**Software Requirements Specification (SRS) Document**

**Project Title:** Rainfall Prediction using Machine Learning

**Dataset:** [Rainfall Prediction Dataset](https://media.geeksforgeeks.org/wp-content/uploads/20240510131249/Rainfall.csv)

**Introduction:** The project aims to develop and choose a best model among different machine learning models to predict rainfall based on historical weather data. The objective is to enhance predictive accuracy for weather forecasting, which is crucial for agriculture, disaster management, and water resource planning.

**Problem Statement:** Accurate prediction of rainfall is a challenging task due to the variability in weather patterns and the complex interactions between meteorological variables. Traditional forecasting methods may not fully capture the nonlinear relationships in the data, leading to suboptimal predictions. There is a need for advanced machine learning techniques to improve rainfall prediction accuracy.

**Proposed Solution vs Existing Solutions:** The proposed solution involves implementing and comparing various machine learning classifiers, including:

* **Decision Trees**
* **Logistic Regression**
* **Random Forest**
* **Gradient Boosting**
* **Support Vector Machines (SVM)**

These models will be evaluated based on their ROC AUC scores and classification reports to determine their effectiveness in predicting rainfall. By comparing these models, we aim to select the most accurate and robust model for rainfall prediction.

Existing solutions often rely on simpler statistical methods or less comprehensive machine learning approaches, which may not perform as well in capturing complex patterns in rainfall data since the metrological variables are much difficult to predict and analyze.

**Submitted By:** Abdul Rehman Tahir

**Submitted To:** Nimra Waqar (Bytewise Lead)