



Analysis of Data Mining Techniques for Weather Prediction

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Abstract-Weather Prediction is a scientifically and technologically grueling problem ever. Now days, Cloudburst is one of the important cast problems. Because, it results into huge disastrous, further than 20 mm of rain may fall in a many twinkles. It also responsible for flash flood tide creation. Due to this type of unforeseen flood tide, the people are affected economically and physically veritably much. thus it's demanded to read rainstorm in early to avoid disastrous. The main end of the paper is to survey the colorful cast ways for rainstorms using Data Mining and Artificial Neural Network(ANN), in the literature.The most generally used parameters for assaying the rainstorm cast temperature, downfall, evaporation and windspeed. From the study, it came to know that soothsaying using big data analytics is the stylish result to get accurate rainstorm vaticination.

Keyword--Weather data, Data Mining, Weather Conditions, Decision Trees, future forecasting, Ensemble Prediction.

INTRODUCTION:

Data mining is a process which finds useful patterns from large quantum of data. Data mining can also be defined as the process of rooting implicit, preliminarily unknown and useful information and knowledge from large amounts of noisy, nebulous, arbitrary, deficient data for practical operation. It is a important new technology with great eventuality to help companies concentrate on the most important information in their databases. It uses machine literacy, statistical and visualization fashion to discover and prognosticate knowledge in a form which is understandable to the stoner. vaticination is the most important fashion of data mining which employs a set of pre-classified exemplifications to develop a model that can classify the data and discover the relationship between independent and dependent data. Weather predictions the operation of wisdom and technology to prognosticate the state of the atmosphere for a given position. It's getting decreasingly vital for scientists, agronomists, growers, global food security, disaster operation and affiliated associations to understand the natural

marvels to plan and be prepared for the future. The art of rainfall vaticination began with early societies using reenacting astronomical and meteorological events to help them cover seasonal changes in the rainfall. Throughout the centuries, attempts have been made to produce vaticinations grounded on rainfall changes and particular compliances. numerous meteorological instruments were being meliorated during the former centuries. Other affiliated developments that are, theoretical, and technological developments, also contributed to our knowledge of the atmospheric rainfall conditions. Weather vaticination is an important thing of atmospheric exploration.

Weather Prediction:

1) Synoptic rainfall vaticination It is the traditional approach in rainfall vaticination. Synoptic refers to the observation of different rainfall rudiments within the specific time of observation. In order to keep track of the changing rainfall, a meteorological center prepares a series of synoptic maps every day, which forms the veritably introductory of rainfall vaticinations. It involves huge collection and analysis of experimental data attained from thousands of rainfall stations.

2) Numerical rainfall vaticination It uses the power of computer to prognosticate the rainfall. Complex computer programs are run on supercomputers and give prognostications on numerous atmospheric parameters. One excrescence is that the equations used are not precise. However, the vaticination won't be entirely accurate, If the original stage of the rainfall isn't fully known.

3) Statistical rainfall vaticination They are used along with the numerical styles. It uses the once records of rainfall data on the supposition that the future will be a reiteration of once rainfall. The main purpose is to find out those aspects of rainfall that are good pointers of the unborn events. Only the overall rainfall can be prognosticated in this way. Repetition of once rainfall. The main purpose is to find out those aspects of rainfall that are good pointers of the unborn events. Only the overall rainfall can be prognosticated in this way.

BACKGROUND STUDY

System for Weather Prediction In Weather vaticination, there are three styles available.

* Synoptic Weather vaticination

* Numerical Weather vaticination

* Statistical Weather vaticination

1) Synoptic Weather Prediction In metrological center, they give synoptic map for every day. Within a Specific time, different rainfall parameters are observed. Different data collection and the study of experimental data observed from thousands of rainfall stations.

2) Numerical Weather Prediction The capability of computer to prognosticate the rainfall is known as Numerical Weather Prediction. However, the vaticination won't be fully accurate, If the original stage of the rainfall isn't completely known.

3) Statistical Weather vaticination Pure Statistical styles are used to prognosticate the rainfall, along with numerical styles are also available. It used once records of rainfall parameters to prognosticate the unborn circumstance.

