

METACOGNITION OF RAINFALL PREDICTION USING NAÏVE BAYES TECHNIQUE IN MACHINE LEARNING

¹Mrs Chaya P ²Kavya I ³Likhitha S ⁴M Tanushri ⁵Roshni Poovanna C

¹Assistant Professor ^{2,3,4,5}Student

¹Department Of Information Science and Engineering

¹GSSS Institute of Engineering and Technology for Women, Karnataka, India.

Abstract : Heavy rainfall prediction is a major problem for meteorological department as it is closely associated with the economy and life of human. The proposed framework uses machine learning technique which helps us to predict the rainfall in an efficient way by using the naïve bayes technique for decision making. Proposed system is an rainfall application which analyses the previous data related to temperature, region, area, year and various parameters can be considered for predicting the rainfall. The system is useful for the society as it is a real time application for rainfall prediction this helps the farmers to make right decision in right time, it helps farmers to get high profits.

Keywords: Machine Learning, Supervised Learning Technique, Prediction, Rainfall.

I. INTRODUCTION

India's foremost occupation is agriculture and its economy depends upon the agriculture of the country. But rainfall has a dramatic effect on agriculture. Hence, early prediction of rainfall is important for the better growth of the economy. Early prediction of rainfall has been one of the most challenging tasks in the world from past years. India is a country that consists of more than a billion people and more than 60% of this population are dependent upon agriculture for a living.

Rainfall prediction is helpful to avoid flood which save lives and properties of humans. Moreover, it helps in managing resources of water. Information of rainfall in prior helps farmers to manage their crops better which result in growth of country's economy. Fluctuation in rainfall timing and its quantity makes rainfall prediction a challenging task for meteorological scientists. The special field of rainfall prediction, which is necessary for all the people. Rainfall prediction plays a vital in preventing casualties caused due to natural disasters. It also helps us to maintain our water resources properly.

India is a country where agriculture and agriculture related industries are the major source of living for the people; agriculture is a major source of economy of the country. India is also one of the country which suffer from major natural calamities like drought or flood which damages the crop. This leads to huge financial loss for the farmers thus leading to the suicide. The Current technology "Machine Learning" used for rainfall rate prediction, system is useful for the society as it's a real time application for rainfall prediction, this helps farmers to make right decision in right time, and it helps farmers to get high profits.

II. METHODOLOGY:

Prediction is a statement about future events. Rainfall Prediction for agricultural commodity has become the need of the hour for farmers. A supervised machine learning algorithm is one that relies on labeled input data to learn a function that produces an appropriate output when given new unlabeled data. The Naive Bayes algorithm is one such algorithm which assumes that similar things exist in close proximity.

The steps in Naïve bayes algorithm are as follows:

1. **Selection of region:** Consider any region for the rainfall prediction.
2. **Selection of month/year:** consider any month/year of your choice to predict the rainfall.
3. **Input data:** Data may include information regarding temperature, area, year, region etc which is collected over some period of time.
4. **Pre-processing:** Data which is collected should be pre-processed redundant data, inconsistent should be taken care.
5. **Attribute Selection:** Important Features have to be extracted.
6. **Classification Algorithm:** An appropriate and efficient algorithm should be employed.
7. **Result:** prediction or recommendation can be provided to the visitors based on the results obtained.

