Final Year Project

Software Requirement Specification

For

The Psychiatrist (Real-Time Sentiment Analysis of tweets on Twitter for Identifying People with Suicidal Tendencies with AI) (BSCS)

By

S#	Name	Registration #/Roll #/Section	Mobile #	Project ID
1.	Ammara Khan	Fa17-BSCS-003/C		46
2.	Zubair Mustafa	Fa17-BSCS-081/C		

Supervised by:

Sir. Jawad Hassan _____ _____

(Signature**)**

Department of Computer Science

Lahore Garrison University
Lahore Table of Contents

Page#

1. Introduction

This section gives the description and overview of everything included in the Software Requirement Specifications (SRS) of the project. Furthermore, purpose for this document is also covered in the introduction.

1.1 Purpose

The purpose of this document is to give a detailed description of the requirements for the **"The Psychiatrist"** (Real-Time Sentiment Analysis of tweets on Twitter for Identifying People with Suicidal Tendencies with AI) web-based application. It will also explain the constraints and interface required by the application for complete execution.

The purpose for developing this web-based application is to provide the concerned authorities, especially law enforcement with such an application that will help them identify Twitter users that have suicidal tendencies so that they can be provided help and medical assistance in time.

1.2 Document Conventions

Following are the conventions observed in this document:

Font Style	Descriptions
Bold	The technology stack
Italic	Reference to sections or piece of section
Bold & Italic	Priority of System Features

1.3 Intended Audience and Reading Suggestions

This web-based application can be used by anyone who is willing to analyze the sentiments of people on social media and figure out if they have suicidal tendencies. The intended audience for this project includes primarily the Computer Sciences Department's faculty and secondarily the law enforcement agencies or medical research institutions. This document is expected to be read by the development team, alpha and beta testers. Others involved in the project anyhow need to read the document as such:

- Overall Description
- External Interface Requirements
- System Features
- Non-Functional Requirements

1.4 Product Scope

The project uses **Twitter API** which will be used to retrieve real-time tweets from Twitter. These tweets are then subjected to an analyzer script written in **Python** language. To apply machine learning/artificial intelligence algorithms on the tweets retrieved from Twitter, **IBM Watson** will be used. This will aid the sentiment analysis and in identifying if the user is suicidal or not. The front-end of the web-application is in **HTML, CSS and JavaScript** which displays the identified suicidal users in the past and the currently identified ones to keep a record.

This product is expected to be beneficial to the First Responders (Law Enforcement Agencies/Government Officials/Health Officers) in identifying suicidal people on Twitter and providing them required help in time. The product is also expected to become a helpful platform for reducing suicide rate as the victims may be identified before it's too late.

2. Overall Description

This section is intended to provide an overview of the features and the operational functions of the application. It will also declare the stakeholders of the application. Finally, the assumptions and dependencies for the software will be explained.

2.1 Product Perspective

Our project is new and does not utilize or depend on any of the features or capabilities of any of the applications similar to it. All the related projects that we observed were limited to finding if the tweet was suicidal or not and none of the projects identified the user that posted those suicidal tweets. Our project will identify the user IDs by analyzing the tweets posted in real-time.

2.2 Product Functions

The project will perform the following functions:

- Pull Tweets in near real-time
- Perform Sentiment Analysis
- Display results

2.3 User Classes and Characteristics

This project can be used by:

Police/Government Officials:

This is the primary category of users that is targeted as they are the first responders of a potential suicide case. They will be able to use this project to get user ID of the suicidal user and have the concerned authorities involved to provide help to the identified person.

Health Researchers:

Many health researches carry out researches against the rate of suicide, health conditions of a country, cause of suicide etc. The researchers would be able to use this project in order to quickly perform analytics on the data pulled from an actual social network. **Students:**

This is the tertiary class to be targeted because if they find this project interesting, they may be able to modify or enhance the features to make this project more helpful to the primary and secondary consumers.

2.4 Operating Environment

The project will operate with the following components:

As the web-based application under development is platform independent, it will be running on a desktop machine that can have either a Linux or a Windows operating system. The software requirement for the project is to have Python language framework installed on the machine where the application will run. There are no separate hardware components required for this project.

2.5 Design and Implementation Constraints

Following are the issues that might limit the application's use:

- Twitter API access is hard to get, it might take a while to get access to the Twitter's development API key. If you are not granted access to the API you can't use this application
- Availability to IBM Watson is also necessary as it will be used for sentiment analysis of the tweets

2.6 User Documentation

For user documentation and information, please consult *Section 3: External Interface Requirements* of this document.

