iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** VI **Month of publication:** June 2023

DOI: https://doi.org/10.22214/ijraset.2023.53208

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue VI Jun 2023- Available at www.ijraset.com

An Analytical Model for Prediction of Floods Using Machine Learning

Parashuram B B[1], Prof Mohamed Abdul Kader Jallani[2]
[1]*Student, School of Computer Science and Applications, Reva University*
[2]*Assistant Professor, Reva University, Bangalore-560064, India*

Abstract: One of the prodigious perquisites of Python is that you can build solutions for real time glitches. This applies in almost every manufacturing. From constructing models to forecast sicknesses to constructing web apps that can estimate the future sales of your online store, predict demand, predict future outcomes.
In this paper we proposed a binary logistic model which can forecast floods grounded on the regular rainfall index for every year in Kerala, India.
Keywords: Model Predicting, Logistic Regression, Flood Prediction, Forecasting, Machine Learning.

I. INTRODUCTION

As the industry grows, Companies are continually observing for methods to improve processes and reshape the world through data. In a few years, you can expect to find even more diverse ways of implementing Python models in your data science workflow.
Predictive modelling is a arithmetical method using machine learning and data excavating to forecast and prediction likely forthcoming consequences with the aid of historic and prevailing data. It works by investigating present and historical data and projecting what it acquires on a model produced to prediction likely consequences. Prognostic modelling can be used to envisage just about anything, from TV assessments and a customer's next acquisition to credit hazards and corporate earnings.
A predictive model is not stationary, it is authenticated or studied frequently to integrate fluctuations in the fundamental data. In other words, Predictive models make expectations based on what has occurred in the earlier and what is happening currently. If inward, new data illustrates variations in what
Is trendy now, the influence on the probable forthcoming outcome must be re premeditated, too. For instance, a software corporation could model historic sales data against marketing outflows across numerous provinces to produce a model for forthcoming income based on the influence of the promoting spent.
There are numerous means to relate prognostic models in the factual world. Most productions use prognostic programming either to discover the source of a problematic or to progress impending consequences. Applications comprise but are not limited to:

1) Speech identification
2) Discovering Fraud
3) Predicting Sales
4) Natural calamity relief
5) Business performance growth
6) News ordering
7) Vehicle preservation

II. LITERATURE REVIEW

In 2017, author Swapnil Bande and Dr. Virendra V. Shete[1] introduced Flood Prediction Model
In this method authors has created a model using environmental parameters such as humidity, temperature, pressure and rainfall were used by an array of sensors and then the data created is compared using ANN techniques.
Further, different machine learning techniques are compared and then the best results are obtained. The advantage in this model is that the author has used the Levenberg-Marquardt algorithm which uses momentum learning and given good accurate results.
An android application [kartika, n.d., 3] have been made by author Ni Komang Ega Kartika, Muhammad Ary Murti and Casi Setianingsih in 2019.

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In which, the application predicts output for next three months using Radial Basis Function Neural Network and Antares. Antares uses a RESTful approach for developing API. The output that are obtained by using datasets that are further carried out by three steps, they are testing, training and prediction.

In 2017, an alert application of flood was developed by author Jayashree S, Sarika S, Solai A L,Soma Prathibha [prathibhha, .d., 5]. In this paper authors have used ZigBee technology and the application also works when the network is not present. This means that this application is network independent.

The user can make an emergency call or might send the SMS to their family members. The alert application consists of user registration, display of dam water levels and safe zone mapping. Which means that the user can regularly get updates of the water level and can move to a safer place where the flood may not arise.

In 2019, author Arjun N, Prof. Nikhil Binoy C, Keerthi C, Sreerag S and Ashwin H Nair [nair, n.d., 7]

In this Method authors have searched about the water levels at two different places that are Dam and Canal. This means that the prediction of flood will be at two levels: Dam prediction and Canal prediction. Here in this model Multilayer Perceptron is used as a Neural Network. And as an activation function Back propagation and Tan-Sigmoid function for the network. The accuracy of this model is 78.

III. METHODS AND IMPLEMENTATION

In proposed method following steps were followed to gain results

1) Phase 1

Include essential Libraries of Python to build a model

```
import pandas as pd
import numpy as np
from sklearn import model_selection
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import
train_test_split
```

2) Phase 2

Extract data from the Dataset

```
df= pd.read_csv('kerala.csv')
```

To train regression model, conversion of yes, no to 0 & 1 is performed.

```
df['FLOODS'].replace(['YES','NO'],[1,0], inplace=True)
```

3) Phase 3

Model is constructed

```
X=df[['SEP','JUN','JUL']]
Y= df[['FLOODS']]
X_train,X_test,y_train,y_test=train_test_split(X,Y,test_size=0.4,random_state=100)
```

Next We Use Logistic Regression Model To Train

```
logreg= LogisticRegression()
logreg.fit(X_train,y_train)
```

4) Phase 4

Model is predicted

Next prediction is done

```
y_pred=logreg.predict(X_test)
print (X_test)
print (y_pred)
```

5) Phase 5:

Accuracy Calculated
from sklearn import metrics
print('value of Accurateness:
',metrics.accuracy_score(y_test, y_pred))
print('value of Recall: ',metrics.recall_score(y_test, y_pred, zero_division=1))
print("value of Precision:",metrics.precision_score(y_test, y_pred, zero_division=1))
Value of Accurateness: 0.854
Value of Recall: 0.884
Value of Precision: 0.851

Table 1: Proposed Method Results with Accuracy

Model Used	Accurateness	Recall	Precision
LogisticRegression	85.4%	88.4%	85.1%

IV. CONCLUSION

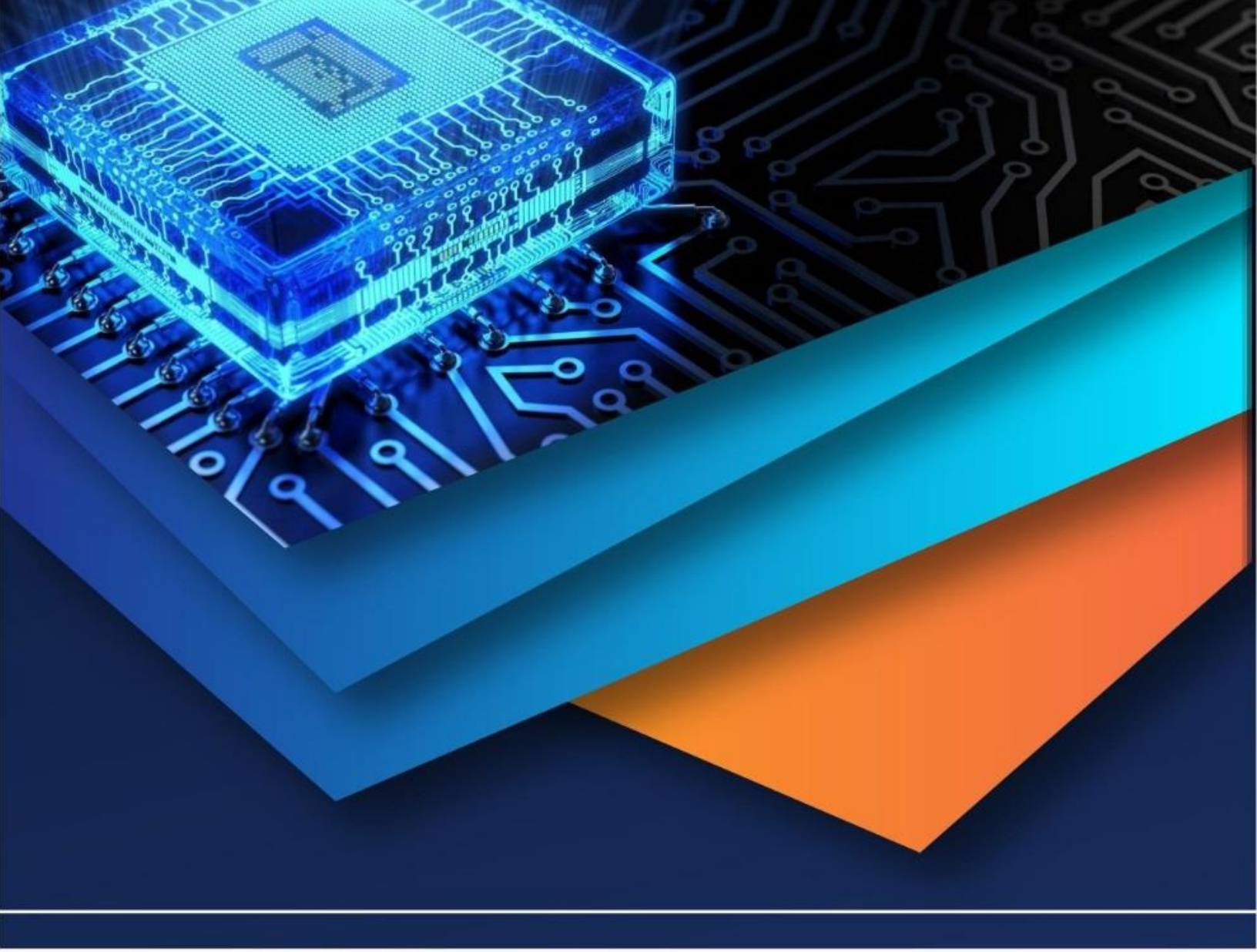
In the proposed method a novel model is built to predict the flood possibility based on rain fall on yearwise.
In the proposed d method linear regression method used and all steps are followed and described with results to demonstrate the prediction.
In proposed method accurateness achieved is 85.4% and recall value is 88.4% and precision is 85.1%.
Hence it has been concluded that model was succeeded in flood prediction.

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AUTHORS PROFILE

Parashuram B B is pursuing Master of Computer Applications, School of CSA, REVA University, Bengaluru, India. His area of interest includes machine learning
E-mail: parambleo21@gmail.com
Mohamed Abdul Kader Jailani N M.Tech, MCA is working as Assistant Professor in the school of CSA, REVA UNIVERSITY, Bengaluru, India. He passed both TN-SET and NET examinations. He is interested in doing research in image processing, machine and deep learning.
Email: jailani.msa@gmail.com



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