

**Enhanced Long Range Location Tracking and Fall Detection System**

**MAJOR PROJECT REPORT**

**MCA491P**

*submitted by*

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| **Rajesha C U** | **1RV23MC080** |

*under the guidance of*

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| **Dr. Deepika K**  Associate Professor  Department of MCA  **RV College of Engineering** |
|  |

*in partial fulfilment for the award of degree of*

**Master of Computer Applications**

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**Department of Master of Computer Applications**

**2024-2025**



**DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS**

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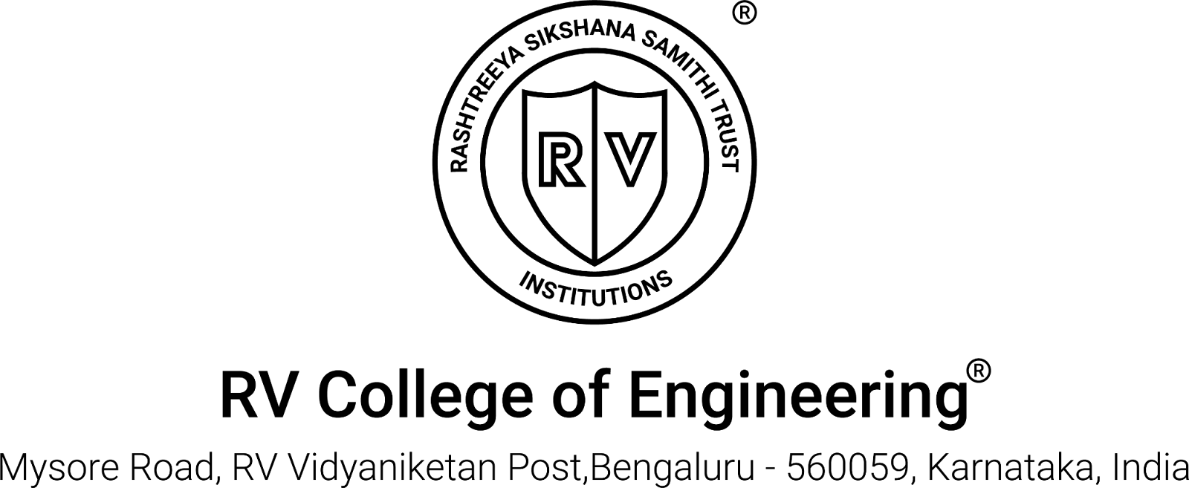
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| **Dr. Deepika K**  Associate Professor  Department of MCA  **RV College of Engineering** |

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*in partial fulfilment for the award of degree of*

**MASTER OF COMPUTER APPLICATIONS**

**2024-2025**



**CERTIFICATE**

Certified that the Major Project titled ‘**Enhanced Long Range Location Tracking and Fall Detection System’** is carried out by **Rajesha C U (1RV23MC080)** a bonafide student of RV College of Engineering®, Bengaluru, in partial fulfillment for the award of Degree of **Master of Computer Applications** of  **Visvesvaraya Technological University, Belagavi** during the year **2024-2025**. It is certified that all corrections/suggestions indicated for the internal assessment have been incorporated in the report deposited in the department library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed by the institution for the said Degree.

