and Google Talk will see voice request to impel the picked home machine through Bluetooth. In controlling system side we have Bluetooth Module, Arduino as little scale controller, GSM Module and load controlling circuits. At whatever point this Bluetooth Module gets voice charge from Google Talk then it trades the voice request to Arduino. Arduino will control the specific weights depends on the voice arrange it got. Pretty much, once this endeavor is done, each one of the necessities and essentials which will full fill the overall public demand has been done viably. By arranging the Android UI, Smart Home Application in perspective of the Android phone ought to be conceivable. By persistently upgrading the control work, android phone licenses us at whatever point, wherever to control any device, finally comprehends the exceedingly savvy home.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ABSTRAK

Kini begitu banyak teknologi berguna sehari yang keluar untuk membuat hidup kita lebih selesa, mewah dan selamat. Terutama dalam bidang mudah alih begitu banyak aplikasi yang sedang dibangunkan untuk memberi kami lebih banyak maklumat dan hiburan. Projek ini direka dengan gabungan tiga teknologi terkini dan paling mencabar yang Android, Arduino dan sistem GSM. Android adalah sistem operasi Linux berasaskan direka terutamanya untuk peranti mudah alih dan ia adalah sumber terbuka. Terdapat begitu banyak aplikasi sudah maju pada Android dan banyak aplikasi yang sedang dibangunkan di bebas daripada kos untuk penggunanya. Kita juga boleh membangunkan aplikasi disesuaikan kami sendiri dengan bebas daripada kos atau kos minimum mengikut keperluan kami. Dalam projek ini kita menggunakan Smart Home Permohonan untuk mengawal perkakas rumah seperti lampu, kipas, kunci pintu di rumah dengan butang pada aplikasi mudah alih atau pengecaman suara. Setiap kali kami beroperasi permohonan ini, ia akan menunggu untuk input suara untuk beberapa lama dan Google Talk akan mengenali arahan suara untuk mengaktifkan perkakas rumah yang dipilih melalui Bluetooth. Dalam mengawal bahagian sistem kita ada Modul Bluetooth, Arduino sebagai pengawal mikro, Modul GSM dan litar beban mengawal. Setiap kali Modul Bluetooth ini menerima arahan suara dari Google Talk kemudian ia memindahkan arahan suara untuk Arduino. Arduino akan mengawal beban masing-masing bergantung kepada arahan suara yang diterima. Secara ringkas, apabila projek ini selesai, semua keperluan dan syarat-syarat yang penuh akan memenuhi permintaan orang ramai telah selesai dengan jayanya. Dengan mereka bentuk antara muka pengguna Android, Smart Home Permohonan berdasarkan telefon Android boleh dilakukan.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

TABLE OF CONTENTS

CHAPTER	SUBJECT		PAGE
	DECLARATION		**i**
	DEDICATION		**ii**
	ACKNOWLEDGEMENTS		**iii**
	ABSTRACT		**iv**
	ABSTRAK		**v**
	TABLE OF CONTENTS		**vi**
	LIST OF TABLES		**xi**
	LIST OF FIGURES		**xii**
CHAPTER 1	**INTRODUCTION**		
	1.1	Introduction	1
	1.2	Problem Statement	2
	1.3	Project Question	2
	1.4	Project Objective	3
	1.5	Project Scope	3
	1.6	Expected Output	4
	1.7	Project Contribution	4
	1.8	Report Organization	5
	1.9	Conclusion	6

