

SOFTWARE REQUIREMENT **SPECIFICATION**

Group Members

Kulvir Singh (19BCE2074)

Gurtavrein Singh (19BCE2101)

C S Sahil (19BCE2094)

1 Introduction

1.1 Purpose

The purpose of this document is to describe the software specification requirements for Weather Predicting System. The document will describe how the product will collect and display local weather data and analyze the weather forecast. The document contains the functional behavior and non-functional requirements of the system project. The document also contains the guidelines for system engineers and programmers to start working and accomplish the project on a given time frame. The product will be beneficial to the people as they will know what weather lies ahead of them.

1.2 Document Conventions

The format of this Software Requirement Specifications for Weather Predicting System is simple. Bold face and indentation is used on general topics and on specific points of interest. The rest of the document will be written using the standard font, Calibri

1.3 Intended Audience and Reading Suggestions

The intended readers of this document are the developers of the station, testers, station owners, managers and coordinators.

In case of any suggested changes on the requirements listed on this document should be included in the last version of it so it can be a reference to developing and validating teams.

1.4 Product Scope

The software product is of Weather Predicting System . It will be able to display local weather data and analyze weather forecast based on the local weather data fed to the software on autonomous instruments. The product will be beneficial to the common people different organizations who will need weather information from weather station for various reason. The main goal is to have an autonomous record instruments and a database for the safe storage of all the records from weather station.

This product does not include a live stream of the weather. It does not store the data on its on. The data is fed by the personnel handling the software and the prediction of the weather ahead is carried out by the project.

The weather details used are not from India, but are from Switzerland. This is because in order to get the Indian Weather Data one needs to pay certain amount of money. Whereas the data from Switzerland is free.

2. Overall Description

2.1 Product Perspective

The weather prediction system, basically belongs to the class of devices and applications, which determine the weather of a particular location. The only difference is that, our product has a far more superior user interface platform, and also can be easily accessed by people, belonging to all sections of the society. Simple components have been used to build this project.

2.2 Product Functions

- a) The product is built to provide an accurate report of the current day, the previous day, or the next day.
- b) The product has been designed, in such a way that the user interface, (i.e) the website which acts as the GUI, is easily accessible by users from all sections of the society.
- c) The GUI for the project is a website, which has multiple functions like login, select day, etc. which will be further explained in the next module of this document.

2.3 User Classes and Characteristics

The primary classes of users, who use this product, are:-

- a) Naïve users
- b) Application users (with little technical experience)
- c) Product designers

Naïve users:- These users are the ones, who are not involved with the technicality of the product, but

they just use the features of the product, like, viewing the weather report of the current day, the previous day or the next day of their respective city/village.

Application users:- These users are the ones, who access the product to fix minor technicalities/bugs etc. which can possibly arise in this product.

Product designers:- Product designers are the ones, who decide to change the existing model into a better version with respect to their vision over the product, or make required changes/modifications over the product and provide an update over the GUI, for better usability and increased quality of the product.

2.4 Operating Environment

This project has both hardware and software components, integrated to make the best out of the final product. The hardware components are monitored by the product designers, which are capable of working under any conditions, since they are required to perfectly detect the conditions of the weather.

The software is basically a website, which acts as a GUI for the project, as the website is the place where the user will interact and obtain the details that the product is supposed to be served for. The Software GUI component comprises of a front-end and a back-end, which deals with the user interface and data handling, producing results, etc. respectively.

2.5 Design and Implementation Constraints

Design constraints:-

- a) With respect to the basic model/prototype of the product that is being presented to you, the hardware components should be present in each and every city across a particular region, where the product's operation is valid, for the detection of weather.
- b) The GUI being built has to be made as simple as possible, since the main principle of this product is that the product should be user friendly, and easily accessible by users from all sections of the society.
- c) Language requirement is another constraint, because not everyone who wishes to have a fair idea about the weather of the near future, will know English

Implementation constraints:-

Users are required to have basic internet facilities until new updates/modifications arise, which won't need this facility.

The hardware components, which detect the weather, must be present in an accurate location of the city, which can give a fair idea about the entire city's weather condition.

2.6 User Documentation

- a) Terms and regulations norms will be given to the user, before they can access the website.
- b) A user manual will be provided as a soft copy in the website.

2.7 Assumptions and Dependencies

Multiple assumptions have been made, which can further enhance the functioning of the product. The use of satellites, which can easily collect statistics and data, which can be useful to display the weather report more accurately, and avoid the hassle with the hardware components.

The product has a primary dependency, (i.e) it depends on the predictability of weather too, so that the hardware components can be fed with the required instructions, which can help in predicting a particular type of weather.