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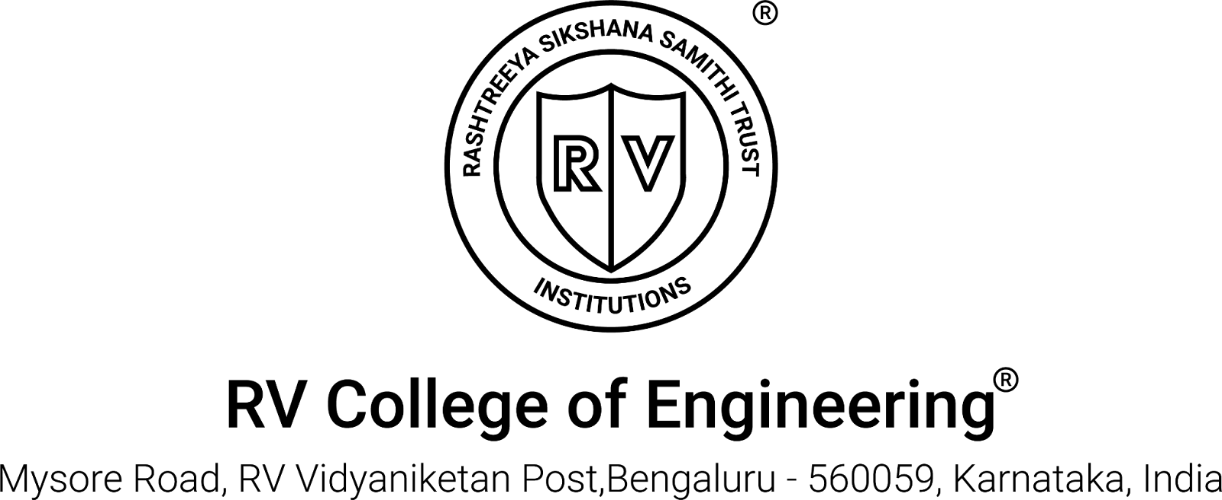
**External Viva Examination**

**Name of Examiners Signature with Date**

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i



**DECLARATION**

I **Rajesha C U**, the student of Fourth semester  Department of MCA, RV College of Engineering®, Bengaluru-560059, bearing USN: **1RV23MC080** hereby declare that the project titled **Enhanced Long Range Location Tracking and Fall Detection System** has been  carried  out  by  me. It   has   been   submitted in partial   fulfilment   of   the   program requirements for the award of Degree    in   **Master   of    Computer   Applications**    of   **Visvesvaraya Technological University, Belagavi** during the year **2024-2025**.

Further, I declare that the content of the dissertation has not been submitted previously by anybody for the award of any Degree or Diploma to any other University.

**I also declare that any Intellectual property rights generated out of this project carried out at RVCE will be the property of RV College of Engineering®, Bengaluru and I will be among the authors of the same.**

Place: Bangalore

Date of Submission:

**Signature of the Student**

Student Name:Rajesha C U

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ii

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iii

**ABSTRACT**

The **Enhanced Long-Range Location Tracking and Fall Detection System** is designed to provide reliable tracking and safety monitoring for trekkers, hikers, and individuals in remote areas lacking conventional communication infrastructure such as GPS, cellular, or Wi-Fi networks. The system leverages LoRa (Long Range) communication technology in a star topology, enabling low-power, long-distance data transmission between multiple wearable nodes and a central gateway. Each wearable node integrates an ESP32 microcontroller, GPS module, BMP180 environmental sensor, fall detection mechanism, and an emergency alert button. These devices periodically capture location, temperature, pressure, and alert signals, transmitting them to the central node for real-time monitoring.

At the central gateway, received telemetry data is processed, validated, and stored on an SD card for logging and analysis. A local Wi-Fi Access Point, hosted on the central node, serves a modern web-based dashboard that displays live positional updates on an offline Leaflet.js map, along with sensor readings and emergency alerts. The dashboard is accessible to all connected users without internet dependency, ensuring continuous situational awareness in challenging environments. Fall detection alerts and emergency button triggers are prioritized for immediate visual indication, improving the safety response time in critical situations.

This system demonstrates a robust, low-power, and offline-capable solution for safety-critical tracking applications in remote terrains. By combining LoRa’s long-range communication capabilities with real-time web visualization, it overcomes the limitations of traditional tracking systems that rely on cellular or satellite networks. Potential applications extend beyond trekking to include disaster relief operations, remote workforce safety, and wildlife monitoring. Future enhancements could include multi-hop LoRa mesh networking, AI-based fall detection, and integration with solar-powered modules for extended operational autonomy.

