**M.S.Ramaiah Institute of Technology**

(Autonomous Institute, Affiliated to VTU)

MSR Nagar, MSRIT post, Bangalore-54

A Dissertation Report on

**Smart Health Care Monitoring System Using**

**Raspberry Pi**

Submitted by

**Himanshu Kumar 1MS12CS039**

**Suhail T N 1MS12CS115**

**Manoj More S 1MS13CS412**

**Suresh V 1MS13CS421**

*in partial fulfillment for the award of the degree of*

# *Bachelor of Engineering in Computer Science & Engineering*

Under the guidance of

**Prof. S. Rajarajeswari**

Assistant Professor

Dept of Computer Science & Engg.

M.S.Ramaiah Institute of Technology.



**2015-2016**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**M.S.RAMAIAH INSTITUTE OF TECHNOLOGY**

**(Autonomous Institute, Affiliated to VTU)**

**BANGALORE-560054**

[www.msrit.edu](http://www.msrit.edu)

**M.S.Ramaiah Institute of Technology**

(Autonomous Institute, Affiliated to VTU)

BANGALORE-560054

**Department of Computer Science & Engineering**



**CERTIFICATE**

This is to certify that the project work titled **Smart Health Care Monitoring System Using Raspberry Pi** is a bonafide work carried out by **1MS12CS039 Himanshu Kumar, 1MS12CS115 Suhail T N, 1MS13CS412 Manoj More S**, **1MS13CS421 Suresh V,** in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** during the year 2016. The Project report has been approved as it satisfies the academic requirements with respect to the project work prescribed for Bachelor of Engineering Degree. To the best of our understanding the work submitted in this report has not been submitted, in part or full, for the award of said degree.

**Signature of the Guide Signature of the HOD**

Prof.S. Rajarajeswari Dr. K. G Srinivasa

**External Examiners**

Name of the Examiners: Signature

1.

2.

**DECLARATION**

We Student of final semester BE, Dept of Computer Science and Engineering, M.S. Ramaiah Institute of Technology, Bangalore, hereby declare that the project entitled “**Smart Health Care Monitoring System Using Raspberry Pi”,** thesis completed and written by me under the guidance of **Prof. S. Rajarajeswari,** Department of Computer Science & Engineering, MSRIT, Bangalore for the partial fulfillment of the requirements for the award of the degree of Bachelor of Engineering has not been formed the basis for award of any other degree or diploma certificate.

Place:

Date:

1MS12CS039 Himanshu Kumar

1MS12CS115 Suhail T N

1MS13CS412 Manoj more S

1MS13CS421 Suresh V

**ACKNOWLEDGEMENT**

We take this opportunity of thanking **Dr**. **N. V. R. Naidu, Principal, MSRIT** for creating such a pleasant environment and appreciating our talents in both academic and extracurricular activities.

We are thankful to **Dr. K. G. Srinivasa, Head of Department , Computer Science and Engineering. MSRIT** for his valuable morale support and guidance.

Our utmost gratitude to **Prof. S. Rajarajeswari, Assistant Professor, Department of Computer Science and Engineering, MSRIT** whose sincerity and encouragement we will never forget. She has been our inspiration as we overcame all the obstacles in the completion of this project work.

This work would not have been possible without the guidance and help of several individuals who in one way or another contributed their valuable assistance in preparation and completion of this study.

We would like to express sincere thanks to all the teaching and non-teaching faculty of CSE Department, MSRIT and my dear friends who helped in all the ways while preparing the Report.

