

Hadi Mazhar Baig

01-134122-028

Hassan Shafiq

01-134122-037

Sensor Based Android Application for Tracking and Controlling System

Bachelor of Science in Computer Science

Supervisor: Syed Suroor Mehdi Zaidi

Department of Computer Science
Bahria University, Islamabad

February 2017

CERTIFICATE

**Bahria University Library
Islamabad Campus**

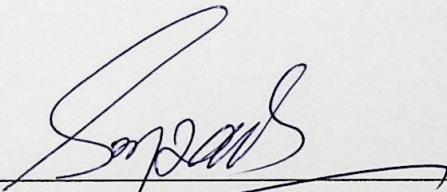
Acc No: MFN 5957

Date : _____

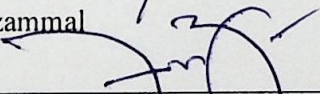
We accept the work contained in this report titled as "Sensor Based Android Application for tracking and controlling system", written by Hadi Mazhar Baig and Hassan Shafiq as a confirmation to the required standard for the partial fulfilment of the degree of Bachelor of Science in Computer Science.

Approved by ...:

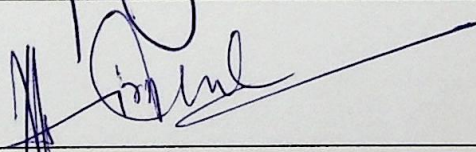
Supervisor: Syed Suroor Mehdi Zaidi

_____ 

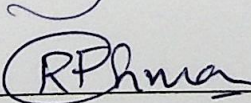
Internal Examiner: Dr. Muhammad Muzammal

_____ 

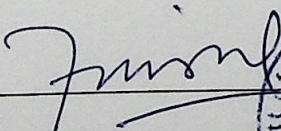
External Examiner: Dr. Nazir Ahmed Malik

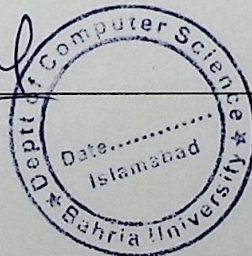
_____ 

Project Coordinator: Arif ur Rahman

_____ 

Head of the Department: Dr. Faisal Bashir

_____ 



May 26th, 2017

Abstract

Sensor based android application for tracking and controlling system is a system that connects different electronics appliances and sensors by remotely controlling, monitoring or accessing them. Sensor based android application for tracking and controlling system includes different ways to achieve multiple objectives to improve or change the daily life comforts and to enable an independent life for people. The main fields for Sensor based android application for tracking and controlling system are, home automation and remote monitoring of electronic appliances and sensors. The system design is based on the Message Queue Telemetry Transport(MQTT) protocol and Arduino. Multiple sensors such as motion sensor, sound sensor, gas sensor is Used from different purposes. Internet or Wi-Fi in case of mobile application are used to monitor, control, access the processes of the devices. The system is a combination of both hardware and software technologies. The results of the system show that it can be classified as a comfortable, secure, private system which is, economic and safe with great flexibility and reliability to the users.

Acknowledgements

First and foremost, we are most thankful to the Lord who gave us the strength and will to learn and develop our skills beyond what was needed for this project. He has blessed us with extremely supportive friends and family without whom we wouldn't have been able to get this far in.

We are also very grateful to our respected supervisor, Mr Syed Suroor Mehdi Zaidi for his constant mentorship and timely guidance that allowed us to extract our potential and apply it where and when it was most needed.

