



Weather Forecast Prediction Using Machine Learning

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Abstract— Weather is the state of air and atmosphere at a particular time stating how hot, dry, cold, humid etc. the surrounding is. Weather predictions have become an important factor of life lately as it can help us save our time, money, property and even life. Even though there are a decent amount of weather stations in India, these stations are mostly located in populated areas like cities, suburbs or towns. This makes the prediction in remote areas more inaccurate, which can cause inconvenience to citizens like farmers who heavily rely on weather forecast in their daily occupation. Our project aims to create mini weather stations for collecting data to predict weather with the help of Machine Learning. This can help bridge the gap and provide accurate near future weather prediction even in remote areas.

Keywords—Weather, predictions, accurate, remote areas

I. INTRODUCTION

The goal of this project is to create a mini weather station which would collect data on Temperature, Humidity, Luminous Intensity etc. This data would then be stored systematically and presented to the user via graphs and diagrams for better visualization. Further our system would then apply ML Algorithm in order to predict the Weather in near future and showcase it to our users on our website.

II. COMPARITIVE STUDY

Many research papers have been written on predicting weather using different Machine Learning Algorithms. Many of these papers have also pointed out some key flaws. The accuracy of the system using linear regression was found out to be only 7% making Regression models not viable[1]. Since the problem falls more under classification type as the result is a discrete value Logistic Regression is a more reliable algorithm. Some papers were also successful in calculating parameters like Temperature, Light Intensity, Humidity etc. with the help of sensors and Arduino.[2]. However all of the papers into consideration did not bring both of these concepts into play to predict weather accurately. This project attempts to achieve.

III. TECHNOLOGIES USED

a. Technology:	b. Hardware:
<ul style="list-style-type: none">• HTML, CSS, JS• NodeJS,• ExpressJS• MongoDB Atlas• Arduino IDE• Heroku	<ul style="list-style-type: none">• Arduino UNO R3• Temperature and Humidity Sensor• Photoresistor• UV Sensor• Anemometer• Breadboard

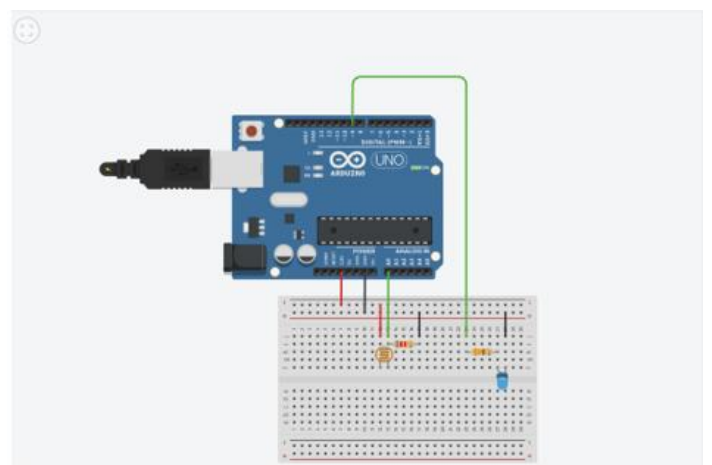
For the Front-end part Html, CSS, JavaScript and Bootstrap would be used, NodeJS would act as the runtime environment for running JavaScript on the server, ExpressJS would act as the backend along with MongoDB Atlas which would act as the Database, all the data would be collected using Arduino Uno R3 and various sensors and this entire project would be hosted on Heroku.

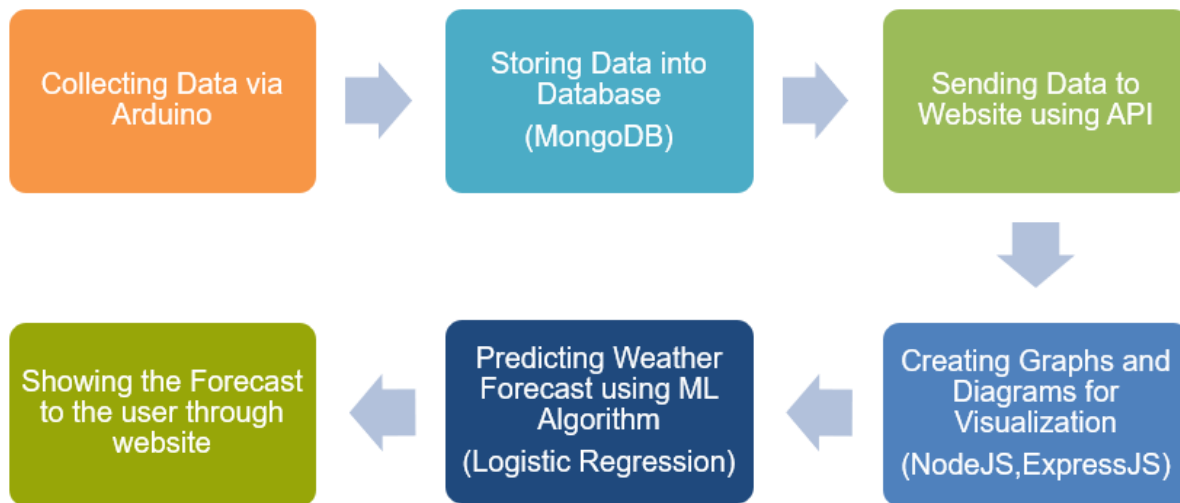
IV. WORKING & CHARACTERISTICS

The basic working of the system is as follows:

• Collecting Data via Arduino:

The different parameters such as temperature, luminous intensity, humidity etc. is collected by the Arduino using the different sensors.





- **Storing Data into Database:**

The data is then sent and stored to MongoDB Atlas through a WIFI module attached on Arduino or via connection the Arduino itself to a laptop through USB.

- **Sending Data to Website using API:**

A middleware or an API would then take all this data from MongoDB and send it to Our Website.

- **Creating Graphs and Diagrams for Visualization:**

This data is then used to create various graphs regarding various parameters for better visualization.

- **Predicting Weather Forecast using ML Algorithm:**

This data is also then fed to the ML Algorithm which would be logistic regression to predict the weather in the near future (i.e. Rainy, Sunny etc.)

- **Showing the Forecast to the user through website:**

The predicted result is then shown to the user.

V. CONCLUSION

Through this project we were able to successfully enhance the accuracy of predicting weather in certain local areas via finding out the different parameters required for running the logistic regression models. These parameters were then fed to the model to predict the weather in the near

future for a particular location. Thus through simple and affordable means weather prediction was achieved.

VI. FUTURE SCOPE

- These weather stations could be set up at separate locality making the system more accurate and region specific.
- Better quality components can also be added for further improving the accuracy.
- More sensors like rain-gauge or pressure sensors can also be used as extra parameters.

ACKNOWLEDGMENT

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- [2] Karthik Krishnamurthi, Suraj Thapa, Lokesh Kothari, Arun Prakash,"Arduino Based Weather Monitoring System" International Journal of Engineering Research and General Science Volume 3