Software Requirements Specification

for

Prediction of Heart Attack Using Machine Learning Algorithms and Deep Learning

Version 1.0

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Contents

Revisions

Version	*Primary Author(s)*	*Description of Version*	*Date Completed*
1.0	*Shreyas R*	*Creation of the system.*	*06/10/2023*

1. Introduction

1.1. Document Purpose

- *The purpose of this document is to capture functional requirements of the project from the customer.*
- *This document will be used by the test teams for the purpose of writing test plans, test cases, test script and test script automation.*
- *This document will be used by the project manager to make a project plan, project schedule and project costing.*

1.2. Product Scope

The project scope involved developing a system for prediction of heart attack using multiple implementations such as Deep Learning and Machine Learning Algorithms: Decision Tree, Random Forest, SVM, Logistic Regression, KNN, and Naïve Bayes.

The project also involves experimentation with various parameters (e.g., training and test data sizes, epochs, activation functions) to achieve maximum accuracy for both machine learning and deep learning models.

1.3. Intended Audience and Document Overview

- *Customer or Product Manager*
- *Project Manager*
- *Development Team*
- *DevOps Team*
- *System Testing Team*

1.4. Definitions, Acronyms and Abbreviations

Definitions

1. *Machine Learning (ML) : A field of artificial intelligence where computer systems are trained to learn and improve performance on a specific task without being explicitly programmed.*
2. *Deep Learning (DL): A subset of machine learning based on artificial neural networks with multiple layers, allowing the system to learn complex patterns and representations.*
3. *Data Preprocessing : The process of cleaning, transforming, and organizing raw data into a format suitable for analysis and modeling.*
4. *Feature Extraction : The process of selecting and transforming relevant features from the raw data to be used in model training.*
5. *Prediction Model : A mathematical or computational model developed through machine learning or deep learning to predict outcomes based on input parameters.*
6. *User Interface (UI) : The graphical or textual interface through which users interact with the heart attack prediction system.*

Abbreviations

1. *SRS - System Requirements Specification*
2. *UI - User Interface*
3. *ML - Machine Learning*
4. *DL - Deep Learning*
5. *QA - Quality Assurance*
6. *CSV - Comma-Separated Values (file format)*

1.5. *Document Conventions*

NA

1.6. *References and Acknowledgments*

NA

2. Overall Description

2.1. Product Overview

This project is called Prediction of Heart Attack Using Machine Learning Algorithms and Deep Learning. It is used to create a robust and accurate prediction system for identifying the likelihood of a heart attack in individuals.

This system makes use of both machine learning algorithms as well as deep learning techniques to provide early detection and intervention opportunities.

2.2. Product Functionality

1. *Data Preprocessing and Cleaning*
2. *Machine Learning Algorithm Implementation*
3. *Deep Learning Classification*
4. *Model Tuning and Optimization in each implementation*

2.3. Design and Implementation Constraints

NA

2.4. Assumptions and Dependencies

1. *Data Availability - The project is dependent on the availability and accessibility of the Heart Attack Dataset, which is essential for training and testing the machine learning and deep learning models.*
2. *Data Reliability - Assuming that the Heart Attack Dataset used for training and testing the models is reliable, accurate, and represents a diverse range of cases.*

3.   Specific Requirements

3.1. *External Interface Requirements*

3.1.1. *User Interfaces*

1. *Data Entry : The UI should provide a section for users to input the relevant data features required for heart attack prediction.*
2. *Data Validation : Validate user inputs to ensure they meet the required format and constraints.*
3. *Feature Explanation : Display brief explanations or tooltips for each feature, assisting users in providing accurate data.*

3.1.2. *Hardware Interfaces*

NA

3.1.3. *Software Interfaces*

1. *Web browser interacts with Internet over TCP/IP protocol*
2. *Web server interacts with database using node.js and database driver*

3.2. *Functional Requirements*

The system shall generate predictions for heart attack likelihood based on the selected algorithm and user-provided data.

4.   Other Non-functional Requirements

4.1. *Performance Requirements*

1. *Response Time*
2. *Accurate Predictions*
3. *Scalability with Data size*

4.2. Safety and Security Requirements

User ID and Password

4.3. Software Quality Attributes

NA

5. Other Requirements

NA

Appendix A – Data Dictionary

NA

Appendix B - Group Log

NA