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction 7

2.2 Related Work/Previous Work 7

2.3 Critical Review of Current Problem and Justification 12

2.4 Proposed Solution/Further Project 18

2.5 Conclusion 18

CHAPTER 3 METHODOLOGY

3.1 Introduction 19

3.2 Methodology 20

3.3 Project Milestone 23

3.4 Conclusion 27

CHAPTER 4 ANALYSIS AND DESIGN

4.1 Introduction 28

4.2 Problem Analysis 29

4.3 Requirement Analysis 29

4.3.1 Data Requirement 29

4.3.2 Functional Requirement 30

4.3.3 Non - Functional Requirement 30

4.3.4 Others Requirement 30

4.3.4.1 Hardware Requirement 31

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

4.3.4.2 Software Requirement 33

4.4 User Interface Design 34

4.5 Hardware Design 42

4.6 Conclusion 45

CHAPTER 5 IMPLEMENTATION

5.1 Introduction 46

5.2 Environment Setup 47

5.2.1 Software 47

5.2.2 Hardware 52

5.3 Implementation Status 56

5.3.1 Icon of the mobile application 56

5.3.2 Main Interface Button Module 57

5.3.3 Bluetooth Interface Button Module 58

5.3.4 Main Interface Button Module with status (on) 59

5.3.5 Main Interface Button Module with status (off) 60

5.3.6 Main Interface Voice Module 61

5.3.7 Google Talk Interface Module 62

5.3.8 Main Interface Voice Module with status 63

5.3.9 Module Summarization 64

5.4 Conclusion 64

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER 6 TESTING

6.1 Introduction 65

6.2 Test Plan 66

6.2.1 Test Organization 66

6.2.2 Test Environment 67

6.2.2.1 User In Home 67

6.2.2.2 User Outside Home 67

6.2.3 Test Schedule 67

6.3 Test Strategy 68

6.3.1 Classes of Test 68

6.4 Test Design 72

6.4.1 Test Description 72

6.4.2 Test Data 74

6.5 Test Result and Analysis 75

6.6 Conclusion 75

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER 7 PROJECT CONCLUSION

7.1 Introduction 76

7.2 Project Summarization 76

7.2.1 Project Weakness and Strength 77

7.3 Project Contribution 78

7.4 Project Limitation 78

7.5 Future Works 78

7.6 Conclusion 79

REFERENCE 80

APPENDICES 81

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

LIST OF TABLES

TABLE	TITLE	PAGE
1.1	Problem statement	2
1.2	Project question	2
1.3	Project objective	3
2.1	Critical review of current problem and justification	12
3.1	Gantt chart for PSM 1	24
3.2	Gantt chart for PSM 2	25
3.3	Milestones for PSM 1	26
3.4	Milestones for PSM 2	27
6.1	Test Organization	66
6.2	Test Strategy	68
6.3	Functionality Testing	72
6.4	Mobile Application Test Case	72
6.5	Test Case Bluetooth Connection Module	73
6.6	Test Case GSM Module	73
6.7	Test Case Voice Recognition Module	74
6.8	Test Data	74
6.9	Test Result	75
7.1	Weakness and Strength	77

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

LIST OF FIGURES

DIAGRAM	TITLE	PAGE
2.1	System Architecture for Zigbee-Bluetooth based home appliance control	8
2.2	Block Diagram at Home Unit	9
2.3	Computer Control System for Home Appliances : Circuit Diagram	10
2.4	RF Receiver with load connection	11
2.5	Functional Block Diagram of the System	12
3.1	Methodology waterfall	22
3.2	Flow Chart	23
4.1	Main Menu	34
4.2	Bluetooth Interface	35
4.3	Main interface with status (on)	36
4.4	Main interface with status (off)	37
4.5	Main Interface Voice	38
4.6	Bluetooth Interface Voice	39
4.7	Google Talk Interface	40
4.8	Main Interface Voice with status	41

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

4.9	**Circuit Design for button and voice recognition function**	**42**
4.10	**Circuit Design for GSM Module**	**43**
4.11	**Hardware Design for PSM 1**	**44**
4.12	**Hardware Design for PSM 2**	**45**
5.1	**Arduino IDE main interface**	**47**
5.2	**Voice recognition coding**	**48**
5.3	**Button function coding**	**49**
5.4	**GSM coding**	**50**
5.5	**Mit App Inventor Main Interface**	**51**
5.6	**Mit App Inventor Block Diagram**	**52**
5.7	**Arduino Mega**	**53**
5.8	**Arduino Uno**	**53**
5.9	**GSM Module**	**54**
5.10	**Bluetooth Module HC-05**	**54**
5.11	**Bluetooth Module HC-06**	**55**
5.12	**Push Button**	**55**
5.13	**LED**	**56**
5.14	**Smart Home Application Icon**	**56**
5.15	**Main Interface Button Module**	**57**
5.16	**Bluetooth Interface Module**	**58**
5.17	**Main interface button module with status (on)**	**59**
5.18	**Main interface button module with status (off)**	**60**
5.19	**Main Interface Voice Module**	**61**

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

5.20	**Google Talk Interface Module**	**62**
5.21	**Main Interface Voice Module with status**	**63**
6.1	**Bluetooth not connected**	**69**
6.2	**Bluetooth is connected**	**69**
6.3	**Voice Recognition Test**	**70**
6.4	**Alert Message send to user**	**71**

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER I

INTRODUCTION

1.1 Introduction

Splendid home application is getting prominent and generally utilized as a bit of a great deal of houses the world over. It has tremendous measures of focal concentrations to clients which it will make it less asking for them to control their home gadgets. Sharp home application can be name to two medium in which how it is connected and they are either wired or remotely related. The standard capability between these two sorts is that home machines are related remotely a focal controller in the event that it a remote clever home application. Then again, the mechanical congregations are connected with a focal controller if the medium utilize wired specific philosophy.

