ANALYSIS ON THE WEATHER FORECASTING AND TECHNIQUES

Janani.B
PG Scholar
Department of cse
SNS college of Engineering

PriyankaSebastian
PG Scholar
Department of cse
SNS College of Engineering

ABSTRACT

Weather Forecasting is a scientific estimation of forecasting the weather. Weather is observing the state of atmosphere at the given period of time. To predict the weather is one of the most challenging task to all the researchers and scientist. Parameters that are considered for predicting weather are temperature, rainfall, humidity and wind. The prediction is made based on the past values. The future values are estimated based on the past meteorological record. Hence it is termed as numerical based model. Weather plays a major role in Agriculture and the industries. Bringing out the Accuracy in the weather prediction is still under research. In this paper we focus on various techniques that are used for weather prediction. Nearly about 10 papers are compared with their problem, techniques and tools that are used in the paper with its own advantage and disadvantage. Several approaches are used in but the Artificial neural network and the concept of fuzzy logic provides a best solution and prediction comparatively.

LITERATURE SURVEY

1) SUPPORT VECTOR MACHINES

Support Vector Regression (SVR) is used to predict the maximum temperature at a location. Minimizes an upper bound on the generalization error and training error is not considered. So it performs better than conventional techniques which may suffer from possible over fitting. SVM performs better than MLP trained with back propagation algorithm for all orders [1]. SVM has a significant effect on the performance of the model. Through proper selection of the parameters, Support Vector Machines can replace some of the neural network based models for weather prediction applications.

2) ARTIFICIAL NEURAL NETWORK

Temperature is predicted based on the neural network algorithm which supports different types of training algorithms. The algorithm used is Back propagation Algorithm. Advantages of using the BPN (i) it can fairly approximate a large class of functions. (ii) More efficient than numerical differentiation. (iii) Has potential to capture the complex relationships between many factors that contribute to certain temperature [3]. It approximates large class of functions and non linear parameter with better accuracy

TIME SERIES ANALYSIS FOR WEATHER FORECASTING

Time Series Analysis captures the data groups and data variables in the specified time. Experimental results obtained using the proposed network and generalisation capacity of model [2]. The forecasting reliability was evaluated by comparing the actual and predicted temperature values. The results show that the network can be an important tool for temperature forecasting.

FUZZY POLLUTION CONCENTRATIONS

Analyses the fuzzy weather forecasts, which are computed in the system and used to forecast pollution concentrations and to investigate the effectiveness of forecasting pollution concentrations, [8] putting the dependence between particular attributes, describing the weather forecast in order and proving the applicable fuzzy numbers in air pollution forecasting.

FUZZY C-MEAN AND TYPE-2 FUZZY LOGIC

The use of heterogeneous data causes increased uncertainty, where large amount of data should be processed; this procedure is time consuming and needs very powerful computers. An effective method is proposed based on Fuzzy c-

mean clustering and type-2 fuzzy logic [4]. This proposed method is very effective on uncertainty data which lead to true prediction. Type-2 FLS have been using in local area and it is not applicable for large amount of data because of its time-consuming procedure. The results proved hybrid method is applicable for both local and global area.

FUZZY LOGIC BASED RAINFALL PREDICTION MODEL

The developed Fuzzy Logic model is made up of two functional components; the knowledge base and the fuzzy reasoning or decision-making [5]. Two operations (i) the fuzzification operation and (ii) defuzzification operation. The predicted outputs were compared with the actual rainfall data. Fuzzy methodology is efficiently capable of handling scattered data. The developed fuzzy rule-based model shows flexibility and ability in modeling an ill-defined relationship between input and output variables.

PREDICTION OF WEATHER BY USING BACK PROPAGATION ALGORITHM

Developed for weather forecasting and processing information, a weather forecasting kit, is used for transferring the data using wireless medium. Components or sensors like wind sensor, rain sensor, thermo-hydro sensor are used. These sensors are used for recording the parameters like wind, rainfall, temperature and humidity respectively. The recorded parameters are shown on wireless display and also on the PC [6]. It will classify, compare and predict the change on other parameters of weather by changing any one parameter which was recorded by the sensors.

