

CONTENT

	<u>TITLE</u>	<u>PAGE NO.</u>
	LIST OF FIGURES.....	x
	LIST OF TABLES.....	xii
	LIST OF ABBREVIATION.....	xiii
CHAPTER 1	INTRODUCTION	1-5
	1.1 INTRODUCTION	1
	1.2 MOTIVATION	1
	1.3 OBJECTIVE	2
	1.4 PROBLEM DEFINITION	2
	1.5 CONTRIBUTION OF THE THESIS	4
	1.6 ORGANIZATION OF THE THESIS	5
CHAPTER 2	LITERATURE SURVEY	7
	2.1 OVERVIEW	7
	2.2 BASICS OF PC BASED DEVICE CONTROLLING	7
	2.2.1 Wired Based Communication from Source to Pc	8
	2.2.2 Wireless Based Communication from Source to Pc	9
	2.2.2.1 Infrared Based Mechanism	10
	2.2.2.2 Bluetooth Based Mechanism	10
	2.2.2.3 Zigbee Based Mechanism	11
	2.2.2.4 Web Based Mechanism	11
	2.2.2.5 GSM Based Mechanism	12
	2.2.2.6 Speech Based Mechanism	13
	2.2.2.7 IoT Based Mechanism	13
	2.3 GLOBAL SYSTEM FOR MOBILE COMMUNICATION	16
	2.3.1 GSM Module	16
	2.3.2 SMS Technology	18
	2.3.3 AT Command	20
	2.3.3.1 General Syntax Definition Used in AT Command	21
	2.3.3.2 AT Commands Protocol	21

2.3.3.3	AT Commands Structure	22
2.3.3.4	Results and Structure	23
2.3.3.5	Response and Indication Structure	23
2.3.3.6	Call Control AT Commands	24
2.3.3.7	Short Message Commands	24
2.4	WORLD WIDE WEB COMMUNICATION	26
2.4.1	WAMP Server	27
2.4.1.1	APACHE Web Server	27
2.4.1.2	PHP	28
2.4.1.3	MySql	28
2.5	SPEECH RECOGNITION TOOLS FOR COMMUNICATION	29
2.5.1	Speech Recognition and HMM	30
2.5.2	Recognizing Toolkit – HTK	31
2.5.2.1	Data Preparation Tools	31
2.5.2.2	Training Tools	32
2.5.2.3	Recognition Tools	34
2.5.2.4	Analysis Tools	35
2.5.3	Recognizing Toolkit – Sphinx	36
2.5.4	Asterik	36
2.6	IOT BASED WI-FI COMMUNICATION	37
2.6.1	IOT-Key Features	37
2.6.2	Programming Language – Lua	38
2.6.3	Embedded Web Server	39
2.6.4	ESP8266 Wi-Fi Module	40
2.7	OVERVIEW OF AT89S52 MICROCONTROLLER	42
2.7.1	Architecture of AT89s52	42
2.7.2	Instruction Set Architecture of AT89s52	46
2.7.3	MAX 232:TTL to Serial Convertor	48
2.7.4	Keil	49
2.7.5	Universal Burner	49
2.8	RELATED WORKS	50
CHAPTER 3	METHODOLOGY	57

3.1	SYSTEM FRAMEWORK	57
3.2	COMMUNICATION MECHANISM	58
3.2.1	GSM Communication	58
3.2.2	Web Communication	59
3.2.3	Speech Communication	61
3.2.4	IOT Communication	62
3.3	FUNCTIONAL DETAILS OF DIFFERENT MODULES	64
3.3.1	Server Module	64
3.3.2	Hardware Interface Module	65
CHAPTER 4	IMPLEMENTATION	67
4.1	OVERVIEW	68
4.2	HOME SERVER SET UP	68
4.3	RECEIVING COMMAND THROUGH SMS	68
4.4	RECEIVING COMMAND THROUGH WEB	71
4.5	RECEIVING COMMAND THROUGH SPEECH	72
4.5.1	Input Speech	73
4.5.2	IVR Design	76
4.5.3	ASR Design	77
4.5.4	Recognizing Toolkit – HTK	77
4.5.4.1	Data Preparation	77
4.5.4.2	Data Preparation Tools	78
4.5.4.3	Training And Testing	79
4.5.4.4	Recognition And Analysis	81
4.6	RECEIVING COMMAND THROUGH WI-FI	82
4.6.1	Observation	83
4.7	DATABASE DESIGN	83
4.7.1	E-R Diagram	84
4.7.2	Relational Schema	84
4.8	INTEGRATION OF COMMON PLATFORM	87
4.9	FIRING COMMAND TO AT89S52 FROM DATABASE	87
4.10	AT89S52 PROGRAMMING DESIGN	88
4.11	HARDWARE INTERFACE DESIGN	88
4.12	INTRODUCING THE SECURITY FEATURES	91

