Internet of Everything (ITL 702)

Outdoor Activity Recommendation System Using IOT

B. E. Information Technology

By

Himanshu Chaurasiya	**37**
Vikas Chaurasiya	**38**
Mukesh Gupta	**39**
Ashly John	**40**

Mentor:
Dr. Prachi Raut
Professor

Department of Information Technology
St. Francis Institute of Technology
(Engineering College)

University of Mumbai

2022-23

DECLARATION

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources.

We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in this submission.

We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

1. ----------
(Signature)

(Name of student and Roll No.)

2. ----------
(Signature)

(Name of student and Roll No.)

3. ----------
(Signature)

(Name of student and Roll No.)

4. ----------
(Signature)

(Name of student and Roll No.)

CERTIFICATE

This Internet of Everything Lab Mini-project **Outdoor Activity Recommendation System Using IOT** by **Himanshu Chaurasiya, Vikas Chaurasiya, Mukesh Gupta, Ashly John** is complete in all respects and was successfully demonstrated on 4th November, 2022.

Name : ----------

Signature :----------

(Internal examiner)

Name : ----------

Signature :----------

(External examiner)

Name : ----------

Signature :----------

(Head of the Department)

Date:

Place:

CONTENTS

LIST OF FIGURES

Chapter 1
Introduction

Weather predictions are important forecasts because they are used to protect life and property. Forecasts based on temperature and precipitation are important for agriculture, and therefore to traders within commodity markets. Temperature forecasts are used by utility companies to estimate demand over coming days. Weather predictions are created by gathering objective data about the actual condition of the atmosphere at a certain location and using meteorology to predict how the weather will behave in the future. Human feedback is also required to choose the best possible forecast model on which to base the forecast.

Chapter 2
Literature Review

IEEE Paper	Author name	Methodology
Real Time Weather Monitoring System Using Iot	Puja Sharma and Shiva Prakash	The proposed system will work on the client-server architecture model using IoT. The system is organized in Two-tier Architecture. Their proposed system contains various sensors which will monitor the temperature of the region, humidity, Rain value and pressure of the system.
Weather Prediction using Machine Learning and IOT	Gopinath N, Vinodh S, Prashanth P, Jayasuriya A, Deasione S	This project proposes a method for forecasting weather conditions and predicting rainfall by means of machine learning. Here, there are two set ups: one, to measure the weather parameters like temperature, humidity using sensors along with Arduino and another set up, to display the current values(status) and predicted rainfall based on the trained machine learning data sets

Weather Forecasting Using Machine Learning Algorithm	Nitin Singh, Saurabh Chaturvedi , ‘Shamim Akhter	They have used data analytics and machine learning algorithms, such as random forest classification, to predict weather conditions. In this paper, a low-cost and portable solution for weather prediction is devised.
Real Time Weather Prediction System Using IOT and Machine Learning	Gaurav Verma, Pranjul Mittal, Shaista Farheen	In this paper they have build the system which utilizes a temperature and humidity sensor i.e. DHT11 and a light intensity sensor.The data is also displayed on a customized HTML webpage for monitoring the real time values. A logistic regression model is used for setting up the machine learning environment.

Chapter 3
Problem Statement

To predict the weather condition based on Atmospheric pressure, Humidity, Temperature and Darkness level (cloudy or sunny weather), information for any specific area and to suggest people whether to go for outdoor activities or not.

