Average Rainfall Prediction

	Projects
📷 Date	@September 11, 2023
👽 AI summary	The Machine Learning for Rainfall Prediction project aims to improve rainfall prediction accuracy by using machine learning algorithms, addressing the inefficiencies of manual systems. It utilizes Python and libraries like Scikit-Learn and Pandas for data processing and model training. The system preprocesses data, trains and tests models, and generates predictions displayed as rainfall amounts and probabilities, providing a reliable solution for predicting rainfall.

Introduction:

- The Machine Learning for Rainfall Prediction project is designed to predict rainfall using machine learning algorithms.

- The project aims to provide a reliable solution for rainfall prediction.

Problem Statement:

- The current manual system of rainfall prediction is time-consuming and prone to errors.

- The manual system requires human intervention to analyze data, which can lead to delays and miscommunication.

Proposed Solution:

- The Machine Learning for Rainfall Prediction project is a Python-based project that uses machine learning algorithms to predict rainfall.

- The project uses a dataset to train and test the machine learning models.

- The project generates prediction results in the form of rainfall amount and probability.

Tools and Technologies Used:

- Programming Language: Python

- Python Libraries:
    - Scikit-Learn (for machine learning)
    - Pandas (for data manipulation)
    - NumPy (for numerical computations)
    - Matplotlib (for data visualization)
- Development Environment: Jupyter Notebook
- Operating System: Windows 7 or above/Linux

Functional Requirements:

- Data Preprocessing: The system preprocesses the dataset to prepare it for training and testing.
- Model Training: The system trains the machine learning models using the preprocessed dataset.
- Model Testing: The system tests the trained models using the test dataset.
- Prediction: The system generates rainfall predictions using the trained models.
- Results Display: The system displays the prediction results in the form of rainfall amount and probability.

Code:

```
import numpy as np
import pandas as pd

data = pd.read_csv('dataset.csv')
data.head()

data.info()

data

data['SUBDIVISION'].unique()

from sklearn.preprocessing import LabelEncoder

le = LabelEncoder()
data['SUBDIVISION'] = le.fit_transform(data['SUBDIVISION'])
data

x = data.iloc[:,2:5].values
x

y = data.iloc[:,6:7].values
y

from sklearn.model_selection import train_test_split
```

```python
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.25,random_state=0)

x_train.shape

y_train.shape

y_test.shape

from sklearn.linear_model import LinearRegression

ml = LinearRegression()
ml.fit(x_train, y_train)

y_pred = ml.predict(x_test)

from sklearn.metrics import r2_score

a = r2_score(y_test, y_pred)
a

import matplotlib.pyplot as plt

plt.scatter(y_test,y_pred)
plt.xlabel('Actual Values')
plt.ylabel('Predicted Values')
plt.title('Actual vs Predicted')

b = ml.intercept_

m = ml.coef_

z = (m*y_test)+b

y_pred.shape

y_m=z[:,2]

plt.scatter(y_test,y_pred)
plt.scatter(y_test, y_m)
plt.xlabel('Actual Values')
plt.ylabel('Predicted Values')
plt.title('Actual vs Predicted')
plt.plot()
```

Screenshots:
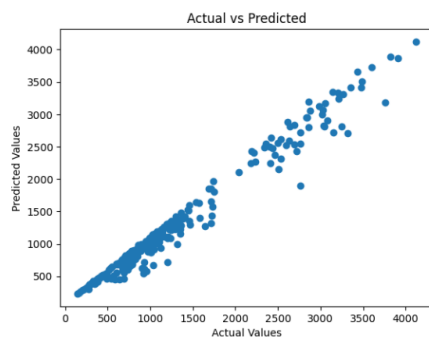
Before Prediction Values Plotted
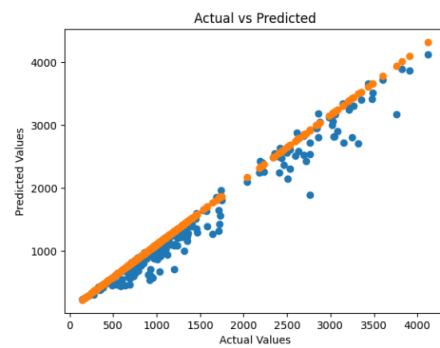
After Prediction Values Plotted

Conclusion:

The Machine Learning for Rainfall Prediction project is a reliable solution for rainfall prediction.The system meets the requirements and provides accurate predictions using machine learning algorithms.