Remote framework had been comfortable all together with discard wired correspondence among home machines. Arduino based, Bluetooth based shrewd home application will be related. These days, everybody can't be withdrawn from

their PDAs. Distinctive five thousand people from USA, UK, South Korea, India, China, South Africa, Indonesia and Brazil brought an examination concerning which was finished by Time magazine. The outcome showed the lion's offer of them is unbreakable from their mobile phones, eighty four percent to the extent anybody knows guaranteed that get by without their PDAs. Another examination displays that seventy five percent of the bit of the general business is Android and an aggregate of one hundred and six million android wireless were passed on in the second 50% of 2012. Android phone changed into the best working framework in the market in the present time worldwide and it changed into the most standard working structure.

1.2 Problem Statement

Table 1.1: Problem Statement

PS	Problem Statement
1	The customary arrangement of Smart Home Application will cost a great deal of cash and that is the real reason of why it has not gotten much request and consideration, adding to that likewise the multifaceted nature of introducing it and designing it.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

1.3 Project Question

Table 1.2: Project Question

PQ	Project Question
PQ1	What is the purpose of making the mobile application?
PQ2	How the mobile applications help the user?
PQ3	How the security implement in the project?

1.4 Project Objective

Table 1.3: Project Objective

PQ	PO	Project Objectives
PQ1	PO1	To develop android application that construct a wireless Smart Home Application controlled by a smartphone.
PQ2	PO2	To control Smart Home Application by using Voice Recognition.
PQ3	PO3	To construct alert notification (sms) when someone try to enter in house.

1.5 Project Scope

In order to full fill the stated objectives several steps must be taken. These steps involve both software programming and hardware implementation.

These steps are as follows:

1. Establishing a wireless network communication between the android smartphone and Smart Home Application using a microcontroller (Arduino).
2. Create a simple reliable Smart Home Application using Arduino as a microcontroller that will be the medium between the android smartphone and the home appliances.
3. To find a suitable application that will work efficiently with the Arduino board in order to control the home appliances.
4. Program the Arduino board in a way that will let it interact with the android application in android smartphone.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

1.6 Expected Output

Basically, once this attempt is done, every single one of the necessities and fundamentals which will full fill people when in doubt request has been done satisfactorily. By laying out the Android User Interface, Smart Home Application in context of the Android telephone should be possible. It has joined android customer, make transmission, and remote improvement, home data focus to plot a total structure, and the entire framework works typically.

Perceiving voice certification summons and remote encoding are the two noteworthy assignments for home data focus. Android wireless has motivations behind eagerness, for example, human interface, adaptable and extendible applications and android telephone is unquestionably not hard to pass on so on. By always updating the control work, android mobile phone licenses us at whatever point, wherever to control any contraption, in conclusion understands the exceedingly shrewd home.

1.7 Project Contribution

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

This system will be grasped to make a Smart Home Application expecting next to zero exertion and easy to influence, this will to benefit both the maker and the client. It will help the producer by making it straightforward and more affordable to apply it and it will in like manner benefit the clients by affecting it to wise and the most basic favored stance is that it will make the house a generously more worthwhile place for the clients.

1.8 Report Organization

Chapter 1: Introduction

This part 1 will clarify about the presentation of the task and furthermore concentrating on issue explanation and the target that will be accomplished in this undertaking. The undertaking foundation, scope and other clarification about this task are additionally in this part.

Chapter 2: Literature Review

This section will be talk about the detail of this undertaking and furthermore incorporate the present issue. The related and past undertakings about Smart Home Application are additionally examined in this section.

Chapter 3: Methodology

This part will be clarifying in insight about the strategy that will be pick and utilized as a part of this venture which is the waterfall technique. The turning point likewise will be incorporated into this part.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Chapter 4: Analysis and Design

This part will be clarifying and examining about the plan of the portable application and furthermore programming and equipment that will be utilized as a part of this venture.