iv

**Table of Contents**

|  |  |
| --- | --- |
|  |  |
| **CONTENTS**  College Certificate  Declaration by student  Acknowledgement  Abstract  Table of Contents  List of Tables  List of Figures  **Chapter 1: Introduction** | **Page No**  **i**  **ii**  **iii**  **iv**  **v**  **vii**  **viii**  **01** |
| 1.1 Project Description  1.2 Dissertation Organization | 01  02 |
| **Chapter 2: Literature Review** | **05** |
| 2.1 Literature Survey  2.2 Existing and Proposed System  2.3 Tools and Technologies used  2.4 Hardware and Software Requirements | 05  09  10  11 |
| **Chapter 3: Software Requirement Specifications** | **13** |
| 3.1 Introduction  3.2 General Description  3.3 Functional Requirement  3.4 Non-Functional Requirements  3.5 Design Constraints | 13  15  17  20  21 |
| **Chapter 4: System Design** | **23** |
| 4.1 Architectural Design  4.2 Context Diagram | 23  26 |
| **Chapter 5: Detailed Design** | v  **27** |
| 5.1 System Design  Class Diagram  Use case Diagram  Activity Diagram  Sequence Diagram  Data Flow Diagrams  Any Assumptions made  5.2 Detailed Design | 27  28  39  30  31  32  35  35 |
| **Chapter 6 Implementation** | **37** |
| 6.1 Code Snippets  6.2 Implementation | 37  39 |
| **Chapter 7: Software Testing** | **41** |
| 7.1 Test cases  7.2 Testing and Validations | 41  44 |
| **Chapter 8: Conclusion** | **47** |
| **Chapter 9: Future Enhancements** | **48** |
| **Bibliography** | **49**  vi |

**List of Tables**

|  |  |  |
| --- | --- | --- |
| **Table No** | **Table Name** | **Page no** |
| **2.2** | Hardware Specifications Table | 11 |
| **2.3** | Software Specifications Table | 12 |
| **3.1** | **Functional Requirements** | 19 |
| **4.1** | Sensor Data Type and Description | 24 |
| **7.1** | **Test Cases – Data Transmission and Logging** | 44 |
| **7.2** | **Test Cases – Dashboard and Map Visualization** | 45 |

vii

**List of Figures**

|  |  |  |
| --- | --- | --- |
| **Figure No** | **Figure Name** | Page No |
| **2.1** | Mind Map Representation of Key Research Trends and Findings in Enhanced Long Range Location Tracking and Fall Detection System | 08 |
| **4.1** | Block Diagram of Long Range Based Location Tracking and Fall Detection System | 23 |
| **4.2** | Context diagram of Enhanced Long-Range Location Tracking and Fall Detection System | 26 |
| **5.1** | Class Diagram of Enhanced Long-Range Location Tracking and Fall Detection System | 28 |
| **5.2** | Use Case diagramof Enhanced Long-Range Location Tracking and Fall Detection System | 29 |
| **5.3** | Activity Diagram of Enhanced Long-Range Location Tracking and Fall Detection System | 30 |
| **5.4** | Sequence Diagram of Enhanced Long-Range Location Tracking and Fall Detection System | 31 |
| **5.5** | **Data Flow Diagram of Enhanced Long-Range Location Tracking and Fall Detection System Level-0** | 32 |
| **5.6** | **Data Flow Diagram of Enhanced Long-Range Location Tracking and Fall Detection System Level-1** | 33 |
| **5.7** | **Data Flow Diagram of Enhanced Long-Range Location Tracking and Fall Detection System Level-2** | 34 |
| **6.1** | **Sender Node code Snippet of Enhanced Long-Range Location Tracking and Fall Detection System** | 37 |

viii

|  |  |  |
| --- | --- | --- |
| **Figure No** | **Figure Name** | **Page No** |
| **6.2** | **Receiver Node code Snippet of Enhanced Long-Range Location Tracking and Fall Detection System** | 38 |
| **6.3** | **Implementation received code of Enhanced Long-Range Location Tracking and Fall Detection System** | 40 |
| **7.1** | **Offline Map of Enhanced Long-Range Location Tracking and Fall Detection System** | 45 |
| **7.2** | **Nodes data of Enhanced Long-Range Location Tracking and Fall Detection System** | 46 |

ix