PROJECT REPORT

WEATHER.IO: WEATHER APP

1.**INTRODUCTION**

Overview:

Weather application enable users to get instant alerts regarding weather conditions. Weather apps are the simplest method to know about the updates of the upcoming weather.

Weather forecasting is the application of science and technology to predict the conditions of atmosphere for a given location and time. They are made by collecting quantitative data about the current state of the atmosphere at a given place. Weather application displays the current weather, daily forecast and hourly forecast based on geolocation or search.

Purpose:

The purpose of weather app is to provide as accurate as possible prediction of what the weather will be like in the near future.

It enables the automatic querying of weather data, to deliver a specific information based on given parameters such as location and time . This provide real time or forecast weather data, depending on the user's needs. They are important to most aspects of day to day life.

2.LITERATURE SURVEY

There are many research papers that have been published related to predicting the weather. A paper was published on 'The Weather Forecast Using Data Mining Research Based on Cloud Computing' This paper proposes a modern method to develop a service oriented architecture for the weather information systems which forecast weather using these data mining techniques. This can be carried out by using Artificial Neural Network and Decision tree Algorithms and meteorological data collected in Specific time. Algorithm has presented the best results to generate classification rules for the mean weather variables. The results showed that these data mining techniques can be enough for weather forecasting. Another paper was published on 'Analysis on The Weather Forecasting and Techniques' where they decided that artificial neural network and concept of fuzzy logic provides a best solution and prediction comparatively . They decided to take temperature, humidity, pressure, wind and various other attributes into consideration. Another research paper titled 'Issues with weather prediction' discussed the major problems with weather prediction. Even the simplest weather prediction is not perfect. The one-day forecast typically falls within two degrees of the actual temperature. Although this accuracy isn't bad, as predictions are made for further in time. For example, in a place like New England where temperatures have a great variance the temperature prediction are more inaccurate than a place like the tropics. Another research paper titled 'Current weather prediction' used numerical methods to stimulate what is most likely going to happen based on known state of the atmosphere. The application of science and technology that predicts the state of atmosphere at any given particular time period is known as Weather forecasting. There are many different methods to weather forecast. Weather forecast notices are important because they can be used to prevent destruction of life and environment. The

weather forecasting methods used in the ancient time usually implied pattern recognition i.e., they usually rely on observing patterns of events. For example, it is found that the following day has brought fair weather; if the preceding day sunset is particularly red. However, all of the predictions prove not to be reliable. Firstly, the data is trained. For training the data, we will take 15-20% of the data from the data set. For this prediction, we'll be using Linear regression algorithm and Naïve Bayesian classification algorithm. For the project, we'll be using python, NumPy, Jupiter Notebook, Spyder, Panda. The project is split into three separate Jupiter Notebooks: one to collect the weather data, inspect it, and clean it; a second to further refine the features and fit the data to a Linear Regression model and Naïve Bayesian model and a third to train and evaluate our output. The project simply uses temperature, dew, pressure and humidity for training the data. Here these data are then trained using Linear Regression for the prediction. Vol-8 Issue-3 2022 IJARIIE-ISSN(O)-2395-4396 17553 ijariie.com 5095 The Naive Bayes algorithm is comprised of two words Naïve and Bayes, Which can be described as: Naive: It is called Naïve because it assumes that the occurrence of a certain feature is independent of the occurrence of other featuresBayes: It is called Bayes because it depends on the principle of Bayes' theorem Linear regression is one of the easiest and most popular Machine Learning algorithms. It is a statistical method that is used for predictive analysis. Linear regression makes predictions for continuous/real or numeric variables such as sales, salary, age, product price, etc.

The weather prediction done using linear regression algorithm and Naïve Bayes algorithm are very essential for improving the future performance for the people. For predicting the weather, the linear regression algorithm and Naïve Bayes algorithm was applied to the datasets of the weather. We made a model to predict the weather using some selected input variables collected from Kaggle. The

problem with current weather scenario is that we are not able to prepare our self and not able to do some important works. So, for knowing the weather scenario at high accuracy considering every factor that affects in the weather scenario, we provided how the machine learning techniques can be trained and used for the weather forecasting. In this Machine learning models are much accurate than human prediction and physical models prepared by human. For weather forecasting we used dataset for the Austin KATT station from 2013-02-21 to 2017- 07-31. Accuracy obtained here was measured on the basis of coefficient correlation. We also utilize the historical data to predict the weather conditions which is much faster than the traditional models. The new pattern is combining deterministic and machine learning or statistical components, can provide fast and accurate calculations of these processes as well and help in predicting value of independent variable accurately. In future work, going to do research and make a model on how the neighboring weather can affect the weather of our area.

