

## LITERATURE SURVEY

S NO	TITLE	YEAR	AUTHOR	CONTENT
1	Prediction of Yibin City Based on GRU and XGBoost	2022	Jian Rong Ban, Qi Gou and Ya Shi Li	<p>1) In this paper, GRU and XGBoost algorithms are used to predict the rainfall in Yibin City, Sichuan Province, and the different prediction results of the two methods are compared.</p> <p>2) Experiments have found that the mean absolute error (MAE) of GRU and XGBoost models are 0.088 and 0.013 respectively; The mean square error (MSE) is 0.016 and 0.0003 respectively; The mean average absolute percentage error (MAPE) was 58.22 and 14.85 respectively.</p> <p>3) In the two prediction models, the prediction error of the XGBoost model is smaller.</p>
2	Machine Learning based Rainfall Prediction	2020	R. Kingsy Grace and B. Suganya	<p>1) This paper proposes a rainfall prediction model using Multiple Linear Regression (MLR) for Indian dataset.</p> <p>2) The input data has multiple meteorological parameters and to predict the rainfall more precisely.</p> <p>3) The Mean Square Error (MSE), accuracy, and correlation are the parameters used to validate the proposed model.</p> <p>4) From the results of this paper, the proposed machine learning model provides better results than the other algorithms in the literature.</p>
3	Analyzing trend and forecasting of rainfall changes in India using non parametric and machine learning approaches	2020	SwapanTalukdar, Shahfahad, Susanta Mahato,Jayanta Mondal,Pritee Sharma, Abu Reza Md.Towfqu Islam & Atiqur Rahman	<p>1) This study analyzes and forecasts the long-term Spatio-temporal changes in rainfall using the data from 1901 to 2015 across India at meteorological divisional level.</p> <p>2) The Pettitt test was used to detect the changing point in the time frame.</p>

				<p>3) Mann-Kendall (MK) test and Sen's Innovative trend analysis were performed to analyze the rainfall trend.</p> <p>4) Artificial Neural Network-Multilayer Perceptron (ANN-MLP) was employed to forecast the upcoming 15 years rainfall across India.</p> <p>5) Result - The increasing rainfall trend was observed during the period 1901–1950, while a significant decline in rainfall was detected after 1951.</p>
4	Machine Learning Techniques to Predict Daily Rainfall Amount	2021	Chalachew Muluken Liyew and Haileyesus Amsaya Melese	<p>1) Main objective of the project was to identify the relevant atmospheric features that cause rainfall and predict the intensity of daily rainfall using machine learning techniques.</p> <p>2) The Pearson correlation technique was used to select relevant environmental variables which were used as an input for the machine learning model.</p> <p>3) The dataset was collected from the local meteorological office at Bahir Dar City, Ethiopia.</p> <p>4) Three machine learning models were used - Multivariate Linear Regression, Random Forest, and Extreme Gradient Boost.</p>
5	A Time-series based Prediction Analysis of Rainfall Detection	2020	Lince Rachel Varghese, K. Vanitha	<p>1) This paper analyzes and studies the rainfall data patterns of all the districts of Kerala.</p> <p>2) A time series analysis was used to extract the trends in seasonal rainfall. Data mining, data analysis is used on meteorological data to find hidden patterns in the data.</p> <p>3) The monthly rainfall data of 14 districts of Kerala from 2008 to 2019 were taken into consideration. The data was classified as seasons consisting of 4 quarters.</p>

				4) The purpose of this classification and analysis is to find the climatic variations of districts that affect the Hevea (Rubber) cultivation.
6	A Machine Learning Approach for Rainfall Estimation Integrating Heterogeneous Data Sources	2020	Massimo Guarascio, Gianluigi Folino, Francesco Chiaravalloti, Salvatore Gabriele, Antonio Procopio and Pietro Sabatino	<p>1) Dense networks of sensors, named rain gauges (RGs), were typically used to obtain direct measurements of precipitation intensity in individual geographical points.</p> <p>2) Machine learning-based methodology is proposed that exploits a classifier based on ensemble methods for rainfall estimation and is able to integrate information from different remote sensing measurements.</p>
7	Rainfall Prediction Using Machine Learning	2022	Akash Gupta, Hitesh Kumar Mall and S Janarthanan.	<p>1) This paper provides comparative research which looks at three aspects of modeling inputs, modeling methodologies, and preprocessing procedures.</p> <p>2) The findings demonstrate how different machine learning systems perform on a range of assessment parameters, as well as their capacity to forecast rainfall using weather data analysis.</p> <p>3) This study contains a series of experiments that include the utilization of basic machine learning techniques to build Weather forecasting models that estimate whether it will rain in major cities tomorrow based on the day's meteorological data.</p>
8	Applying the Deep Neural Network to Estimate Future Trend and Uncertainty of Rainfall under Climate Change	2022	Shiu-Shin Lin, Wei-Li Yeh, Kai-Yang Zhu, Yu-Dong Ho and Wei- Cheng Wu	<p>1) This study proposes a deep neural network (DNN) as a downscaling framework to compare original variables.</p> <p>2) The nonlinear data features extracted by kernel principal component analysis (KPCA).</p> <p>3) It uses them as learning data for Deep neural network (DNN) downscaling models to assess future</p>

				<p>regional rainfall trends and uncertainties in islands with complex terrain.</p> <p>4) Monthly rainfall data of case regions from January 1950 to December 2005 in the Central Weather Bureau in Taiwan.</p>
9	Spatio-temporal rainfall variability over different meteorological subdivisions in India: analysis using different machine learning techniques	2021	Gyanendranath Mohapatra, V. Rakesh, Smrati Purwar & A. P. Dimri	<p>1) Machine learning techniques such as cluster analysis (CA) and principal component analysis (PCA) were used on the data.</p> <p>2) Monthly rainfall data of 117 years (1901–2017) from India Meteorological Department over 36 meteorological subdivisions in India is used in this study.</p> <p>3) Hierarchical clustering method was used to identify the homogeneous clusters in India.</p> <p>4) Based on clustering the regions were classified into dry, wet, and transition groups.</p> <p>5) Both CA and PCA showed high rainfall variability in Groups which contained areas from Kerala, Konkan, and coastal Karnataka.</p> <p>6) Also, low rainfall variability was observed in Groups which comprise subdivisions from east, north, and central part of the country.</p>
10	Urban Rainfall Forecasting Method Based on Multi-model Prediction Information Fusion	2020	Liu Huang, Xuejun Liu and Heyi Wei	<p>1) This paper proposes a multi-model information fusion forecasting method based on SVR model and RBF model.</p> <p>2) The rainfall data of Wuhan during 1980-2016 were used to verify the practicability of the multimodal information fusion method.</p> <p>3) The research results show that compared with the single forecast model, the multimodal information fusion forecasting method can improve the forecasting accuracy.</p>

11	Exploratory data Analysis of Indian Rainfall Data	2001	Anusha Gajinkar	1) This Study shows that, India has two monsoon rainfall season one is north west monsoon and second one is south east monsoon.
12	Spatial analysis of Indian Summer monsoon Rainfall	2014	Markand Oza C.M.Kishtawal	1) Understanding the variability in rainfall, analysis of Indian Summer monsoon rainfall using Spatial resolution.
13	Climate impacts on Indian Agriculture.	2004	K.Krishna kumar K.Rupa Kumar R.G.Ashrit N.R.Deshpande J.W.Hansen	1) Presents about the analysis of Crop-climate relationships for India, using historical predictions.