Weather Check- Canadian Cities

Project 3: Team -10

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Introduction

Weather can be a major concern for travelers choosing a destination and preparing for their trip. With diverse weather systems in Canada, visitors need to plan in such a way that they are prepared for conditions at each stop. In this project we designed interactive platforms to serve as a guide on weather conditions in Canada; making travel planning easier.

Research questions

- What can we draw from maps depicting the cities featuring different factors like temperature, Humidity ,pressure etc.

- To what extent do weather Parameters like pressure, humidity, rainfall Pressure, wind etc. affects the temperature of cities in Canada?

- Is there any difference in temperature of various cities and what factors affect them?

- What are we observing with Canada Weather Status App ?

- What can we glean from weather forecasts of different cities?

Data Exploration and Scripting

Libraries/Dependencies:

- Flask powered API
- Bootstrap for styling
- Data stored in SQLite
- json
- plotly.graph_objs as go
- plotly.express as px
- plotly.offline as pyo
- html
- d3js
- leaflet

```javascript
// Apply the group barmode to the layout
let layout = {
    title: "Weather Trends in Canadian Cities"
};

// Render the plot to the div tag with id "plot"
Plotly.newPlot("plot", traceData, layout);

};

// Call updatePlotly() when a change takes place to the DOM
d3.selectAll("#selDataset").on("change", updatePlotly);
var citi=[];
var temp =[];
var pres=[];
var hum =[];
var wind =[];
var windd=[];
var feels_like=[];

for(var i=0;i<cities.length;i++){
    row=cities[i];
    let bulk=row.city
    const options = {
        method: 'GET',
        url:`http://api.weatherapi.com/v1/current.json?key=29ad3cbdd70c4198ac704843231502 &q=${bulk}&.json`
    }

    const dataPromise = d3.json(options.url);
    console.log("Data Promise: ", dataPromise);
// Fetch the JSON data and console log it
    d3.json(options.url).then(function(data) {
    // console.log(data);

    if (data.location['country'] === 'Canada') {
        // console.log(data)
        citi.push(data.location['name']);
    // console.log(citi);
        temp.push(data.current['temp_c']);
    // console.log(temp);
        pres.push(data.current['pressure_in']);
    // console.log(pres);
        hum.push(data.current['humidity']);
    // console.log(hum);
        wind.push(data.current['wind_kph']);
    // console.log(wind);
        windd.push(data.current['wind_degree']);
    // console.log(windd);
        feels_like.push(data.current['feelslike_c']);
    // console.log(feels_like);
```

```javascript
56    const options = {
57        method: 'GET',
58        url:`http://api.weatherapi.com/v1/current.json?key=29ad3cbdd70d
59    };
60
61    d3.json(options.url).then(function(data) {
62        console.log(element)
63        console.log(data)
64        if (data.location['country'] === 'Canada') {
65            marker = L.marker([data.location.lat, data.location.lon],{i
66            tooltip = L.tooltip()
67                .setLatLng([data.location.lat, data.location.lon])
68                .setContent(`<h6> ${data.current[element]} </h6>`).addTo(my
69            marker.bindPopup(`<h4> ${data.location["name"]} </h4>`).ope
70        }
71    });
```

```python
# create database
def get_db():
    db = getattr(g, "_database", None)
    if db is None:
        db = g._database = sqlite3.connect(DATABASE)
    return db


@app.teardown_appcontext
def close_db(exception):
    db = getattr(g, "_database", None)
    if db is not None:
        db.close()
```

```python
# render dashboard template with charts
return render_template(
    "dashboard.html",
    temp_chart_form=temp_chart,
    weather_chart=weather_chart,
    weather_pie_chart=weather_pie_chart,
)


if __name__ == "__main__":
    app.run(debug=True)
```

```html
<div class="container">
    <div class="city" id="city"></div>
    <div class="date" id="dat"></div>
    <div class="temp"><span id="temp"></span><sup>°C</sup></div>

    <div class="weather">
    <div><img id="icon" class="icon">
    <div class="status" id="status"></div>
    </div>
    <div class="inputs">
    <input type="text" id="location" placeholder="Type City Name..">
    <input type="submit" value="City Weather status" onclick="locate()">
</div>
```

