



Bahria University
Discovering Knowledge

FINAL YEAR PROJECT REPORT

**INTERNET OF THINGS PROVEN SECURITY
MECHANISM USING PERSON IDENTIFICATION**

In fulfillment of the requirement
For degree of Bachelors in INFORMATION TECHNOLOGY (BS-IT)

By

MUHAMMAD ZEESHAN SALEEM	41228
SAROSH AAMIR	41232
FARAZ SHAHID	41213
HAFSA MUNAWAR	41214
MUHAMMAD MAAZ	41225

SUPERVISED

BY

DR. GHULAM MUHAMMAD SHAIKH
BAHRIA UNIVERSITY (KARACHI CAMPUS)

2019

INTERNET OF THINGS (IOT) BASED SURVEILLANCE MECHANISM USING PERSON IDENTIFICATION

We would like to thank everyone who had contributed to the successful completion of this project. We would like to express our gratitude to our research supervisor, Dr. Ghulam Muhammad Sheikh for his valuable advice, guidance and his enormous patience throughout the development of the research.

In addition, We would also like to express our gratitude to our loving parent and friends who had helped and given us encouragement.

INTERNET OF THINGS PROVEN SECURITY MECHANISM USING PERSON IDENTIFICATION

DECLARATION

ABSTRACT

APPROVAL FOR SUBMISSION

ACKNOWLEDGEMENTS

The project's objective is to develop a theft detection system based on facial recognition. The system would detect faces through a camera, process the faces and decide whether the face belongs to an authorized entity or not. If the person is not authorized to enter the room/area, the system would send an SMS to the authorized person through GSM module, and the authorized person would be able to surveillance the area using an Android application in real time through internet an internet connection. Different techniques that are used for recognition of faces are explored in this report. All of the different stages that are involved in the entire image processing stage will be studied and discussed. Finally the algorithm coded in python implemented in the Raspberry Pie module.

The report discusses the methods used for the completion of the project and the flow of the system. The report goes into detail about various stages in image processing about what methodology is used for facial detection, and then recognition. The report discusses how Har Cascade Classifiers are used for facial detection and LBPH for recognition with details of their working. And how SMS are sent using AT commands in python and how all the different applications are created for surveillance. The report focuses on details on how the different modules are brought together and integrated for the completion of the project.

TABLE OF CONTENTS

	DECLARATION	ii
	APPROVAL FOR SUBMISSION	iv
	ACKNOWLEDGEMENTS	vi
	ABSTRACT	vii
	TABLE OF CONTENTS	viii
	LIST OF FIGURES	xi
	LIST OF SYMBOLS / ABBREVIATIONS	xiii
CHAPTER		
1	INTRODUCTION	1
	1.1 Background	1
	1.2 Problem Statements	2
	1.3 Aims and Objectives	2
	1.4 Scope of Project	3
2	LITERATURE REVIEW	4
	2.1 Overview	4
	2.2 Android and Raspberry Pi Smart Surveillance system:	4
	2.3 ARM-based module Motion detection system using IoT:	5
	2.4 Security Alert System using Raspberry Pi with concepts of IoT:	5
	2.5 Advanced Home Security Based on Real Time Home using Raspberry Pi:	5

2.6	Motion Detection using PIR sensor and Raspberry Pi Module:	6
2.7	Security Access and Identification system using Facial recognition:	6
2.8	IOT Based Theft Premption System based on IoT:	7
2.9	Remote Theft Identification using Raspberry Pi System Based on Motion Detection	8
3	DESIGN AND METHODOLOGY	9
3.1	Overview	9
3.2	Hardware Components	9
3.2.1	Raspberry Pi 3B+	9
3.2.2	Pi Cam Version 2.1	11
3.2.3	GSM SIM900A	11
3.2.4	Kingston Micro SD card 16GB	12
3.3	Software Components	12
3.3.1	Raspbian Stretch OS	12
3.3.2	IDE Thonny Python	12
3.3.3	Python3	13
3.3.4	OpenCV with Haar Cascade Frontal Face Classifier and LBP13	
3.3.5	Dataplicity	13
3.3.6	MJPEG Streamer	13
3.3.7	Android Studio	14
3.3.8	Xcode 10	14
3.4	Used Techniques	15
3.4.1	Image Processing	17
3.4.2	Algorithms used in Image Processing	19
3.4.3	Android Application	25
3.4.4	iOS Application	25
4	IMPLEMENTATION	26
4.1	Overview	26

4.2	Hardware Components	26
4.3	Software Components	27
4.3.1	Creating Dataset	28
4.3.2	Recognition of faces	29
4.3.3	Code	31

5 RESULTS AND DISCUSSIONS 43

5.1	Overview	43
5.2	Result Screenshots	43
5.2.1	Python Screen Shots	43
5.2.2	Web Screen Shots	46
5.2.3	iOS Screen Shots	47
5.2.4	Android Screen Shots	49
5.3	Project Deliverables	50

6 CONCLUSION AND RECOMMENDATIONS 51

6.1	Overview	51
6.2	Conclusion	51
6.3	Recommendation	51

Figure 10	Delta Calculation for Hough Features	21
Figure 11	EBPH intermediate picture	22
Figure 12	Histograms Extraction	24
Figure 13	Euclidean's Distance	25
Figure 14	Hardware Components Integration	27
Figure 15	Flow of Data Set Creation	28
Figure 16	Flow of Face Recognition	30
Figure 17	Training face_recognition.py	33
Figure 18	Taking Samples	44
Figure 19	Recognizing Multiple Faces	44