3. External Interface Requirements

3.1 User Interface Requirements

User Interface: Graphical (GUI) or Command-Line (CLI) This system will provide a graphical user interface. The layout of the system will be a webpage that has a header on the top displaying the name of the website, under the header there will be a navigation bar to go to related pages, under the navigation bar is the body or main focus and at the bottom of the page will be a footer that will have contact information

3.2 Hardware Interfaces

No hardware interfaces required

3.3 Communications Interfaces

No communication interface is required

3.4 Software Interfaces

The software interfaces that will be used are Visual Studio/sublime, MyphpAdmin . Visual Studio/sublime will be used for coding the website. MyphpAdmin will be used to maintain the database to store the forecast. We will be using the following programming languages: HTML,Python,CSS. The following libraries are used:

- Pyflask: . Pyflask will be used for implementing request,response and other utility functions which enables the web framework to be built on top of it.
- Scikit:Contains basic mathematical tools and used for building machine learning model.
- Pandas: Shall be used for data analysis
- Numpy: Provides mutlidimensional arrays and tools to compute these arrays

4. System Features

**The ratings are given from 0 to 9,where 0 being no priority and 9 being a very high priority

4.1 LOGIN:-

4.1.1 Description and Priority

In this feature the user can type in his credentials to log-in and get his proper customized settings

Rating:-8

4.1.2 Stimulus/Response Sequences

The user fills in his

- Username
- Password
- If doesn't have an account can create an account
- Has to accept to access the device location.

The system

- recognizes the given username and password are correct or not.
- The system also displays an error message if the username and the password are incorrect.
- The system opens the sign-up page if required.

4.1.3 Function Requirements

The main function requirements required for the working of Log-In page is

- Must have a strong backend database.
- Ability to interact with the device's GPS to access the device location.
- The webpage must be very interactive for the user to have a easy and effortless experience.

4.2 SIGN-UP:-

4.2.1 Description and Priority

In this feature the user can type in his credentials like email-id, username and password to sign-in and create an account

Rating:-8

4.2.2 Stimulus/Response Sequences

The user fills in his

- Email-id
- Username
- Password
- Confirmed password

The system then,

- Creates the account .

4.2.3 Function Requirements

The main function requirements required for the working of Sign-up page is

- Must should have a strong backend database.
- The webpage must be very interactive for the user to have a easy and effortless experience.

4.3 MAIN PAGE:-

4.3.1 Description and Priority

In this feature the user is greeted with a welcome message, Location, and also the relevant weather information of the present day, the next day and the later day

The weather information includes

- Temperature
- Precipitation
- Humidity
- Wind

Rating:-8

4.3.2 Stimulus/Response Sequences

The user clicks

- Today
- Tomorrow
- The next day

The system then displays ,

- Temperature
- Precipitation
- Humidity
- Wind

4.3.3 Function Requirements

The main function requirements required for the working of login page is

- Must should have a strong backend database.
- The webpage must be very interactive for the user to have a easy and effortless experience.
- Ability to interact with the device's GPS to access the device location.
- A proper Machine Learning model.
- Proper connection between the front end and the machine learning model.

4.4 SETTINGS:-

4.4.1 Description and Priority

In this feature the user can choose his preferred settings and can thus customize it using his way.

Rating:-4

4.4.2 Stimulus/Response Sequences

The user can change

- Units of speed(km/hr or miles/hr)
- Dark-Mode or Light-Mode
- Units of temperature(F/C)
- Logout

The system can

- Change according to the inputs give to user.
- Logout from the users' account.

4.4.3 Function Requirements

The main function requirements required for the working of Log-In page is

- Must have a strong backend database.
- Ability to interact with the device's GPS to access the device location.
- The webpage must be very interactive for the user to have a easy and effortless experience.

5. Other Non-functional Requirements

5.1 Safety Requirements

If there is extensive damage to a wide portion of the database due to catastrophic failure, such as a disk crash, the recovery method restores a past copy of the database that was backed up to archival storage (typically tape) and reconstructs a more current state by reapplying or redoing the operations of committed transactions from the backed up log, up to the time of failure.

5.2 Security Requirements

Security systems need database storage just like many other applications. However, the special requirements of the security market mean that vendors must choose their database partner carefully. The data stored in the databases can be encrypted to prevent from unauthorized access.

5.3 SOFTWARE QUALITY ATTRIBUTES

AVAILABILITY: The location must have all the weather related information.

CORRECTNESS: The weather data should be accurate to a fair extent.

MAINTAINABILITY: The administrators must have the option to maintain the web site and provide updates

USABILITY: The website must allow multiple users to access the website at the same time with no difficulty.

5.4 Performance Requirements

NORMALIZATION

The basic objective of normalization is to reduce redundancy which means that information is to be stored only once. Storing information several times leads to wastage of storage space and increase in the total size of the data stored.

ACCURATE MACHINE LEARNING MODEL

The chosen machine learning model must be accurate in providing the predicted data to a fair extent as none of the model are 100% accurate. The model must be best fitting model.

6. Other requirements

- a) Legal access from the Govt. Of India to setup the hardware in various cities, for predicting the weather.
- b) Database of huge size is mandatory, which must store the login details of the users, who use the product
- c) Reliable host, which can support the functioning of the website, (i.e) the GUI of the project.