Chapter 5: Implementation

This part will be clarified about all the action that include in the building up the versatile application and furthermore the testing to influence the portable application to work to will be done in this section.

Chapter 6: Testing

This part will incorporate all the testing progress that has been done in this task.

Chapter 7: Project Conclusion

This section will be the last part and all the rundown and finish of the undertaking will be made in this section. The change that can be made for this venture later on additionally be clarified in this part.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

1.9 Conclusion

Concerning the conclusion for this part, the Smart Home Application will be produced to conquer the present issue. The following part will be talked about writing survey which is about the other article that identified with this task.

CHAPTER II

LITERATURE REVIEW

UNIVERSITI TEKNIKAL MALAYSIA MELAKA
UTeM
اونيۏرسيتي تيکنيکل ملسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2.1 Introduction

This chapter will discuss in details on the components and instruments used for this project in general. Besides that, there are couple more of past related project or paper work that is related to this project.

2.2 Related Work/Previous Work

Based on the Nnamdi Umelo And Adebanjo Adekiigbe. (2015) in their project "A Lightweight Wireless Home Appliances Control" state that the insurgency in Smart Home applications makes high potential measure of clients and is presently turning into a pattern in current homes. For the most part, Smart Home is a house that utilizations data innovation to screen the earth of the house, controls electrical machines and speaks with the external world with some mechanical help. It

is a common house inserted with uncommon devices for better applications and builds the expectations for everyday comforts of clients.

Savvy Home System offers the possibility of noteworthy change in our expectations for everyday comforts for all levels of clients particularly the elderly and the wheelchair-wards who are intensely dependent on home care. Shrewd Home focuses and underscores on a couple of angles, for example, wellbeing, security, adaptability and solace of clients. Then again, remote systems have turned out to be inescapable as the requirement for universal registering keeps on raising thus the pattern from "Web of PCs" to "Web of things". Also, as the requirement for homes to get more intelligent raise so is the requirement for things in homes get remote.

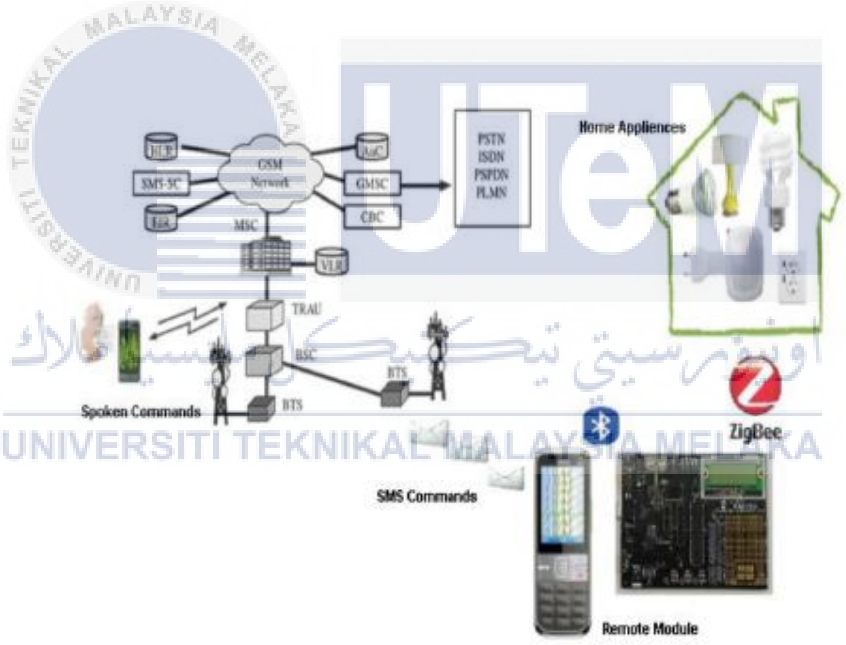

Figure 2.1: System Architecture for Zigbee-Bluetooth based home appliance control

Mr. Sanket Anil Vora And Prof..Kendre, S. (2014) in their project “Wireless Control System for Automating Home Appliances and Security Using Android Application” state that the insurgency in Smart Home applications makes high potential measure of clients and is presently turning into a pattern in current homes. For the most part, Smart Home is a house that utilizations data innovation to screen