Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 6, June : 2024

ARTIFICIAL INTELLIGENCE BASED RAINFALL PROPHECY USING PERFORMANCE EVALUATION OF DEEP NEURAL NETWORK

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ABSTRACT:

India is an agricultural country and its economy is largely based upon crop productivity and rainfall. For analyzing the crop productivity, rainfall prediction is require and necessary to all farmers. Rainfall Prediction is the application of science and technology to predict the state of the atmosphere. It is important to exactly determine the rainfall for effective use of water resources, crop productivity and pre planning of water structures. Using different data mining techniques it can predict rainfall. Data mining techniques are used to estimate the rainfall numerically. This paper focuses some of the popular data mining algorithms for rainfall prediction. Naive Bayes, K-Nearest Neighbour algorithm, Decision Tree, Neural Network and fuzzy logic are some of the algorithms compared in this paper. From that comparison, it can analyze which method gives better accuracy for rainfall prediction.

Keywords:

INTRODUCTION:

Rainfall Prediction is one of the most challenging tasks. Though already many algorithms have being proposed but still accurate prediction of rainfall is very difficult. In an agricultural country like India, the success or failure of the crops and water scarcity in any year is always viewed with greatest concern. A small fluctuation in the seasonal rainfall can have devastating impacts on agriculture sector. Accurate rainfall prediction has a

potential benefit of preventing causalities and damages caused by natural disasters. Under certain circumstances such as flood and drought, highly accurate rainfall prediction is useful for agriculture management and disaster prevention. In this paper, various algorithms have been analyzed. Data mining techniques are efficiently used in rainfall prediction.

EXISTING SYSTEM

Agriculture is the strength of our Indian economy. Farmer only depends upon monsoon to be their cultivation. The good crop productivity needs good soil, fertilizer and also good climate. Weather forecasting is the very important requirement of the each farmer. Due to the sudden changes in climate/weather, The people are suffered economically and physically. Weather prediction is one of the challenging problems in current state. The main motivation of this paper to predict the weather using various data mining techniques. Such as classification, clustering, decision tree and also neural networks. Weather related information is also called the meteorological data. In this paper the most commonly used weather parameters are rainfall, wind speed, temperature and cold.

POPOSED SYSTEM

Rainfall is important for food production plan, water resource management and all activity plans in the nature. The occurrence of prolonged dry period or heavy rain at the critical stages of the crop growth and development may lead to significant reduce crop yield. India is an agricultural country and its economy is largely based upon crop productivity. Thus rainfall prediction becomes a significant factor in agricultural countries like India. Rainfall forecasting has been one of the most scientifically and technologically challenging problems around the world in the last century.

LITERATURE SURVEY

Pritpal Singh et al.[1] Measurable investigation shows the idea of ISMR, which can't be precisely anticipated by insights or factual information. Hence, this review exhibits the utilization of three techniques: object creation, entropy, and artificial neural network (ANN). In view of this innovation, another technique for anticipating ISMR times has been created to address the idea of ISMR. This model has been endorsed and supported by the studio and exploration data. Factual examination of different information and near

investigations showing the presentation of the normal technique Sam Carmer , Michael Kampouridis, Alex A. Freitas , Antonios Alexandridis et al.[2] The primary impact of this movement is to exhibit the advantages of AI calculations, just as the more prominent degree of clever framework than the advanced rainfall determining methods. We analyze and think about the momentum execution (Markov chain stretched out by rainfall research) with the forecasts of the six most notable AI machines: Genetic programming, Vector relapse support, radio organizations, M5 organizations, M5 models, models - Happy. To work with a more itemized appraisal, we led a rainfall overview utilizing information from 42 metropolitan urban communities. Sahar Hadi Poura , Shamsuddin Shahida, Eun-Sung chungb et al. [3] RF was utilized to anticipate assuming that it would rain in one day, while SVM was utilized to foresee downpour on a blustery day. The limit of the Hybrid model was fortified by the decrease of day-by-day rainfall in three spots at the rainfall level in the eastern piece of Malaysia. Crossover models have likewise been found to emulate the full change, the quantity of days straight, 95% of the month-to-month rainfall, and the dispersion of the noticed rainfall Tanvi Patil, Dr. Kamal Shah et al. [4] The reason for the framework is to anticipate the climate sooner or later. Climatic still up in the air utilizing various sorts of factors all over the place. Of these, main the main highlights are utilized in climate conjectures. Picking something like this relies a great deal upon the time you pick. Underlying displaying is utilized to incorporate the fate of demonstrating, AI applications, data trade, and character examination. N.Divya Prabha, P. Radha et al. [5] Contrasted with different spots where rainfall information isn't accessible, it consumes a large chunk of the day to build up a solid water overview for a long time. Improving complex neural organizations is intended to be a brilliant instrument for anticipating the stormy season. This downpour succession was affirmed utilizing a complex perceptron neural organization. Estimations like MSE (Early Modeling), NMSE (Usually Early Error), and the arrangement of informational collections for transient arranging are clear in the examination of different organizations, like Adanaive. AdaSVM. Senthamil Selvi S, Seetha et al. [6] In this paper, Artificial Neural Network (ANN) innovation is utilized to foster a climate anticipating strategy to distinguish rainfall utilizing Indian rainfall information. Along these lines, Feed Forward Neural Network