I. PROPOSED WORK

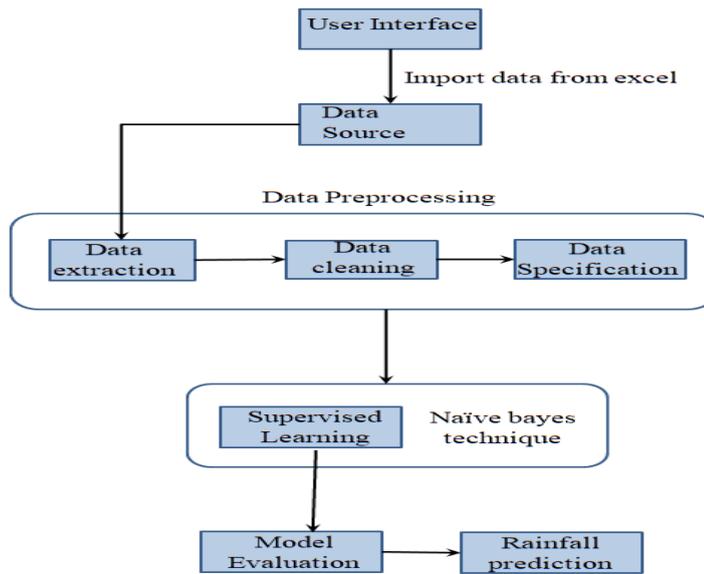


Fig 1: System Architecture

Fig 1 depicts the system architecture of rainfall prediction using Naïve Bayes algorithm. System architecture is the conceptual model that defines the structure, behaviour, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviours of the system. A system architecture can consist of system components and the sub-systems developed, that will work together to implement the overall system. Fig 1 shows the architecture of rainfall prediction using Naïve Bayes algorithm. User interface of Admin will import the data from the excel to the data source. The data goes for the pre-processing where it consists of three stages data extraction does the extraction of the data ,data cleaning is for removing the unwanted data, data specification is used for mentioning features and the parameters required. A machine learning technique, Naïve Bayes is applied to the pre-processed data for the rainfall prediction then evaluation of the model is done and results will be obtained.

II. System Design

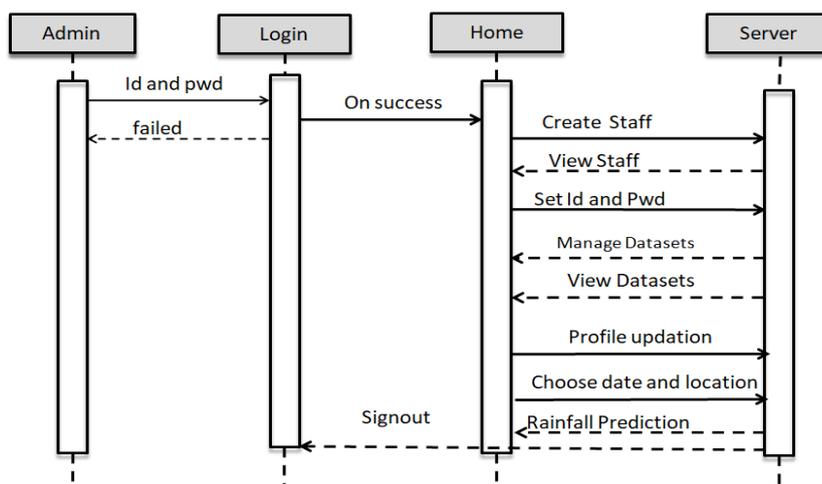


Fig 2: Sequence Diagram of Admin

A sequence diagram simply depicts interaction between objects in a sequential order i.e. the order in which these interactions take place. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. A sequence diagram shows, as parallel vertical lines, different processes or objects that live simultaneously, and, as horizontal arrows, the messages exchanged between them, in the order in which they occur. The Fig 2 shows the sequence diagram for the Admin. Figure 2 shows the sequence diagram of admin module. It depicts the sequence of events the admin follows. On entering the valid id and password the admin can login. He can use a number of functionality such as create staff, set id and password , Manage datasets of all regions , profile updation . He can view the staff details, datasets. He can predict rainfall by choosing date and and particular region. If the id and password are invalid it directs back to the home page.

III. RESULTS



Fig 3: Training dataset

Fig 3 shows the datasets of the particular region. To view the datasets admin have to enter the choose region type, region, month out of the drop down list. It shows the datasets available.