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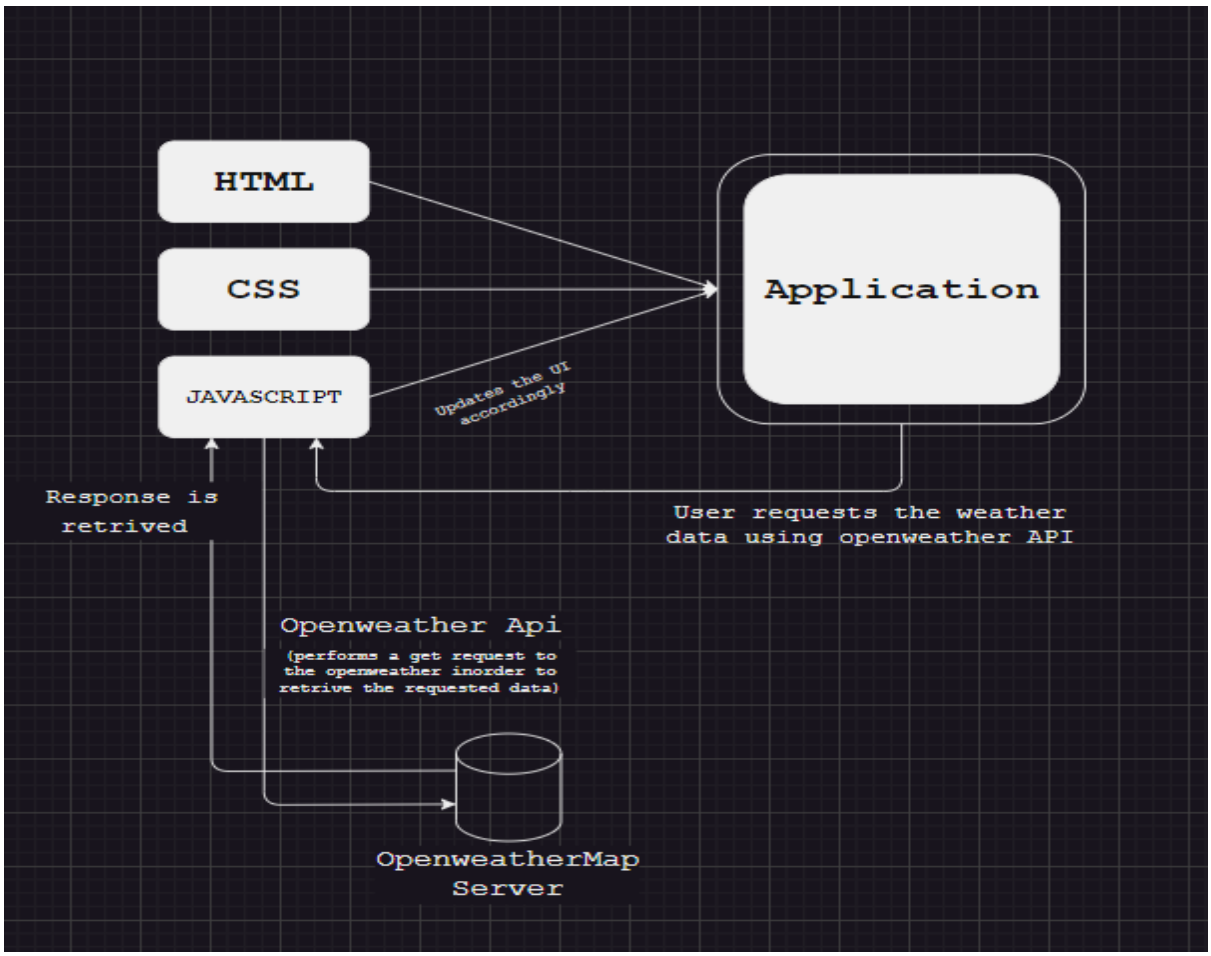
Reference links:
http://ijariie.com/AdminUploadPdf/Literature_Survey_weather_prediction_and_climate_analysis_using_machine_learning_ijariie17553.pdf

Proposed Solution:

Observation and analysis, extrapolation to determine the state of the atmosphere in the future, and estimation of specific variables.