Contents

Abstract	ii
1. Introduction	
1.1 Overview.....	1
1.2 Problem Description.....	1
1.3 Objective.....	1
1.4 Project Scope.....	2
1.5 Methodology.....	2
2. Literature Review	3
2.1 Synopsis.....	3
2.2 Technological Review.....	3
2.2.1 Android.....	3
2.2.2 Microsoft Visual Studio.....	3
2.2.3 Web Application.....	4
2.2.4 Arduino.....	4
2.2.5 Internet of Things(IoT).....	4
2.2.6 Message Queue Telemetry Transport(Mqtt).....	4
2.3 Existing Applications.....	5
2.3.1 GSM based home Automation System.....	5
2.3.2 Bluetooth based home automation.....	5
3. Requirements Specifications	6
3.1 Proposed System.....	6
3.2 Requirement Specifications.....	6
3.2.1 Functional Requirements.....	7
3.2.2 Non-Functional Requirements.....	7
3.3 Activity Diagram 1.....	8
3.4 Activity Diagram 2.....	9
3.5 Use Cases.....	10
3.5.1 Android Application User Use Case Diagram.....	10
3.5.2 Web Application User Use Case Diagram.....	11
3.5.3 Changing State Use Case Diagram.....	12
4. System Design	13
4.1 General System Design.....	13
4.2 Design Methodology.....	14
4.3 High Level Design.....	15
4.3.1 Logical/Conceptual View.....	15
4.3.2 Process View.....	16
4.3.3 Android Application Sequence Diagram.....	17
4.3.4 Web Application Sequence Diagram.....	17
5. System Implementation	18
5.1 System Architecture.....	18
5.2 System Internal Components.....	18
5.2.1 Sign Up.....	18
5.2.2 Sign In.....	19
5.2.3 Controlling the devices.....	19
5.3 Tools and Technology.....	19
5.3.1 Android Studio.....	19
5.3.2 Dreamweaver.....	19

5.3.3	PHP.....	19
5.3.4	MYSQL.....	19
5.3.5	Cloudmqtt.....	19
5.4	Development Environment/Language Used.....	19
5.5	Methodology.....	19
6.	System Testing and Evaluation.....	21
6.1	Types of testing.....	21
6.1.1	Graphical user interface testing.....	21
6.1.2	Usability Testing.....	25
6.1.3	Software Performance Testing.....	25
6.1.4	Compatibility Testing.....	26
6.1.5	Load Testing.....	26
6.1.6	Security testing.....	27
7.	Conclusion.....	28
A.	User Manual.....	29
A.1	Login Page.....	29
A.2	Sign Up Page.....	30
A.3	Main Page.....	30
A.4	Device Control Page 1.....	31
A.5	Device Control Page 2.....	31
B.1	Sign up and Login Page.....	32
B.2	Website Dashboard.....	33
B.3	Sensor Alert History.....	34
References		35

List of Figures

Figure 1: Activity Diagram.....	8
Figure 2: Activity Diagram to change the states(on/off).....	9
Figure 3: Android Application User Use Case Diagram.....	10
Figure 4: Web Application User Use Case Diagram.....	11
Figure 5: Changing State Use Case Diagram.....	12
Figure 6: General System Design.....	13
Figure 7: Bottom-Up Design Methodology.....	14
Figure 8: Package Diagram.....	15
Figure 9: Android Application Login Sequence Diagram.....	16
Figure 10: Web Application Login Sequence Diagram.....	17
Figure A.1: Login Page.....	29
Figure A.2: Sign Up Page.....	30
Figure A.3: Main Page.....	30
Figure A.4: Device control Page 1.....	31
Figure A.5: Device control Page 2.....	31
Figure B.1: Website Sign up and Login page.....	32
Figure B.2: Website Dashboard.....	33
Figure B.2: Sensors Alert History.....	34

List of Tables

Table 3.1: Defining Android Application user use case for viewing states.....	10
Table 3.2: Defining Web Application user use case for registering and viewing states.....	11
Table 3.3: Changing states use case for changing the states (on/off).....	12
Table 6.1: Test case for GUI of website.....	21
Table 6.2: Test case for GUI of Android Application.....	22
Table 6.3: Test case for Sign up to website.....	22
Table 6.4: Test case for Log in website.....	23
Table 6.5: Test case for Sign in to Android Application.....	23
Table 6.6: Test case for Log in to Android Application.....	24
Table 6.7: Usability Test Case.....	25
Table 6.8: Software Performance Test Case.....	25
Table 6.9: Compatibility Test Case.....	26
Table 6.10: Load Test Case 1.....	27
Table 6.11: Load Test Case 2.....	27
Table 6.12: Security Test Case.....	27