Chapter 4

System Design and Requirements

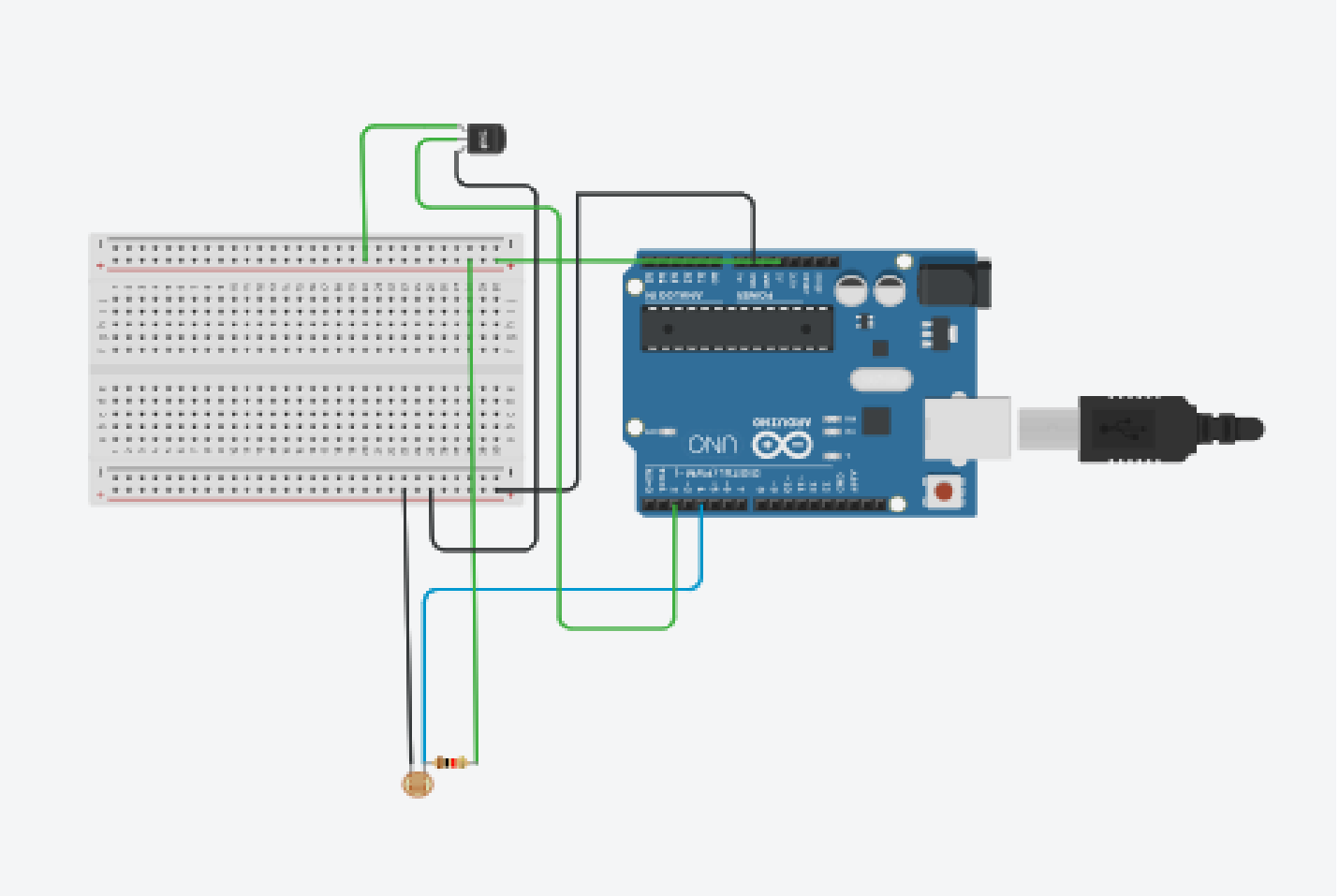

Fig 1: Circuit Diagram

Hardware Requirement:

1. DHT11(temperature and humidity)
2. LDR(Light)
3. R2 100k ohm
4. Arduino UNO
5. Breadboard

Software requirement:

1. Arduino Compiler
2. MC Programming Language

Chapter 5
Data Analytics

Naive Bayes Algorithm:

A Naive Bayes classifier is a probabilistic machine learning model that's used for classification tasks. The crux of the classifier is based on the Bayes theorem. It is based on probability models that incorporate strong independence assumptions. The Naive Bayes is a classification algorithm that is suitable for binary and multiclass classification. Naive Bayes performs well in cases of categorical input variables compared to numerical variables. It is useful for making predictions and forecasting data based on historical results. Some popular examples of Naive Bayes Algorithm are spam filtration, Sentimental analysis, and classifying articles.

