Software Requirements Specification

for

Prediction of Heart Attack Using Machine Learning Algorithms and Deep Learning

Version <1.0>

Prepared by

Group Name: BTech Section A

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Contents

Contents ii

Revisions ii

1 Introduction 1

1.1 Document Purpose 1

1.2 Product Scope 1

1.3 Intended Audience and Document Overview 1

1.4 Definitions, Acronyms and Abbreviations 1

1.5 Document Conventions 1

1.6 References and Acknowledgments 2

2 Overall Description 2

2.1 Product Overview 2

2.2 Product Functionality 3

2.3 Design and Implementation Constraints 3

2.4 Assumptions and Dependencies 3

3 Specific Requirements 4

3.1 External Interface Requirements 4

3.2 Functional Requirements 4

3.3 Use Case Model 5

4 Other Non-functional Requirements 6

4.1 Performance Requirements 6

4.2 Safety and Security Requirements 6

4.3 Software Quality Attributes 6

5 Other Requirements 7

Appendix A – Data Dictionary 8

Appendix B - Group Log 9

Revisions

| Version | Primary Author(s) | Description of Version | Date Completed |
| --- | --- | --- | --- |
| Draft Type and Number | Full Name | Information about the revision. This table does not need to be filled in whenever a document is touched, only when the version is being upgraded. | 00/00/00 |

# 

# Introduction

*<TO DO: Please provide a brief introduction to your project and a brief overview of what the reader will find in this section.>*

## Document Purpose

* The purpose of this document is to capture functional requirements of the project from the customer.
* This document will be used by system test team for the purpose of writing test cases, test scripts, test plan, and test script automation.
* This document will be used by the project manager for making project plan, project schedule and project cast.

## Product Scope

The project scope involves developing a machine learning model to better predict the occurrence of a heart attack. The project involves Machine learning, Deep learning, and databases.

## Intended Audience and Document Overview

Customer, system tester, project manager, development group and DevOps group

## Definitions, Acronyms and Abbreviations

* DL- Deep Learning
* ML- Machine Learning
* SRS- software requirements specification

## Document Conventions

In general, this document follows the IEEE formatting requirements. Use Arial font size 11, or 12 throughout the document for text. Use italics for comments. Document text should be single-spaced and maintain the 1” margins found in this template. For Section and Subsection titles please follow the template.

## References and Acknowledgments

SoW document that comes from the customer is the input to write this document.

# Overall Description

## Product Overview

* This product is called Prediction of heart attack system. It uses the existing patient’s data which has heart attack factors i.e., the labels like age, cholesterol levels, gender etc. and the “target” value for that particular patient providing the status of heart attack (occurred or not occurred).
* This product contains 4 modules – ML algorithms, DL algorithms, database and database driver.
* The user provides the real time data of the given health factors and the model will predict the occurrence of heart attack.

## Product Functionality

Major functions of the system:

* Develop ML model
* Tune the ML model
* Develop DL model
* Tune the DL model
* Give warning when heart attack is predicted

## Design and Implementation Constraints

* Size of data set
* Accuracy

## Assumptions and Dependencies

* Quality of data

# Specific Requirements

## External Interface Requirements

*Network interface*

### User Interfaces

System interface

Data interface

### Hardware Interfaces

*Hardware and Device interfaces*

### Software Interfaces

Communication of ML/DL model between dataset and algorithms.

## Functional Requirements

### F1: The system shall …

*Using the Heart Attack Dataset*

*Developing ML Models using ML algorithms*

1. *Decision Tree*
2. *Random Forest*
3. *SVM*
4. *Logistic Regression*
5. *KNN*
6. *Naïve Bayes*

*Tuning the above ML algorithms for maximum accuracy by changing training and test data size*

### <Functional Requirement or Feature #2>

*Implement Heart attack using Deep Learning - Deep Neural network classification.*

*Tuning this algorithm for maximum accuracy by changing the following parameters:*

1. *Number of neurons in each layer*
2. *Increasing Epochs*
3. *Increasing hidden layers*
4. *Changing activation functions*

## Use Case Model

TO DO: Provide a use case diagram that will encapsulate the entire system and all actors.

### Use Case #1 (use case name and unique identifier – e.g. U1)

***Author*** *– Soujanya Manasa*

***Purpose*** *– Predict Heart Attack*

***Requirements Traceability*** *– Accurate dataset containing all the factors involving the occurrence of heart attack.*

***Priority*** *- High*

***Preconditions*** *– Dataset to be acquired.*

***Post conditions*** *– Immediate warning has to be given when the heart attack has occurred*

***Actors*** *– Human system, devices*

***Extends*** *– None*

***Flow of Events***

* 1. *Basic Flow - A heart attack is predicted*
  2. *Alternative Flow - A warning is given if a heart attack occurs*
  3. *Exceptions – No proper dataset*

### Use Case #2

…

# Other Non-functional Requirements

## Performance Requirements

The warning that the heart attack has occurred has to be given in an instant within 0.1 seconds.

## Safety and Security Requirements

The dataset containing the data of the patients has to be secured

## Software Quality Attributes

* Accuracy
* Reliability
* Scalability
* Performance
* Cost- efficiency
* Resilience

# Other Requirements

<This section is **Optional.** Define any other requirements not covered elsewhere in the SRS. This might include database requirements, internationalization requirements, legal requirements, reuse objectives for the project, and so on. Add any new sections that are pertinent to the project.>

Appendix A – Data Dictionary

*<Data dictionary is used to track all the different variables, states and functional requirements that you described in your document. Make sure to include the complete list of all constants, state variables (and their possible states), inputs and outputs in a table. In the table, include the description of these items as well as all related operations and requirements.>*

Appendix B - Group Log

<Please include here all the minutes from your group meetings, your group activities, and any other relevant information that will assist in determining the effort put forth to produce this document>