(FFNN) was utilized utilizing the Backpropagation Algorithm. Execution of the two models is assessed dependent on emphasis examination, Mean Square Error (MSE) and Magnitude of Relative Error (MRE). This report likewise gives a future manual for rainfall determining. YashasAthreya, VaishaliBV, SagarK and SrinidhiHR, et al.[7] This page features rainfall investigation speculations utilizing Machine Learning. The principle motivation behind utilizing this program is to secure against the impacts of floods. This program can be utilized by conventional residents or the public authority to anticipate what will occur before the flood. The flood card, then, at that point, furnish them with the vital help by moving versatile or other important measures.

METHODOLOGY

- Data Collection
- Data Cleaning
- Data Selection
- Data Transformation
- Data Mining Stage

Data Collection: The data used for this work was collected from meteorologist‟s centre. The case data covered the period of 2012 to 2015. The following procedures were adopted at this stage of the research: Data Cleaning, Data Selection, Data Transformation and Data Mining.

Data Cleaning : In this stage, a consistent format for the data model was developed which is search missing data, finding duplicated data, and weeding out of bad data. Finally system cleaned data were transformed into a format suitable for data mining.

Data Selection: At this stage, data relevant to the analysis like decision tree was decided on and retrieved from the dataset. The Meteorological dataset had ten attributes in that were using two attributes for future prediction. Due to the nature of the Cloud Form data where all the values are the same and the high percentage of missing values in the sunshine data both were not used in the analysis.

Data Transformation: “This is also known as data consolidation”. It is the stage in which the selected data is transformed into forms appropriate for data mining. The data file was saved in Commas Separated Value (CVS) file format and the datasets were normalized to

reduce the effect of scaling on the data.

Data Mining Stage: The data mining stage was divided into three phases. At each phase all the algorithms were used to analyse the meteorological datasets. The testing method adopted for this research was percentage split that train on a percentage of the dataset, cross validate on it and test on the remaining percentage. There after interesting patterns representing knowledge were identified.

DATA FLOW DIAGRAM

1. The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.
2. The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.
3. DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow and the transformations that are applied as data moves from input to output.
4. DFD is also known as bubble chart. A DFD may be used to represent a system at any level of abstraction. DFD may be partitioned into levels that represent increasing information flow and functional detail.

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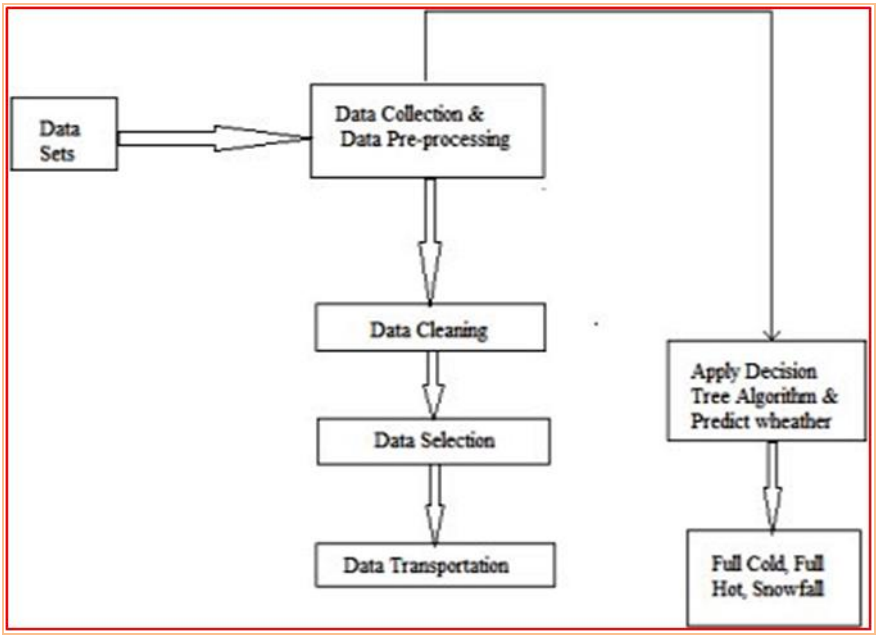

Figure:1 Proposed Methodology

A quality output is one, which meets the requirements of the end user and presents the information clearly. In any system results of processing are communicated to the users and to other system through outputs. In output design it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system‟s relationship to help user decision-making.

The output form of an information system should accomplish one or more of the following objectives.

- ❖ Convey information about past activities, current status or projections of the Future.
- ❖ Signal important events, opportunities, problems, or warnings.
- ❖ Trigger an action.
- ❖ Confirm an action.