Formula:

$$P(A|B) = P(B|A) * P(A) / P(B)$$

where A and B are events and $P(B) \neq 0$.

- Basically, we are trying to find the probability of event A, given the event B is true. Event B is also termed as evidence.
- P(A) is the priori of A (the prior probability, i.e. Probability of event before evidence is seen). The evidence is an attribute value of an unknown instance(here, it is event B).
- P(A|B) is a posteriori probability of B, i.e. probability of event after evidence is seen.

Chapter 6
Results

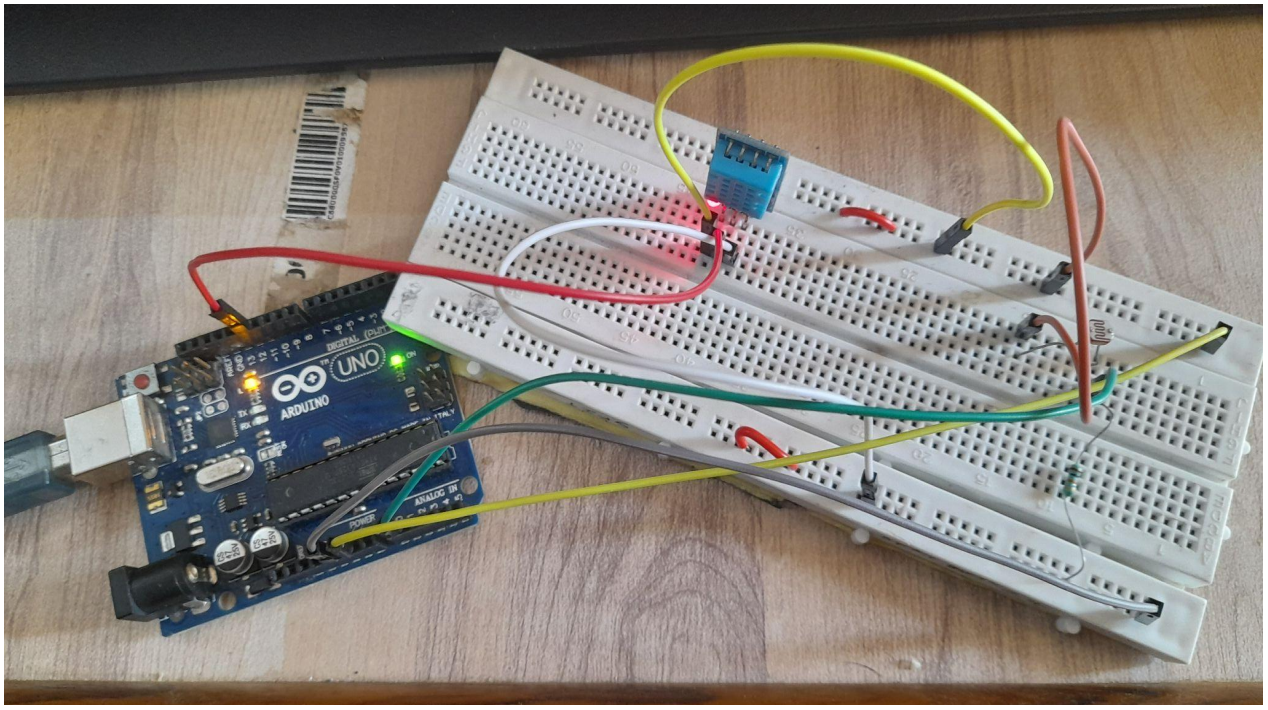

Fig 2: Circuit implementation

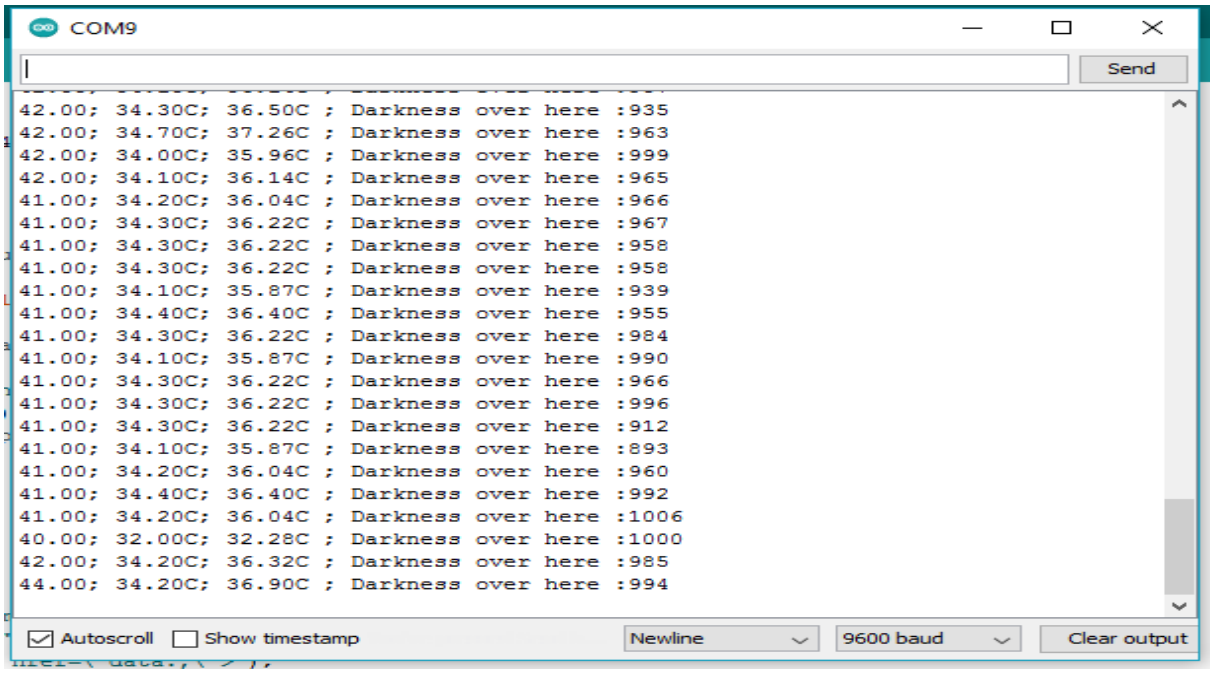

Fig 3: Output on Serial Monitor

Fig 4 : Variation in Temperature

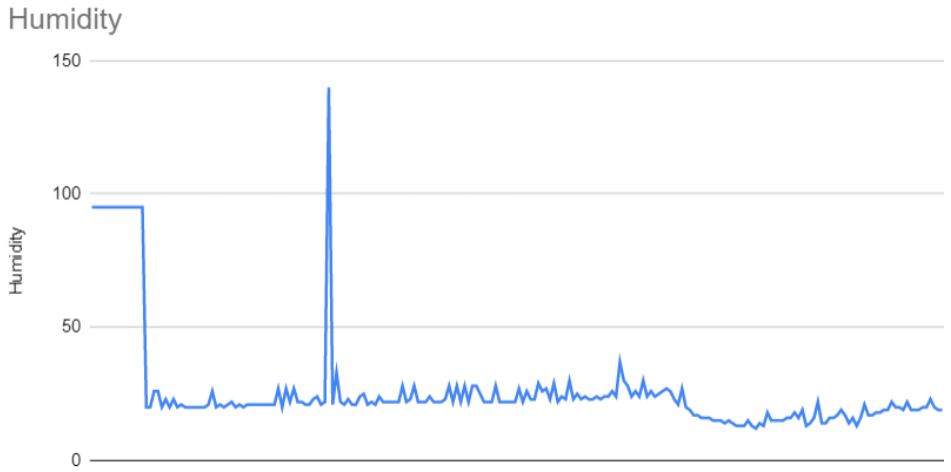

Fig 5 : Variation in Humidity

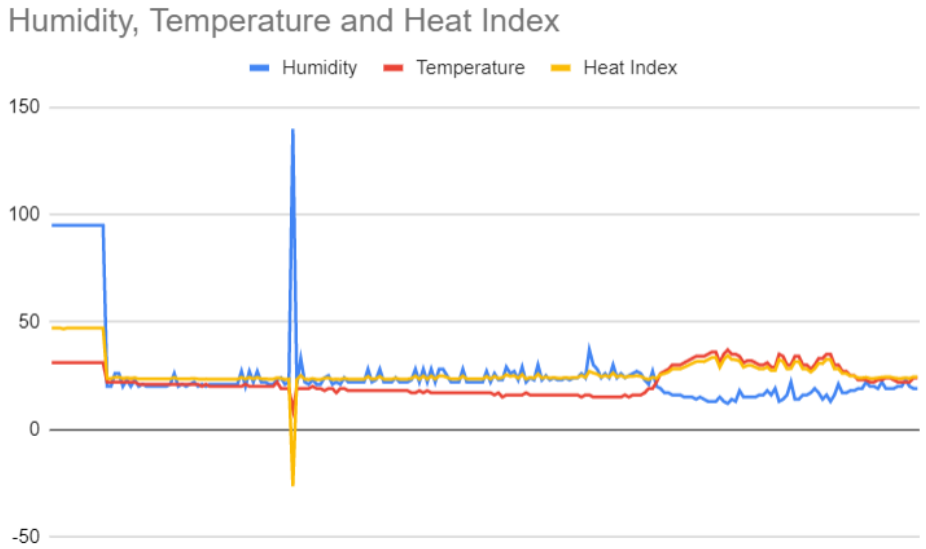

Fig 6 : Humidity, Temperature and Heat Index Graph

```
[ ]  from sklearn.preprocessing import LabelEncoder

[ ]  #Applying the Gaussian naiveboyes
     Classifier=GaussianNB()
     Classifier.fit(inputs,target)

     GaussianNB()