Most powerful prediction algorithm called back propagation algorithm is used to predict weather [7]. A 3-layered neural network is designed and trained with the existing dataset and obtained a relationship between the existing non-linear parameters of weather. The trained neural network can predict the future temperature with less error is examined clearly.

FUZZY LOGIC TO FORECAST SEASONAL RUNOFF

The applicability of fuzzy logic modelling techniques for forecasting water supply was investigated. Fuzzy logic is applied successfully that has the relationship between cause and effects are vague. Fuzzy variables were used to organize knowledge that is expressed 'linguistically' into a formal analysis. Water supply forecast was created that classified potential runoff into three forecast zones: 'low', 'average' and 'high'. Fuzzy logic has a promising potential for providing reliable water supply forecasts.

CASE-BASED REASONING AND FUZZY SET THEORY

A fuzzy k-nn weather prediction system can improve the technique of persistence climatology using direct, efficient, expert-like comparison of past and present weather cases. Persistent climatology is an analog forecasting technique for recognizing for short range weather prediction [9]. The proposed fuzzy k-nn system compares past and present cases directly and it uses only a specific limited set of predictors. This helps to make airport weather predictions more accurate, which will make air travel safer and make airlines more profitable.

DIAGNOSIS IN WEATHER FORECASTING

The diagnostic meteorology provides a basis for understanding the gap between forecasters and researchers. It should give some foundation for diagnostic meteorology and it is not a burden from which forecasters should be relieved [10]. Instead, it is an essential component of scientific forecasting.

REFERENCES
[1] Y.Radika And M. Shashi, "Atmospheric Temperature Prediction Using Support Vector Machines," International Journal Of Computer Theory And Engineering,vol.1,no.1,Apr 2009.

[2] Abhishek Agarwal,Vikash Kumar, Ashish Pandey, Imran Khan, " An Application Of Time Series Analysis For Weather Forecasting", International Journal Of Engineering Research Application ,Mar - Apr 2012.

[3] Dr.S.Santhosh Baboo And I.Kadar Shereef, "An Efficient Weather Forecasting System

Using ANN" International Journal Of Environment science and development,vol.1,no.4,oct 2010.

[4] Ahmad Shahi, Rodziah Binti Atan, Md. Nasir Sulaiman "An Effective Fuzzy C-mean And Type-2 Fuzzy Logic For Weather Forecasting" Journal Of Theoretical And Applied Information Technology , 2009.

[5] Agboola A.H, Gabriel A. J, Aliyu E.O, Alese B.K. "Development Of A Fuzzy Logic Based Rainfall Prediction Model " International Journal Of Engineering And Technology Volume 3 No. 4 , April 2013 .

[6] Sanjay D. Sawaitul, Prof. K. P. Wagh, Dr. P. N. Chatur "Classification And Prediction Of Future Weather By Using Back Propagation Algorithm-An Approach" International Journal Of Emerging Technology And Advanced Engineering ,Volume 02, Issue 1, January 2012.

[7] Ch.Jyosthna Devi , B.Syam Prasad Reddy, K.Vagdhan Kumar,b.Musala Reddy,n.Raja "ANN Approach For Weather Prediction Using Back Propagation", International Journal Of Engineering Trends And Technology- Volume3, 2012.

[8] D. Domanskam. Wojtylak, "Fuzzy Weather Forecast In Forecasting Pollution Concentrations".

[9] Bjarne K. Hansen And Denis Riordan ,"Weather Prediction Using Case-based Reasoning And Fuzzy Set .

[10] Charles A. Doswell Iii And Robert A. Maddox ,"The Role Of Diagnosis In Weather Forecasting" 11th Conf.Weather Forecasting And Analysis June 1986