We thankful our parents who provided us the much-needed morale support while pursuing this project

**ABSTRACT**

Monitoring healthcare in current generation is to be given an utmost importance. Diseases are the brutal hurdles to human beneficiary. One amongst them is the Alzheimer’s and Quadriplegia. In order to minimize the difficulties of people who are suffering from Alzheimer or Quadriplegia, this project allows the data of a patient’s vital body parameters and movements to be collected by wearable or implantable sensors and communicated using wireless communication techniques. Monitoring the health of affected individuals are achieved by an android mobile application which shows the varying heart beat and temperature. The process involves generation of data from appropriate Sensors that are embedded on the Raspberry pi board. The data generated are sent to the server that is created using Elastic compute Generation II Amazon Web Service and this stored data is sent to the Android Application. If the data read from the prototype is beyond the threshold value then the patient’s relatives and the physician will be notified about the same along with his current location. This system for automated health alerts provides a method for detecting health problems very early so that early treatment is possible.

**CONTENTS**

1 **INTRODUCTION…………………………………………………………**

* 1. General Introduction………………………………………………..
  2. Statement of the Problem…………………………………………...
  3. Objectives of the project……………………………………………
  4. Project deliverables…………………………………………………
  5. Current Scope……………………………………………………….
  6. Future Scope……………………………………………………......

1. **PROJECT ORGANIZATION……………………………………………**
   1. Software Process Models…………………………………………...
   2. Roles and Responsibilities………………………………………….
2. **LITERATURE SURVEY…………………………………………………**

3.1 Introduction………………………………………….......................

3.2 Related Works………………………………………………………

3.3 Conclusion………………………………………………………….

1. **PROJECT MANAGEMENT PLAN…………………………………….**
   1. Schedule of the Project……………………………………………..
   2. Risk Identification………………………………………………….
2. **SOFTWARE REQUIREMENT SPECIFICATIONS………….……….**

5.1 Product Overview……………………………………………….….

5.2 External Interface Requirements..……………………….………….

5.2.1 User Interfaces..…………………………………………….

5.2.2 Hardware Interfaces..……………………………………….

5.2.3 Software Interfaces………………………………….………

5.2.4 Communication Interfaces………………………………….

5.3 Functional Requirement…………………………………….………

5.3.1 Functional Requirement 1.1………………………….……..

5.3.2 Functional Requirement 1.2………………………………...

5.3.3 Functional Requirement 1.3………………………………...

5.3.4 Functional Requirement 1.4………………………….……..

5.3.5 Functional Requirement 1.5………………………………...

5.3.6 Functional Requirement 1.6………………………………...

5.3.7 Functional Requirement 1.7………………………………...

5.4 Software System Attributes…………………………………..……..

5.4.1 Reliability……………………………………………….…..

5.4.2 Availability……………………………………………….…

5.4.3 Security……………………………………………………...

5.4.4 Portability…………………………………………………...

5.4.5 Maintainability……………………………………………...

5.4.6 Performance…………………………………………….…..

5.5 Performance Requirements………………………………………....

5.6 Database Requirements…………………………………………......

5.7 Design Constraints………………………………………………….

5.8 Other Requirements………………………………………………...

**1**

1

1

1

2

2

3

**4**

4

5

**6**

6

6

8

**9**

9

11

**12**

12

12

12

12

13

13

13

13

13

13

13

14

14

14

14

14

14

14

15

15

15

15

16

16

16

1. **DESIGN……………………………………………………………………**
   1. Introduction…………………………………………………………
   2. Architecture Design…………………………………………………
   3. Graphical User Interface……………………………………………
   4. Class Diagram………………………………………………………
   5. Sequence Diagram………………………………………………….
   6. Data flow diagram………………………………….………………
   7. Conclusion…………………………………………………………...
2. **IMPLEMENTATION……………………………………………………..**
   1. Tools Introduction & Technology Introduction ……………………
   2. Overall view of the project in terms of implementation……………
   3. Explanation of Algorithm and how it is being implemented…….....
   4. Information about the implementation of Modules…………………
   5. Conclusion…………………………………………………………..
3. **TESTING…………………………………………………………………..**
   1. Introduction…………………………………………………………
   2. Testing Tools and Environment…………………………………….
   3. Test cases……………………………………………………………
   4. Defect Distribution in module wise………………………………....
   5. Number of defects identified and their status and severity…………
   6. Types of testing performed………………………………………….
   7. Conclusion…………………………………………………………..
4. **CONCLUSION & SCOPE FOR FUTURE WORK…………………….**
5. **REFERENCES…………………………………………………………….**
6. **APPENDIX………………………………………………………………..**
   1. Screen snapshots ………………………………………………..….

