INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

SPECIAL ISSUE FOR
2nd NATIONAL CONFERENCE ON
"Recent Trends and Development in Civil Engineering"

A REVIEW ON RAINFALL FORECASTING

HEMADRIBA GOHIL[1], MINA DODIYAR[1], SWETA GARASIYA[1], KAUSHAL RAVAL [2]

1. UG Student, Department of Civil Engineering, Shankersinh Vaghela Bapu Institute of Technology, Gandhinagar, Gujarat – 382650
2. Assistant Professor, Department of Civil Engineering, Shankersinh Vaghela Bapu Institute of Technology, Gandhinagar, Gujarat – 382650

Abstract: Rainfall forecasting is one of the most challenging topics across the earth. Rainfall plays an important role in agriculture so forecast of rainfall is necessary for the better economy growth of our country. Rainfall forecasting is extremely important in water resource engineering like proper management of flood and mitigation, droughts. The intensity of rainfall and its distribution in the temporal depend on many variables, such as pressure, temperature and direction. In this study we used SPSS method for rainfall forecasting.

Keywords: Rainfall, Artificial Natural Network

Corresponding Author: HEMADRIBA GOHIL

Access Online On:

www.ijpret.com

How to Cite This Article:

PAPER-QR CODE

INTRODUCTION

Agriculture is the backbone of Indian economy. Irrigation facilities are still not so good in India and most of agriculture depends upon rain. A good rainfall result in the occurrence of a dry period for a long time or a heavy rain both affect the crops yield as well as economy of country, so due to that early forecast of rainfall is vital [1] . Accurate forecasting of rainfall has been one of the most important issues in hydrological research because early warnings of sewer weather can help prevent quantities and damage caused by natural disasters. if it's timely The & perfectly forecasted. More accurate forecasting of monthly rainfall is considerably important in water resources management Rainfall forecasting is important for many catchment management applications in particular for flood warning systems Rainfall forecast provides advance information for many water quality problems [2].

LITERATURE REVIEW

Luk, Kin C et al (2001) Rainfall forecasting using ANNs has been the focus herein. Three types of ANNs appropriate for this task were identified, developed, and compared; these networks were l multilayer feed forward neural network (MLFN), l Elman partial regular neural network (Elman), and l time delay neural network (TDNN). All the above alternative networks could make reasonable forecast of rainfall one time step (15 minutes) ahead for 16 gauges concurrently. In addition, the following points were observed. For each type of network, there existed an optimal complication, which was a function of the number of hidden nodes and the lag of the network. All three networks had comparable performance when they were developed and trained to reach their optimal complexity. Networks with lower lag tended to outperform the ones with higher lag. This indicates that the 15min. rainfall time series have very short term memory characteristics [3].

Lin, Gwo Fong et al (2005) In this paper, an ANN is used to forecast typhoon rainfall. To increase the ability of description, the ANN model developed adopts two hidden layers. The primary objective of this paper is to investigate the effects of the typhoon characteristics and the spatial rainfall information on short-term typhoon-rainfall forecasting. First, the model configuration is evaluated using eight typhoon description. Different models including the lag-1 h, lag-2 h and lag-3 h are tried to arrive at the optimal model lag. It is found that the lag-2 h model has the best presentation for each rain gauge. In addition, the forecasts for two testing events (Typhoons Herb and Nelson) show that the model is capable of showing the trend of rainfall when a typhoon is nearby. Second, for getting better the model design, the effect of nearby rain gauges on the rainfall forecast at any given location in the study area is considered in the modelling. A semivariogram is also applied to determine the required number of nearby rain gauges whose rainfall information will be used as input to the model. Two testing events (Typhoons Herb and Nelson) support the conclusion that the rainfall can be well forecast by the

138

ANN model when the typhoon description and the suitable spatial rainfall information are used as inputs to the model. It is also found that too much spatial information cannot improve the generalization capability of the model, because the inclusion of unrelated information adds noise to the network and undermines the presentation of the network. The proposed model is recommended as an alternative to the existing methods, because it considers the influence of both the typhoon characteristics and the spatial rainfall information and requires less time for model development [4].

Nayak et al (2013) This paper reports a detailed survey on rainfall forecasting using different neural network architectures over twenty-five years. From the survey it has been found that most of the researchers used back circulation network for rainfall forecast and got significant results. The survey also gives a finish that the forecasting techniques that use MLP, BPN, RBFN, SOM and SVM are suitable to predict rainfall than other forecasting techniques such as statistical and numerical methods. However some limitation of those methods has been found. The extensive references in support of the different developments of ANN research provided with the paper should be of great help to ANN researchers to accurately forecast rainfall in the future [5].

Nayak et al (2006) By analyzing the response relationship between the groundwater of Shaping landslide and changes of rainfall, water level and other factors, the groundwater level forecast model of landslide based on influence factors was built using the CART algorithm. In this process, the optimal binary tree which reflects the complex mapping relationship between the groundwater level and the influence factors was generated. Then the important factors affecting the groundwater of shaping landslide were selected and the groundwater level forecast rule set was brief. The prediction results show that CART model can remove the connection between variables, reduce redundant information and improve forecast accuracy and efficiency. Compared to the PSO-SVR model, CART model with better fit and predictive ability of generalization can be used to predict landslide groundwater level [6].

Exploiting Data Mining Technique for Rainfall Prediction

Sethi et al (2014) Rainfall has an great impact on agriculture, economy not only in India but across the whole world In this paper we have proposed a method for rainfall forecast after analysis of Udaipur rainfall dataset which is derived by some data mining techniques like firstly apply connection analysis then regression analysis. So that we can predict rain in the future year by knowing climate factors which is very useful for farmers for their agriculture purpose. This is the only forecast regarding rain but not accurate because of climate factors. As we know that climate factors changes due to different reasons and here we have used some factors so other remaining factors can influenced the rain [7].

CONCLUSION

From this review paper it is concluded that a detailed on rainfall forecasting using different methods, based on the same rainfall forecasting can be done in statistical SPSS software, ANN, and data fit software. The detailed improved forecast of long term & short term rainfall can be done as well as accurately above.

REFERENCES

1. Hirani, Dhawal, and Nitin Mishra. "A survey on rainfall prediction techniques." International Journal of Computer Application 6.2 (2016): 28-42.

2. El-Shafie, Amr H., et al. "Artificial neural network technique for rainfall forecasting applied to Alexandria, Egypt." International Journal of Physical Sciences 6.6 (2011): 1306-1316.

3. Luk, Kin C., James E. Ball, and Ashish Sharma. "An application of artificial neural networks for rainfall forecasting." Mathematical and Computer modelling 33.6-7 (2001): 683-693.

4. Lin, Gwo Fong, and Lu Hsien Chen. "Application of an artificial neural network to typhoon rainfall forecasting." Hydrological Processes: An International Journal 19.9 (2005): 1825-1837.

5. Nayak, Deepak Ranjan, Amitav Mahapatra, and Pranati Mishra. "A survey on rainfall prediction using artificial neural network." International Journal of Computer Applications72.16 (2013).

6. Nayak, Purna C., YR Satyaji Rao, and K. P. Sudheer. "Groundwater level forecasting in a shallow aquifer using artificial neural network approach." Water Resources Management 20.1 (2006): 77-90.

7. Sethi, Nikhil, and Kanwal Garg. "Exploiting data mining technique for rainfall prediction." International Journal of Computer Science and Information Technologies 5.3 (2014): 3982-3984.