

PML MICRO PROJECT

NAME: HARISMITHA SOUNDARANAYAKI S

ROLL NO: 225229113

ACTIVITY: 1

TITLE OF THE PROJECT: RAINFALL PREDICTION

ACTIVITY:2

BACKGROUND:

Rainfall prediction is a crucial area of study in meteorology and hydrology. The accurate prediction of rainfall can provide essential information for various sectors, including agriculture, water resource management, and disaster management. In recent years, advancements in technology and data analytics have led to significant improvements in rainfall prediction.

Predicting rainfall requires an interdisciplinary approach that integrates meteorological, statistical, and computational techniques. With advancements in technology and data analytics, researchers are continually improving the accuracy of rainfall predictions, which has important implications for various sectors of the economy and society.

MOTIVATION:

The motivation for using machine learning for rainfall prediction lies in its potential to provide more accurate, timely, and granular predictions that can support decision-making in various sectors, including agriculture, water resource management, and disaster management. By combining data from multiple sources and learning patterns and relationships from large and complex datasets, machine learning has the potential to significantly improve our ability to predict and manage rainfall.

PROBLEM STATEMENT:

The problem of rainfall prediction using machine learning requires an interdisciplinary approach that integrates meteorology, statistics, and computer science. The ultimate goal is to develop a robust and accurate model that can provide timely and reliable predictions to support decision-making in various sectors, including agriculture, water resource management, and disaster management.

ACTIVITY 3:

DATA SET DESCRIPTION:

The following is a brief description of some of the key characteristics that a data set for rainfall prediction using machine learning should possess:

- Historical data: The data set should include historical data to enable the development of long-term trends and patterns, as well as recent data to capture current trends and conditions.
- Metadata: The data set should include metadata, including the location and time of the data collection, and any relevant quality control information

ACTIVITY:4

Existing solution:

- DeepRain: The model is trained on a large data set of radar data and can handle complex spatiotemporal relationships between meteorological parameters and rainfall.
- RainNet: The model has achieved high accuracy in various evaluations and is capable of handling non-linear relationships between meteorological parameters and rainfall.
- LSTM-RNN: The model uses a combination of weather station data and radar data and can handle non-linear relationships between meteorological parameters and rainfall.
- Random Forest: The model has been shown to achieve high accuracy in various evaluations and can handle non-linear relationships between meteorological parameters and rainfall.
- XGBoost: The algorithm uses a combination of weather station data and satellite data to predict rainfall up to several hours in advance.

Methodology:

The methodology for rainfall prediction using machine learning typically involves the following steps:

- Data collection and preprocessing
- Feature selection and engineering
- Model selection and training
- Model evaluation

- Deployment and monitoring

Source code:

- <https://github.com/Rushee123/Rainfall-Prediction-Using-Machine-Learning.git>