RESULTS AND DISCUSSION

Decision Tree, Random Forest, Simple Linear Regression and multinomial regression are the classification method used for time series predict in this research work. Two group are separated from the data set for training and for testing the algorithms of classification. To execute the classification algorithms, the tool used is flask webapp data examination. For

classification procedure no more than a separation of data is particular from the loaded data. To choose a subset from innovative data, "Select attribute" are utilised by the operative. The preferred subset is then subjected to "X-Validation" operator. It develop the classification representation which is validated by the test data.

#	Month	Rainfall in mm
1	June	[[248.46084848]]
2	July	[[468.73087879]]
3	August	[[258.79024242]]
4	September	[[128.78860606]]
5	October	[[35.13563636]]

Figure2: Showing Months of Rainfall Prediction

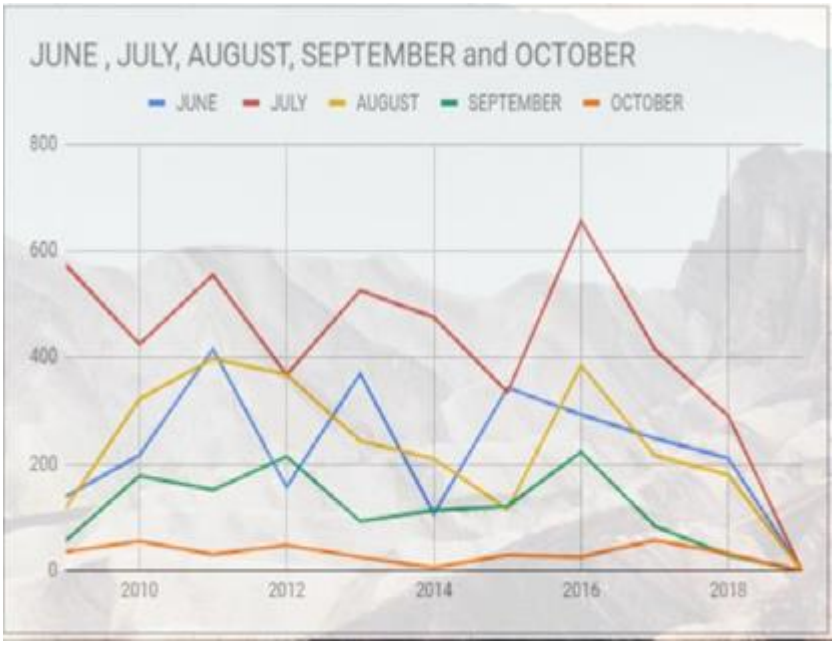

Figure3: Prediction of June month to September

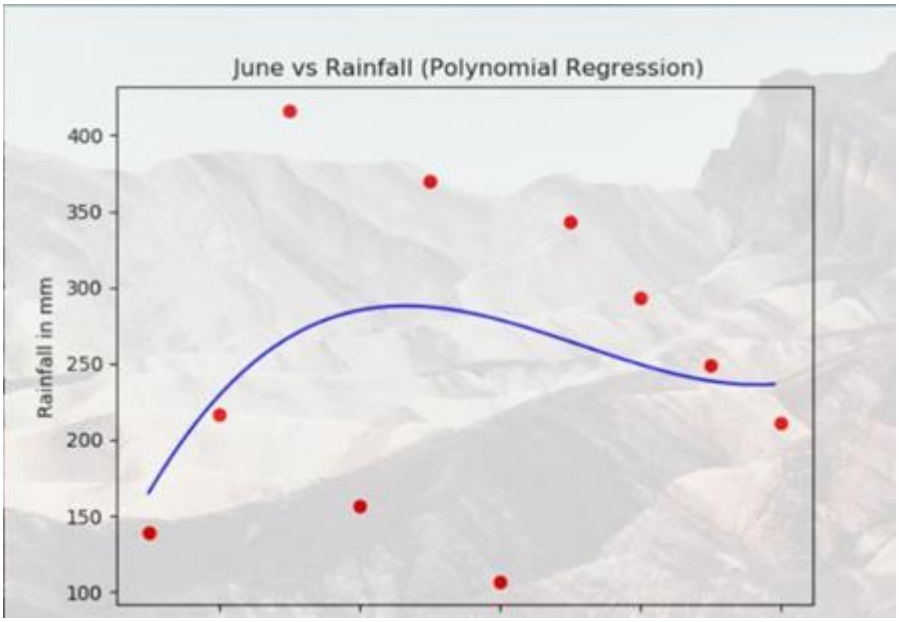

Figure4: Showing Polynomial Regression

CONCLUSION

Weather forecasting is a meteorological work that easy to modify researcher work by applying the numerical weather prediction method. Weather forecasted by using various data mining techniques especially classification clustering and neural network, decision tree. The key aim for improving the classification and prediction performance for the traditional; weather prediction model is designed and developed in this work. But some limitation of the model is also observed, thus in near future need to be review before use of the proposed technique. And also soil there are some issues and challenges in which better implement of data mining technique should be implemented in field of weather forecasting.

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