3.THEORITICAL ANALYSIS

Block diagram:



Hardware/Software requirements:

- System architecture to store the data
- Memory
- Secondary storage
- API
- IDE

HTML

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Weather Application</title>
    <link rel="stylesheet" href="style.css">
</head>

<body>
    <div class="container">
        <div class="weather__header">
            <form class="weather__search">
                <input type="text" placeholder="Search for a city"
class="weather__searchform">
                <i class="fa-solid fa-magnifying-glass" id="searchBtn"></i>
            </form>
            <div class="weather__minmax">
                <p> min:20&#176C</p>
                <p> max:20&#176C</p>
            </div>
        </div>
        <div class="weather__body">
            <h1 class="weather__city">Visakhapatnam</h1>
            <div class="weather__datetime">
                <p>Thursday 27 July 2023
                    8:00 AM </p>
            </div>
            <div class="weather__icon">
                <img src="https://openweathermap.org/img/wn/10d@4x.png" />
                </div>
            <div class="weather__forecast">
                <p>clear</p>
            </div>

            <p class="weather__temperature">
                17&#176C
            </p>

        </div>
        <div class="weather__info">
            <div class="weather__card">
                <i class="fa-solid fa-temperature-full"></i>
```

```
                <div>
                    <p>Real Feel:</p>
                    <p class="weather__realfeel">18&#176C</p>
                </div>
            </div>
            <div class="weather__card">
                <i class="fa-solid fa-droplet"></i>
                <div>
                    <p>Humidity:</p>
                    <p class="weather__humidity">60%</p>
                </div>
            </div>
            <div class="weather__card">
                <i class="fa-solid fa-wind"></i>
                <div>
                    <p>Wind Speed:</p>
                    <p class="weather__wind">3km/h</p>
                </div>
            </div>
            <div class="weather__card">
                <i class="fa-solid fa-gauge-high"></i>
                <div>
                    <p>Pressure:</p>
                    <p class="weather__pressure">1000hPa</p>
                </div>
            </div>
        </div>

    </div>

    <script src="script.js"></script>
    <script src="https://kit.fontawesome.com/a692e1c39f.js"
crossorigin="anonymous"></script>
    <script src="app.js"></script>

</body>

</html>
```

Css

```css
@import url('https://fonts.googleapis.com/css2?family=Poppins&display=swap');

* {
    margin: 0;
    padding: 0;
    box-sizing: border-box;
    font-family: 'Poppins', sans-serif;
}

.container {
    background:linear-gradient(rgb(67, 108, 232),rgb(209, 238, 231),rgb(231, 230, 129));
    color: #fff;
    padding: 2rem;
    width: 40%;
    margin: 4rem auto;
    border-radius: 10px;
}

.weather__header {
    display: flex;
    justify-content: space-between;
    align-items: center;
}

input {
    border: none;
    background: #1e1e1e;
    outline: none;
    color: #fff;
    padding: 0.5rem 2.5rem;
    border-radius: 15px;
}

input::placeholder {
    color: #fff;
}

.weather__search {
    position: relative;

}

.weather__search i {
    position: absolute;
    left: 10px;
```

```
    top: 10px;
    font-size: 15px;
    color: #fff;
}

.weather__units {
    font-size: 1.5rem;
}
.weather__body {
    text-align: center;
    margin-top: 3rem;
}

.weather__datetime {
    margin-bottom: 2rem;
    font-size: 14px;
}

.weather__forecast {
    display: inline-block;
    padding: 0.5rem 1rem;
    color:rgb(22, 95, 190);
    font-size: 18px;
}

.weather__icon img{
    width: 100px;

}

.weather__temperature {
    font-size: 60px;
    color: rgb(232, 73, 78);
}

.weather__minmax {

    color:#eedfdf;
}

.weather__minmax p {
    font-size: 14px;
    margin: 0.5rem;
}

.weather__info {
    display: grid;
    grid-template-columns: repeat(4, 1fr);
```

```
    grid-gap: 1rem;
    margin-top: 3rem;
}

.weather__card {
    display: flex;
    align-items: center;
    background: #1e1e1e;
    padding: 1rem;
    border-radius: 20px;
}

.weather__card i {
    font-size: 1.5rem;
    margin-right: 1rem;
}

.weather__card p {
    font-size: 14px;
}

@media(max-width: 936px) {
    .container {
        width: 90%;
    }

    .weather__header {
        flex-direction: column;
    }
}


@media(max-width: 400px) {
    .weather__info {
        grid-template-columns: none;
    }
}
.error{
    color:rgb(45, 21, 21);
}
```

Javascript

