**Time Series Analysis based Tamilnadu Monsoon rain fall**

**Alternate Title:**

 Rain fall Prediction using Machine Learning

**Aim**:

Analyze the rain fall data from database for rain prediction.

**Abstract:**

Rainfall prediction is a major problem for meteorological department as it is closely associated with the economy and life of human. It is a cause for natural disasters like flood and drought which are encountered by people across the globe every year. Accuracy of rainfall forecasting has great importance for countries like India whose economy is largely dependent on agriculture. This paper presents the rainfall prediction and Rainfall analysis using Machine Learning. The main goal of employing this application is to prevent immediate impacts of flood. This application can be easily used by the common people or government to predict the occurrence of flood beforehand. The advancement in the information technology, the need for easy accessibility of large cloud storage and processing power is available. Data mining technologies helps us to provide reference for decision makers as summarized information even from the large amount of data. Among many data mining techniques, classification is a widely used one. Past studies proposed many techniques that could be applied to classification, such as decision trees, neural networks, Bayesian classifiers. Here we use Linear model and Neural Network.

**Existing System:**

In recent time rapid urbanization, global climate change and extreme rainfall have resulted in flash floods. In orthodox methods of rainfall forecasting, using satellite images and radar also involving mathematical equations, current weather conditions are detected. There are some drawbacks in that lead to wrong predictions of rainfall. The results cannot be accurate in predicting flash floods. Various data mining classification algorithms have been implemented on rainfall dataset. Unfortunately, many time in the prediction not accuracy. So, we will move to the proposed system.

**Proposed System:**

The aim of this project is to get all the rainfall data and from a dataset containing yearly rainfall data. To overcome the fallback in the existing system we propose a machine learning based system to increase the efficiency and accuracy. In our project, linear model gives high accuracy level compared with other algorithms. Finally, we are predicting the result via data visualization and display the predicted output GUI.

**Module Description:**

* **Data collection and pre-processing**
* **Implementation**
* **Prediction**

**Data collection and pre-processing:**

 Weather dataset is collected in a comma separated values (CSV) file for the last three or four years of rainfall information. The dataset contains the month wise aggregation. The dataset might contain empty values, negative values or error. Dataset is cleaned in the pre-processing. The preprocessing methods involve of removing records which is not complete. Once the clean dataset is available we have to prepare it to feed to the machine learning algorithm.

**Implementation:**

 The prediction accuracy of the different models is evaluated using data validation, and the results are compared to get accuracy. We use Linear Regression algorithm to get high accuracy range of prediction

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* **Linear Regression**
* **Neural Network**

**Prediction:**

Preprocessed data are trained and input given by the user goes to the trained dataset. The Linear Regression trained model is used to predict the rainfall for a particular month. Python matplotlib library can be used to produce the graphical representation of the data in a visual format. That output display in the GUI. That web application created by flask.

**Software Requirement:**

* Operating System : Windows 10
* Software : python
* Tools :Anaconda (Jupyter Note Book IDE)

**Hardware Requirement:**

* Hard disk : 500 GB and above.
* Processor : i3 and above.
* Ram : 4GB and above.

**Technologies used:**

* Programming Language: Python.

**Architecture Diagram:**

Data Collection

Machine Learning

Algorithms

Analysis of Data

Prediction

Data Visualization

Web application