**Cloudburst prediction System**

**Software Requirement Specifications**

1. **Introduction**

**1.1 Purpose**

**The purpose of this document is to specify the software requirements for the development of a cloudburst prediction system.**

**1.2 Scope**

**The system aims to predict the occurrence of cloudbursts based on weather data using machine learning techniques. It will provide actionable insights for disaster preparedness and mitigation efforts.**

**1.3 Definition, Acronyms, and Abbreviations**

* **SRS: Software Requirement Specifications**
* **ML: Machine Learning**

1. **The overall description**

**2.1 Product perspective**

**The system will be a standalone application that acquires weather data, preprocesses it, trains a machine learning model, and makes predictions.**

**2.2 Product Features**

* **Acquire weather data from external sources.**
* **Preprocess the acquired data to handle missing values and normalize features.**
* **Train a machine learning model to predict cloudbursts.**
* **Deploy the trained model into a user-friendly platform.**
* **Monitor and update the model as needed.**

**2.3 User Class and Characteristics**

**Users of the system include meteorologists, disaster management agencies, and individuals interested in weather forecasts. Users should have basic computer literacy and an understanding of weather phenomena.**

1. **Specific Requirements  
   3.1 External Interfaces Requirements**

**3.1.1 User Interfaces**

* **The system will have a user interface for data acquisition, preprocessing, model training, and deployment.**
* **The user interface should be intuitive and easy to navigate.**

**3.1.2 Hardware Interfaces**

* **The system will require standard hardware components such as a computer with internet access for data acquisition and preprocessing.**

**3.1.3 Software Interfaces**

* **The system will interface with external weather data APIs or databases for data acquisition.**
* **It will utilize Python libraries such as Pandas, Scikit-learn, and Flask for data preprocessing, model training, and deployment.**

**3.2 Functional Requirements**

* **Acquire Weather Data:**

**The system shall retrieve weather data from external sources.**

* **Preprocess Data:**

**The system shall handle missing values and normalize numerical features.**

* **Train Model:**

**The system shall train a machine learning model using the preprocessed data.**

* **Make Prediction:**

**The system shall use the trained model to predict the occurrence of cloudbursts.**

* **Deploy Model:**

**The system shall deploy the trained model into a web application for user interaction.**

**3.3 Non-Functional Requirements**

* **Performance:**

**The system shall provide predictions within a reasonable timeframe.**

* **Reliability:**

**The system shall produce accurate predictions with a high level of confidence.**

* **Usability:**

**The user interface shall be user-friendly and intuitive.**

* **Scalability:**

**The system shall be scalable to handle large volumes of data and user requests.**