LITERATURE REVIEW

Sr. No.	Authors	Prediction Model	Conference/Journal and Year	Technique	Conclusion
1	Marwa Farouk M.Ali, Somia A. Askany, M. Abd El-wahab, M.A.Hassan	Changes in the weather elements such as temperature, air pressure, moisture, and wind direction	International Journal of Computer Science and Network Security, VOL.19 No.9, September 2019	Data Mining	In this work we have performed experiments and compared data mining algorithms including Naive Bayes, KNN and Decision tree for weather forecast phenomena. The results portrayed that Decision tree more successful in classifying and modelling Data set it also proved its effectiveness in both classification and perdition. The behaviour of KNN algorithm was the weakest among the three algorithms. Naive Bayes which is a simple classifier based on Bayes theorem, is a simple classifier to apply and proves to be efficient in performance against the other two classifiers used as it gives
2	Aishwarya Dhore, AnaghaByakude, Bhagyashri Sonar, Mansi Waste	Climate change	International Research Journal of Engineering and Technology May - 2017	Data Mining	This system presents a first glance on a project to build a numerical weather prediction model in local weather. Such models are usually complex and will take significant time and resources to accomplish. Collect and have all required data and build a historical dataset of weather, precipitation and all possible related attributes. It accepts all complex parameters as input and generates the intelligent patterns while training and it uses the same patterns to generate the forecasts.
3	M. Viswambari, Dr. R. AnbuSelvi	estimating the availability of sunshine	International Conference on Computer Communication and Informati	Data Mining	The weather is predicted or forecasted by using various techniques especially back propagation, neural network, data collection. Still there are some issues and challenges in which better implement of data mining technique should be implemented in the field of weather forecasting.

			(ICCCI-2013), PP:1-4,2013		
4	P.Kalaiyarasi, Mrs.A.Kalais elvi	rain, fog, winds, clouds, lightenin g, storm	International Journal of Computer Science Trends and Technology (IJCT) – Volume 6 Issue 3, May - June 2018	Data Mining	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.
5	FolorunshoOl aiya	predicting the weather	Information Engineering and Electronic Business, 2012	Data Mining, Weather Forecasting.	In this work the C5 decision tree classification algorithm was used to generate decision trees and rules for classifying weather parameters such as maximum temperature, minimum temperature, rainfall, evaporation and wind speed in terms of the month and year. The data used was for Ibadan metropolis obtained from the meteorological station between 2000 and 2009. The results show how these parameters have influenced the weather observed in these months over the study period.
6	Fahad Sheikh, S. Karthick, D. Malathi, J. S. Sudarsan and C. Arun	Weather prediction	Indian Journal of Science and Technology, October 2016	Data Mining	For the current application of data mining in weather prediction domain, the analysis of Naïve Bayes and C4.5 Decision Tree algorithm was done simultaneously with dataset containing weather data collected over a period of 2 years. It was found that the performance of C4.5 (J48) decision tree algorithm was far better than that of Naïve Bayes. The accuracy for C4.5 was 88.2% with respect to classifying the instances correctly. On the other hand, Naïve Bayes showed a poor performance of 54.8% while classifying the instances.

7	Gaurav J. Sawale, Dr. Sunil R. Gupta	Data mining	International Journal Of Computer Science And Applications Vol. 6, No.2, Apr 2013	Data Mining, Weather Forecasting.	When tested on real adats set of 3 year period, the performance of the Back Propagation Network and Hopfield Network Model was satisfactory as there were not substantial number of errors in categorizing. Back Propagation Network and Hopfield Network based approach for weather forecasting is capable of yielding good results and can be considered as an alternative to traditional meteorological approaches. In this paper, Back Propagation Neural Network and Hopfield Network Model is used for predicting the atmospheric condition based on the training set provided to the neural network. This is the first approach of weather prediction which combines both Back Propagation Network (BPN) and Hopfield Network Model effectively.
8	Prof. Shubhangi G. Malas, Prof. Pavan N.Mundhare	Weather Prediction and Climate Change Studies using Data Mining Techniques	JETIR April 2019	Weather Prediction, Data Mining, Artificial Neural Networks, Decision Trees.	In this work, the C5 choice tree arrangement calculation was utilized to create choice trees and guidelines for characterizing climate parameters, for example, greatest temperature, least temperature, precipitation, vanishing and wind speed as far as the month and year. The information utilized was for Ibadan city gotten from the meteorological station somewhere in the range of 2000 and 2009. The outcomes show how these parameters have affected the climate seen in these months over the investigation time frame. Given enough information the watched pattern after some time Artificial Neural Networks can distinguish the connections between the info factors and produce yields dependent on the watched examples inborn in the information with no requirement for programming or creating complex conditions to display these connections. parameter and utilize these to anticipate future climate conditions.
9	SanikaSarode, Puja Girkar, Samiksha Kanekar, Saurabh Mishra, Rohini Patil5	Different Data Mining Techniques for Weather Prediction	International Research Journal of Engineering and Technology (IRJET)03	meteorological data, data mining, back propagation.	The proposed survey analyzes the use of data mining techniques in forecasting weather. This can be carried out using data mining techniques like classification and clustering techniques and the algorithm like Decision tree J48 Algorithm K-Means clustering algorithms, Back propagation