```
const cityElement = document.querySelector(".weather__city");
const datetimeElement = document.querySelector(".weather__datetime");
const forecastElement = document.querySelector(".weather__forecast");
const iconElement = document.querySelector(".weather__icon");
const temperatureElement = document.querySelector(".weather__temperature");
const minMaxElement = document.querySelector(".weather__minmax");
const realFeelElement = document.querySelector(".weather__realfeel");
const humidityElement = document.querySelector(".weather__humidity");
const windElement = document.querySelector(".weather__wind");
const pressureElement = document.querySelector(".weather__pressure");
const searchForm = document.querySelector(".weather__search");
const searchInput = document.querySelector(".weather__searchform");

const apiKey = "e9b258b833970b94a95b9403213f3b7c";
const baseUrl = "https://api.openweathermap.org/data/2.5/weather";
let units = "metric";

searchForm.addEventListener("submit", (e) => {
  e.preventDefault();
  const city = searchInput.value.trim();
  if (city !== "") {
    fetchWeatherData(city);
  }
  searchInput.value = "";
})



celsiusUnit.addEventListener("click", () => {
  if (units !== "metric") {
    units = "metric";
    fetchWeatherData(cityElement.textContent);
  }
});

fahrenheitUnit.addEventListener("click", () => {
  if (units !== "imperial") {
    units = "imperial";
    fetchWeatherData(cityElement.textContent);
  }
});

async function fetchWeatherData(city) {
  try {
    const response = await fetch(
      `${baseUrl}?q=${city}&appid=${apiKey}&units=${units}`
```

```
    );
    if (!response.ok) {
      throw new Error("Weather data not available.");
    }

    const data = await response.json();
    updateWeatherInfo(data);
  } catch (error) {
    console.log(error);
  }
}

function updateWeatherInfo(data) {
  cityElement.textContent = data.name;
  datetimeElement.textContent = getCurrentTime();
  forecastElement.textContent = data.weather[0].description;
  iconElement.innerHTML = `<img
src="http://openweathermap.org/img/wn/${data.weather[0].icon}.png"
alt="Weather Icon">`;
  temperatureElement.innerHTML = `${Math.round(data.main.temp)}&#176;${
    units === "metric" ? "C" : "F"
  }`;
  minMaxElement.innerHTML = `<p>Min: ${Math.round(data.main.temp_min)}&#176;${
    units === "metric" ? "C" : "F"
  }</p><p>Max: ${Math.round(data.main.temp_max)}&#176;${
    units === "metric" ? "C" : "F"
  }</p>`;
  realFeelElement.innerHTML = `<p>${Math.round(data.main.feels_like)}&#176;${
    units === "metric" ?"C": "F"
  }</p>`;
  humidityElement.textContent = `${data.main.humidity}%`;
  windElement.textContent = `${data.wind.speed} ${
    units === "imperial" ? "mph" : "km/h"
  }`;
  pressureElement.textContent = `${data.main.pressure} hPa`;
}

function getCurrentTime() {
  const date = new Date();
  return date.toLocaleString();
}

window.addEventListener("load", () => {
  fetchWeatherData("Visakhapatnam");
  datetimeElement.textContent = getCurrentTime();
})
```

4.RESULT


Search for a city
min:28°C
max:28°C
Visakhapatnam
Thursday 24 July 2023 8:00 AM
rainy
28°C
Real Feel: 30°C
Humidity: 60%
Wind Speed: 3km/h
Pressure: 1000hPa

5.ADVANTAGES and DISADVANTAGES

Advantages-

- Instant information availability
- Improved weather forecast
- Easy flow of information
- Widget support

Disadvantages-

- It is extremely difficult to forecast correctly
- It is not fully functional as we do not get to work on backend

6.APPLICATIONS

They are most important to aspects of day to day life, including aviation, boating, other modes of transportation, farming, tourism, sports, etc.

7.CONCLUSION

This project helps to fetch the weather data for the user that includes temperature, wind, speed, humidity. This project has user friendly interface. If the required input is given in the search bar the accurate weather output is displayed.

8.FUTURE SCOPE

The future of weather application is promising, with the increase in demand for real time and accurate weather information. One potential development is the improvement in accuracy through the use of advanced data collection and analysis techniques, as well as sophisticated algorithms.

In future, we should do improvements to increase the accuracy of weather forecasting by more extensive observations, much faster numerical prediction models and vastly improved methods of assimilating observations into models. We have advanced weather satellites and super computers. The weather forecasting will grow even more accurate.