**17**

17

17

21

23

24

25

27

**28**

28

33

35

35

38

**39**

39

40

41

52

52

52

53

**54**

**55**

**56**

56

**LIST OF FIGURES**

|  |  |  |
| --- | --- | --- |
| **Figure No.** | **Description** | **Page No.** |
| 1.1 | Project Architecture | 3 |
| 2.1 | Overall process in XP | 4 |
| 2.2 | An iteration in XP | 4 |
| 3.1 | System Architecture | 7 |
| 3.2 | Proposed System | 8 |
| 4.1(a) | Gantt chart | 10 |
| 4.1(b) | Continuation of Gantt chart | 10 |
| 6.1 | Raspberry pi System Architecture | 21 |
| 6.2 | Project Architecture | 22 |
| 6.3 | Flow diagram | 22 |
| 6.4 | Class Diagram | 24 |
| 6.5 | Sequence Diagram for the Overall System | 25 |
| 6.6 | Sequence Diagram for Emergency Event | 26 |
| 6.7 | Sequence Diagram for Android Application | 26 |
| 6.8 | Data Flow Diagram | 27 |
| 7.1 | Angry IP scanners | 28 |
| 7.2 | Putty setup | 29 |
| 7.3 | Putty Terminals. | 29 |
| 7.4 | VNC configurations. | 30 |
| **Figure No.** | **Description** | **Page No.** |
| 7.5 | VNC Authentications | 30 |
| 7.6 | VNC viewer Virtual window. | 31 |
| 7.7 | Flash magic terminal settings. | 31 |
| 7.8 | Flash magic terminal. | 32 |
| 7.9 | Amazon EC2 | 32 |
| 7.10 | Cloud desktop | 33 |
| 7.11 | Complete hardware Implementation | 34 |
| 7.12 | TCRT1000 working | 36 |
| 7.13 | TCRT1000 pin circuit | 36 |
| 7.14 | Accelerometer | 37 |
| 7.15 | RFID CIRCUIT MODULE | 37 |
| 7.16 | Temperature sensor LM35 | 38 |
| 8.1 | Testing GSM setup Using Flash Magic | 41 |
| 8.2 | Testing GSM Using Flash Magic | 43 |
| 8.3 | Testing using AVD | 45 |
| 8.4 | Junit Testing | 45 |
| 8.5 | Junit Testing (Success) | 46 |
| 8.6 | Junit Testing (Fail) | 46 |
| 8.7 | Different Phone Models (AVD) | 51 |
| 8.8 | Different OS versions (AVD) | 51 |

**LIST OF TABLES**

|  |  |  |
| --- | --- | --- |
| **Table Number** | **Description** | **Page Number** |
| 4.1 | Project Schedule | 9 |
| 4.2 | Risk Identification and Mitigation | 11 |
| 8.1 | Unit Test Case 1 | 41 |
| 8.2 | Unit Test Case 2 | 43 |
| 8.3 | Unit Test Case 3 | 44 |
| 8.4 | Unit Test Case 4 | 44 |
| 8.5 | Unit Test Case 5 | 47 |
| 8.6 | Unit Test Case 6 | 47 |
| 8.7 | Unit Test Case 7 | 48 |
| 8.8 | Unit Test Case 8 | 48 |
| 8.9 | Unit Test Case 9 | 49 |
| 8.10 | Unit Test Case 10 | 49 |
| 8.11 | Integration Test Case 1 | 50 |
| 8.12 | Integration Test Case 2 | 50 |
| 8.13 | Major Challenges | 52 |

**LIST OF APPENDIX FIGURES**

|  |  |
| --- | --- |
| **Figure Number** | **Description** |