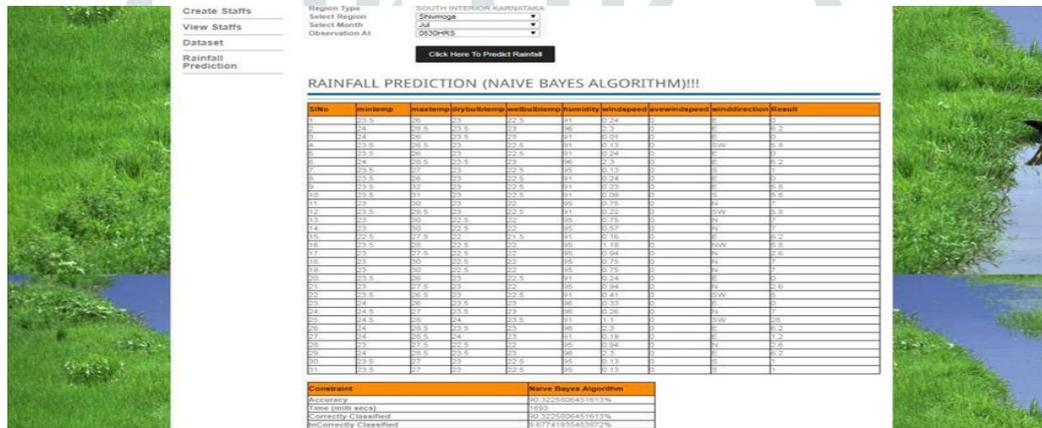


Fig 4: Admin Rainfall Prediction

Fig 4 how admin can get the rainfall prediction. Admin have to choose region type,region,month and time to get the rainfall prediction. The prediction is displayed along with a temperature,wind direction wind speed and humidity. Admin is able to see the accuracy.

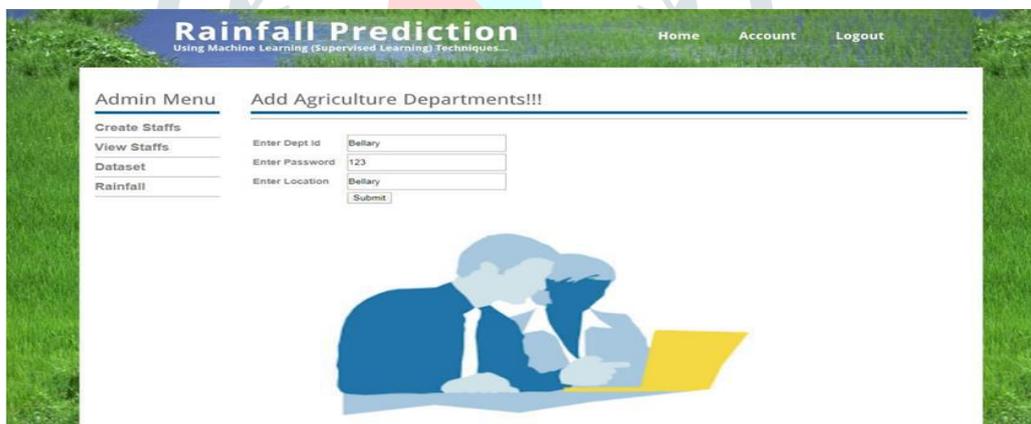


Fig 5: Admin add staff

Fig 5 shows how admin can create other staff/departments. He should give a department id and password and mention to which region it belongs.

IV. CONCLUSION

Nowadays farmers facing lots of problems and they don't know the proper information regarding crops to grow and to cultivate. In agriculture field, farmer has to know about the suitable crops for cultivation. Growing crops are completely based on the rainfall and also type of the soil and its features, location, whether etc. Now a day analysing soil and its features are entirely manual which requires more time. This leads to develop automation for rainfall prediction. Machine learning techniques applied to get good results. The system is developed and tested successfully and satisfies all the requirement of the client.

The goals that have been achieved by the developed system are:

- Simplified and reduced the manual work.
- Large volumes of data can be stored.
- It provides Smooth work-flow.

We can create an interface for the farmers to interact with staffs and can post the problems that they are facing, for rainfall prediction we are using around 8 parameters, we can add some more parameters to predict rainfall.

V. REFERENCES

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