CHAPTER 5	RESULT AND DISCUSSION	92
5.1	AUTHENTICATION OF THE SYSTEM FOR USERS	93
5.2	INTEGRATED DATABASE AS COMMON PLATFORM	95
5.3	IVR USER	96
5.3.1	Error Analysis and Speech Recognition Analysis	96
5.4	SPEECH RECOGNITION WITH SPHINX	98
5.4.1	Sphinx Train	98
5.4.2	Sphinx Decode	98
5.4.3	Result Analysis	101
5.5	OUTCOME FOR WI-FI COMMUNICATION	105
5.5.1	Wi-Fi Enabled Circuit Stimulation	105
CHAPTER 6	FUTURE SCOPE AND CONCLUSION	108
	BIBILOGRAPHY	
APPENDIX A	LIST OF PUBLICATION	
APPENDIX B	LIST OF WORKSHOP ATTENDED	

LIST OF FIGURES

<u>Figure No.</u>	<u>Name of Figures</u>	<u>Page No</u>
2.1	Required Blocks for IOT based Home Automation	14
2.2	Voltage Regulator	15
2.3	Opto-Coupler	15
2.4	GSM/GPRS Modem	16
2.5	Communication Module GSM/GPRS Modem	17
2.6	Organization of SMS Module	19
2.7	AT Commands Protocol	21
2.8	Speech Recognition Process Module	29
2.9	Speech Recognition model using HMM	30
2.10	HTK Processing Stages	31
2.11	Pin out diagram of AT89S52	41
2.12	Block Diagram of microcontroller	44
2.14	Block Diagram of SBUF register with MAX 232	46
2.15	Pin Diagram of MAX 232	48
2.16	Communication of RS 232 with MAX 232	49
3.1	System Architecture of Entire System	57
3.2	Block diagram for GSM Communication	59
3.3	Frame work for GSM Communication	59
3.4	Block Diagram for Web Communication	60
3.5	Frame work for Web Communication	60
3.6	Block Diagram for Speech Communication	61
3.7	Frame work for Speech Communication	62
3.8	Block Diagram for Wi-Fi Communication	63
3.9	Frame work for Wi-Fi Communication	63
3.10	Components for IoT Communication	64
4.1	Screenshot of Web Interface	72
4.2	Design of Speech Implementation	73

4.3	Call Flow Diagram for IVR System	75
4.4	Flow Diagram of the Designed System	82
4.5	Entity-relationship diagram of the database	84
4.6	Screen Shot of MySql having table description	86
4.7	Circuit Diagram of Present hardware Interface	89
5.1	Screenshot of one part of present system in server side	93
5.2	User Verification Interface	93
5.3	Users Information in MySql	93
5.4	Unauthorized Users	93
5.5	Action Table in MySql database	95
5.6	Screen Shot of output result	104
5.7	Screen Shot for the IoT Communication in the server side.	106
5.8	Screen Shot for Wi-Fi Communication at user side	106
5.9	Screen Shot of Circuit Simulation in Proteus ISIS	107

LIST OF TABLES

<u>Table No.</u>	<u>Name of Tables</u>	<u>Page No.</u>
2.1	General Syntax Definition of AT Commands	21
2.2	General Syntax Definition used in AT Commands	22
2.3	Syntax Definition of ATD	22
2.4	Syntax Definition of CMGF	23
2.5	Syntax Definition of CPIN	23
4.1	Data Collection Parameter with its values	74
4.2	Device Table	85
4.3	Users Table	85
4.4	Action Table	86
4.5	Components values and Ratings	90
5.1	List of Training word, occurances in training set and %of Accuracy	97
5.2	Word Accuracies with different GMM sizes and fixed no. of tied States	97
5.3	Word Accuracies with different no. of tied states and 16 GMM v/s 32GMM	97

LIST OF ABBREVIATION

HAS	HOME AUTOMATION SYSTEM
AT	ATTENTION
GSM	GLOBAL SERVICE FOR MOBILE
IOT	INTERNET OF THINGS
IVR	INTERACTIVE VOICE RESPONSE
ASR	AUTOMATIC SPEECH RECOGNITION
MFCC	MEL FREQUENCY CEPTRAL COEFFICIENT
HMM	HIDDEN MARKOV MODEL
LAN	LOCAL AREA NETWORK
SMS	SHORT MESSAGE SERVICE
HTTP	HYPertext TRANSFER PROTOCOL
HTML	HYPertext MARKUP LANGUAGE
FTP	FILE TRANSFER PROTOCOL
GUI	GRAPHICAL USER INTERFACE
PHP	HYPertext PREPROCESSOR
IP	INTERNET PROTOCOL
USB	UNIVERSAL SERIAL BUS
LCD	LIQUID CRYSTAL DISPLAY
WER	WORD ERROR RATE
GMM	GAUSSIAN MIXTURE MODEL
DNS	DOMAIN NAME SPACE