2.7 Assumptions and Dependencies

It is assumed that the web-based application will work correctly with the availability of the following tools and equipment: **Twitter API:**

The application's working depends mainly on the access to the Twitter API. If the access is not granted, the application will not be able to pull tweets to apply sentiment analysis on them

IBM Watson:

To apply sentiment analysis on the tweets, an account on IBM Watson is also required to use its services for the analysis and getting the result **Internet:**

The availability of Internet is required for the application's web-based frontend and to pull Tweets from Twitter.

3. External Interface Requirements

This section contains detailed information of all of the interfaces in the project.

3.1 User Interfaces

It is assumed that the primary users of this application are not technical, so the user interface is kept very simple and understandable by non-technical users. The user only has to run the application and access in the browser. The sentiment analysis will be done in the background and the results will be showed on the webbased frontend of the application.

3.2 Hardware Interfaces

Since the software does not require any designated hardware, it does not have any direct hardware interfaces. The internet is managed by the Wi-Fi router of the desktop machine hosting the application.

3.3 Software Interfaces

The Psychiatrist application runs on either a Linux or a Windows machine. The application front-end can be accessed primarily by Google Chrome and secondarily by any equivalent web browser. The backend of the application is built using **Python** and **IBM Watson** is used for implementing the algorithms applied for sentiment analysis of tweets. The frontend is primarily built using **HTML, CSS** and **JavaScript**.

3.4 Communications Interfaces

The communication between the different parts of the system is important since they depend on each other. However, in what way the communication is achieved is not important for the primary user and is therefore handled at the backend of the web-based application.

4. System Features

This section contains all of the functional and quality requirements of the system. It gives a detailed description of the system and all its features. The features included in the system can be viewed in *Section 2:*

Overall Description of the document. Below, they will be discussed in detail:

4.1 Pull Tweets

Pulling tweets from Twitter.

4.1.1 Description and Priority

This feature will be used for pulling real-time tweets from Twitter through its developer API. This is a ***HIGH*** feature as these are the tweets that will be used for analysis.

4.1.2 Stimulus/Response Sequences

When user runs the application, the python-based backend will connect to Twitter through the API and start pulling real-time tweets from Twitter.

4.1.3 Functional Requirements

The user must have access to Twitter API and Secret keys as it is impossible to pull tweets from Twitter without them.

4.2 Sentiment Analysis

Applying sentiment analysis on retrieved tweets.

4.2.1 Description and Priority

This feature will be used to apply sentiment analysis on the pulled tweets to determine whether they are suicidal or not. It is a ***HIGH*** priority feature as the quality of results depends on the analysis performed on the Tweets.

4.2.2 Stimulus/Response Sequences

After the tweets are pulled, they will be sent to IBM Watson by the backend application where algorithms for sentiment analysis will be applied to determine if the tweet is normal or suicidal. If the tweet is suicidal, it will be sent to the backend of application for further processing and display.

4.2.3 Functional Requirements

The application user must have an account and access to related services created on IBM Cloud because without this it is not possible to apply sentiment analysis on tweets.

4.3 Display Result

Displaying user ID on the frontend.

4.3.1 Description and Priority

This feature will be used for displaying the identified Twitter user's ID on the web-based frontend. This is a ***HIGH*** priority as the quality and result of the application is dependent on it.

4.3.2 Stimulus/Response Sequences

If the analyzed tweet is determined as suicidal, the user ID that posted the tweet is pulled through the API and showed at the web-based frontend of the application.

4.3.3 Functional Requirements

The application user must have access to the internet so that the web-based frontend can work properly.

5. Other Non-functional Requirements

This section contains all the non-functional requirements of the system.

5.1 Performance Requirements

None

5.2 Safety Requirements

For data protection use any of the cloud storage and backups to prevent any data loss.

5.3 Security Requirements

None

5.4 Software Quality Attributes

The project is reliable and portable as it can be used on any computer running any Operating System that supports Python language framework and it will give results using multiple algorithms. It will help to understand different sentiments of users through analyzing their tweets.

5.5 Business Rules

The web-based application will be used by the primary users i-e the Police/Government who are often the first responders of suicide cases. Otherwise, it can be used by students or health researchers who wish to modify or add more features to this application.