			Mar-2018		,Numerical method, Expectation Maximization,Statistic method has been applied to the data collected in specific time. This paper determines the effective computer based method to predict weather based on parameters like accuracy, execution time and usage.
10	Sultan Shekana ,AddisuMulu geta,Durga Prasad Sharma	Weather Variability Forecasting Model through Data Mining Techniques	International Journal of Advanced Computer Science and Applications, Vol. 11, No. 9, 2020	Meteorological data; weather forecasting; multilayer-perceptron; Naïve Bayes; multinomial logistic regression algorithms	Applications of data mining techniques have been increasingly getting popularity and proved to be relevant for the sectors like meteorology, health care, telecommunications, and banking etc. In particular, the meteorology sector has significant possibilities where data mining can be applied for weather variability forecasting to improve the accuracy of weather forecasting and to support decision-makers towards better disaster management. This research study is an attempt to design a forecasting model for the weather variability using data mining techniques in general and Dodota Woreda region as a case.
11	Siddhant Revankar, Shaba Desai.	Rainfall prediction, Naive Bayes, K-Nearest Neighbor, Climate change, Weather patterns	International Journal of Engineering Research in Computer Science and Engineering (IJERCSE) Vol 5, Issue 2, February 2018	Weather Forecasting Using Data Mining	In this paper, Bayesian and K-NN process were implemented. The Bayesian prediction model can easily learn new classes. The accuracy will grow with the increase of learning data. The model returns good prediction results. The negative part of model is, when a predictor category is not present in the training data, the model assumes that a new record with that category has zero probability. This could be a major issue if this rare predictor value is important. On the hand KNN is effective when data is large but finding unknown patterns like forecasting the future trends.
12	K C Gouda, Chandrika M	Weather data, Data Mining, Weather Conditions, Decision Trees, future forecasting, Ensemble Prediction.	International Journal of Engineering Trends and Technology (IJETT) – Volume 32 Number 1- February 2016	Data Mining for Weather and Climate Studies.	As the monsoon rainfall information is very useful for the users across all the sectors so in this study the detailed classification of rainfall categories using IMD observed data is carried out. Using this algorithm (which can analyze very large climate data) the 53 year climate aspect of Indian monsoon is studied. The result shows that this is an efficient algorithm to understand the categorical analysis of rainfall at different spatial scale like talk level to district level to state as a whole. This work can be used

				an input for the study of climatic change over the Indian monsoon region at higher resolution.
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CONCLUSION

In the literature surveyed it was observed that, Marwa et al (2019), had used decision tree based classifier for effective classification and prediction in weather changes and forecasting. Dhore et al (2017), build a numerical weather prediction model for local weather. Viswambari et al (2013), uses back propagation neural network in the field of weather forecasting. Kalaiyarasi et al (2018) applied clustering, neural network and decision tree for improving the classification and prediction accuracy. Folorunsho Olaiya (2012) uses C5 Decision Tree Classification algorithm and observed that various weather parameters influences the classification accuracy. Fahad Sheikh et al (2016) applied C4.5 Decision Tree and Naive Bayes classifier, the accuracy of C4.5(J48) is 88.2% found to be better amongst the two algorithms. Sawale et al (2013) implement Back propagation network (BPN) and Hopfield Network Model effectively. Artificial Neural Network approach was utilized to check the affect of various climatic parameters to predict climatic conditions by Malas et al (2019). Sarode et al. (2018) applied different techniques including Decision tree J48, k-means clustering, Back propagation, numerical methods and statistical methods to predict weather forecast. Bayesian and KNN process was implemented by Revankar & Desai for forecasting the future trends in weather patterns. Decision trees was applied on IMD data to understand categorical analysis of rainfall in Indian Monsoon region. Studying the various methods and techniques we suggest the use of Decision tree technology is used by more authors and found to be more effective for weather forecasting.

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