[ ]  #80% accuracy
     Classifier.score(inputs,target)

     0.8090909090909091
```

Fig 7: Accuracy of algorithm

```
#Prediction
Classifier.predict([[45,50,43,200]])

/usr/local/lib/python3.7/dist-packages/sklearn/base.py:451: UserWarning: X does not have valid feature names,
  "X does not have valid feature names, but"
array(['yes'], dtype='<U3')

[30] Classifier.predict([[26,16,23,301]])

/usr/local/lib/python3.7/dist-packages/sklearn/base.py:451: UserWarning: X does not have valid feature names,
  "X does not have valid feature names, but"
array(['no'], dtype='<U3')
```

Fig 8: Predictions

Chapter 7

Conclusion and Future Scope

We have successfully built a system that calculates the temperature , Humidity, Heat Index and Light intensity of a specific area and applied a Naive Bayes Algorithm on the collected data. On applying the algorithm we have got an accuracy of 80% and also performed predictions on the data.

Future Scope

- More algorithms can be implemented in future to increase the accuracy and check the performance metrics.
- Frontend models can be implemented to show recommendations.
- Various other weather predictions can be done by increasing the parameter used in the model.

References

[1]Sharma, Puja & Prakash, Shiva. (2021). Real Time Weather Monitoring System Using Iot. ITM Web of Conferences. 40. 01006. 10.1051/itmconf/20214001006.

[2]Gopinath N, Vinodh S, Prashanth P, Jayasuriya A, Deasione S, "Weather Prediction using Machine Learning and IOT" Volume 9 Issue 4, April 2020, International Journal of Engineering and Advanced Technology

[3]N. Singh, S. Chaturvedi and S. Akhter, "Weather Forecasting Using Machine Learning Algorithm," *2019 International Conference on Signal Processing and Communication (ICSC)*, 2019, pp. 171-174, doi: 10.1109/ICSC45622.2019.8938211.

[4]G. Verma, P. Mittal and S. Farheen, "Real Time Weather Prediction System Using IOT and Machine Learning," *2020 6th International Conference on Signal Processing and Communication (ICSC)*, 2020, pp. 322-324, doi: 10.1109/ICSC48311.2020.9182766.