INFORMATICS INSTITUTE OF TECHNOLOGY

In Collaboration with

ROBERT GORDON UNIVERSITY ABERDEEN

**Multimodal Fall Detection System**

**For Elderly Persons**

Group 20 Project Proposal Document by:

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# METHODOLOGY

## 3.1 Chapter Overview

In terms of what is covered in the chapter overview, the following is what is considered. The manners in which the project is to carry out research into its necessary domains, the way project is to be managed and the development of the project over time will be explained here. Projections for why certain amends need to be made to the project and other similar adjustments are explained in this chapter

## 3.2 Research Methodology

|  |  |
| --- | --- |
| Research Philosophy | The author of the research has selected positivism as the research philosophy. Positivism is a research philosophy that focusses on using observable and quantifiable facts in developing knowledge. This method emphasizes testing the theories and hypotheses through data collection and analysis and then reaching object conclusions. This lines with the principles of science. In this study, the detection and prediction of falls relies on real-time sensor data. The prioritization on quantifiable data, and the results being based on measurable evidence rather than subjective interpretation make this approach adequately felicitous for this study. |
| Research Approach | We will adopt a deductive approach, starting with a hypothesis that factors such as posture, blood pressure, motion speeds, and angular velocities can predict falls. This hypothesis will be tested through data collection and analysis from sensors and monitoring devices. The approach is suitable as it allows for testing pre-established correlations between variables and drawing conclusions based on measurable evidence. |
| Research Strategy | We intend on using interviews (qualitative data gathering), questionnaires and forms (quantitative data gathering) for our research. |
| Research Choice | Multi Method – In order to consider both the qualitative and quantitative components of the study we intend on regarding the multi-method approach as it takes into consideration the factors that require an in-depth analysis (such as ethical constraints) |
| Time Zone | A cross-sectional time frame will be used for this research, as it is intended to occur at a single point in time. |

Table : Research Methodology Table

## 3.3 Development Methodology

In terms of the type of methodology our group will use, a “**scrum**” would be the most optimal as it utilizes an iterative and incremental agile framework (type of framework where the project is faced with iterative procedures where it goes through multiple assessments and revisions to maximize its accuracy, etc) for managing the projects development. A benefit of using Scrum as our development methodology is that it breaks the project down into smaller tasks called “**sprints**” where the workload is mitigated into small and feasible tasks that minimize time consumption and maximize productivity. Furthermore, scrum refers to the use of an **“Object Oriented Analysis and Design”** (OOAD). This is since Scrum has a modular approach to task management as it breaks down the project into smaller and more manageable tasks while maintaining incremental and iterative development processes. For the project developments life cycle our group may use a spiral model since it is appropriate given its conditions. The given PDLC is an iterative life cycle model where the project is developed in small incremental iterations where its iterations are like a sprint from a scrum methodology. Besides that, using a spiral management system would enable out group to detect and mitigate issues before they could occur such that the risk of a total failure is avoided. To conclude, the idea is scalable and compatible with an Object-Oriented Analysis and Design approach.

## 3.4 Project Management Methodology

### 3.4.2. Deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase** | **Deliverable** | **Week** | **Due Date** |
| **Topic Selection** | Finalized Project Topic | Week 3 | 10-Oct-2024 |
| **Literature Review** | Literature Review Report | Week 4 | 13-Oct-2024 |
| **Project Proposal** | Project Proposal Document | Week 6 | 27-Oct-2024 |
| **Software Review** | Software Requirement Specification (SRS) | Week 9 | 24-Nov-2024 |
| **System Design** | System Design Document (DSD) | Week 11 | 15-Dec-2024 |
| **Prototype Implementation** | Functional Prototype | Week 16 | 02-Feb-2025 |
| **Testing & Evaluation** | Testing (Identifying Test Cases) | Week 19 | 05-Feb-2025 |
| **Integration** | Integration Process | Week 19 | 10-Feb-2025 |
| **CI/CD Development** | Develop CI/CD Pipelines & Integrate Components | Week 21 | 24-Feb-2025 |
| **Final Testing** | Final Testing Phase of the Applications | Week 23 | 09-Mar-2025 |
| **Evaluation** | Evaluation Phase | Week 24 | 16-Mar-2025 |
| **Post-Project Analysis** | Post-Mortem and Research Paper | Week 25 | 23-Mar-2025 |
| **Documentation** | Final Thesis & Project Documentation | Week 27 | 06-Apr-2025 |

Table : Deliverables table

### 3.4.2. Schedule based on Gantt chart

A screenshot of a project

AI-generated content may be incorrect.

Figure : Gantt Chart for project schedule

## 3.5 Chapter Overview

To conclude the content of this chapter, the research methodologies were covered and explained. The way each research was conducted was explained, as well as the weekly goals such that each deliverable was mentioned in the order it was to be released. Furthermore, the development methodology used to carry out the groups research was mentioned as well to point out and justify why the groups research was to be carried out that way.