Climate of Canada

Westerly winds, blowing from the sea to the land, are the prevailing air currents in the Pacific and bring coastal British Columbia heavy precipitation and moderate winter and summer temperatures. Inland, the Great Lakes moderate the weather in both southern Ontario and Quebec [1]. Using Leaflet, we were able to create a map where the user can choose any of the elements on the drop down menu and see the live value for all the cities across Canada and see how the factors impact the weather parameters in different parts of Canada.
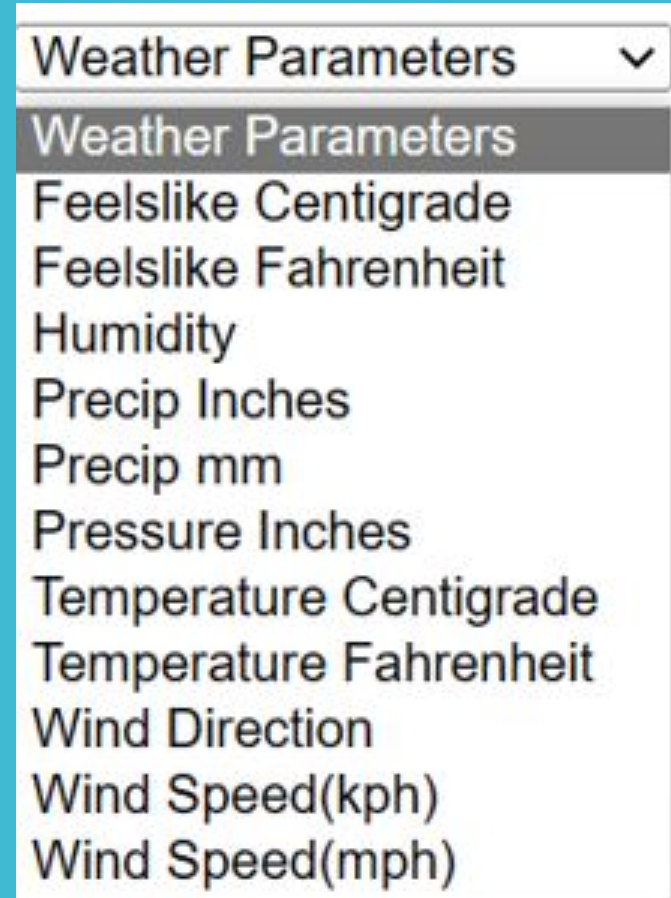
[1] Encyclopædia Britannica, inc. (n.d.). *Soils and plant and Animal Life*. Encyclopædia Britannica. Retrieved February 26, 2023, from https://www.britannica.com/place/Canada/Soils-and-plant-and-animal-life

Canada Map with its cities

Canada Map showing dropdown menu with :

1. Temperature in Celsius
2. Temperature in Fahrenheit
3. Feels like
4. Humidity
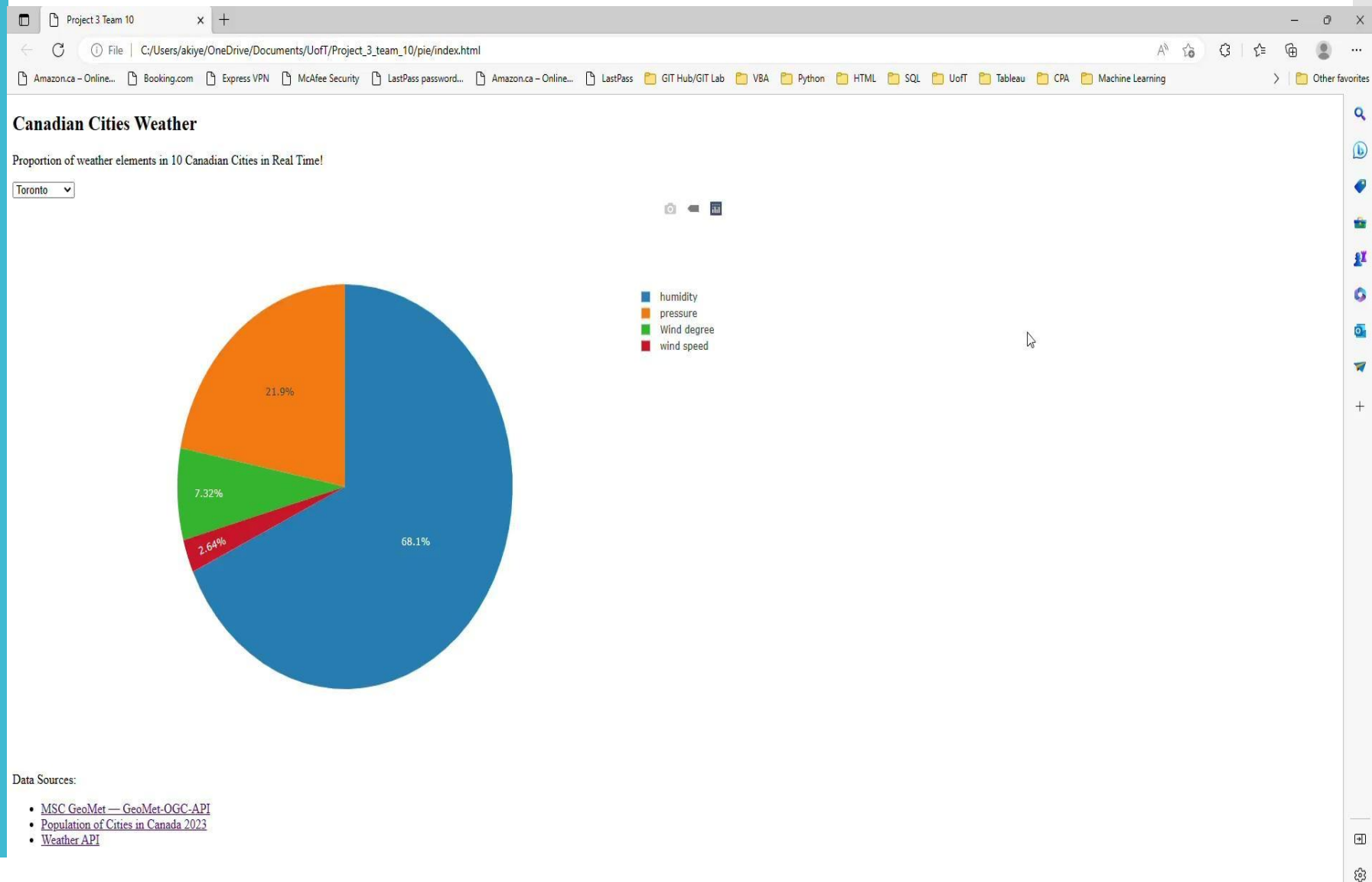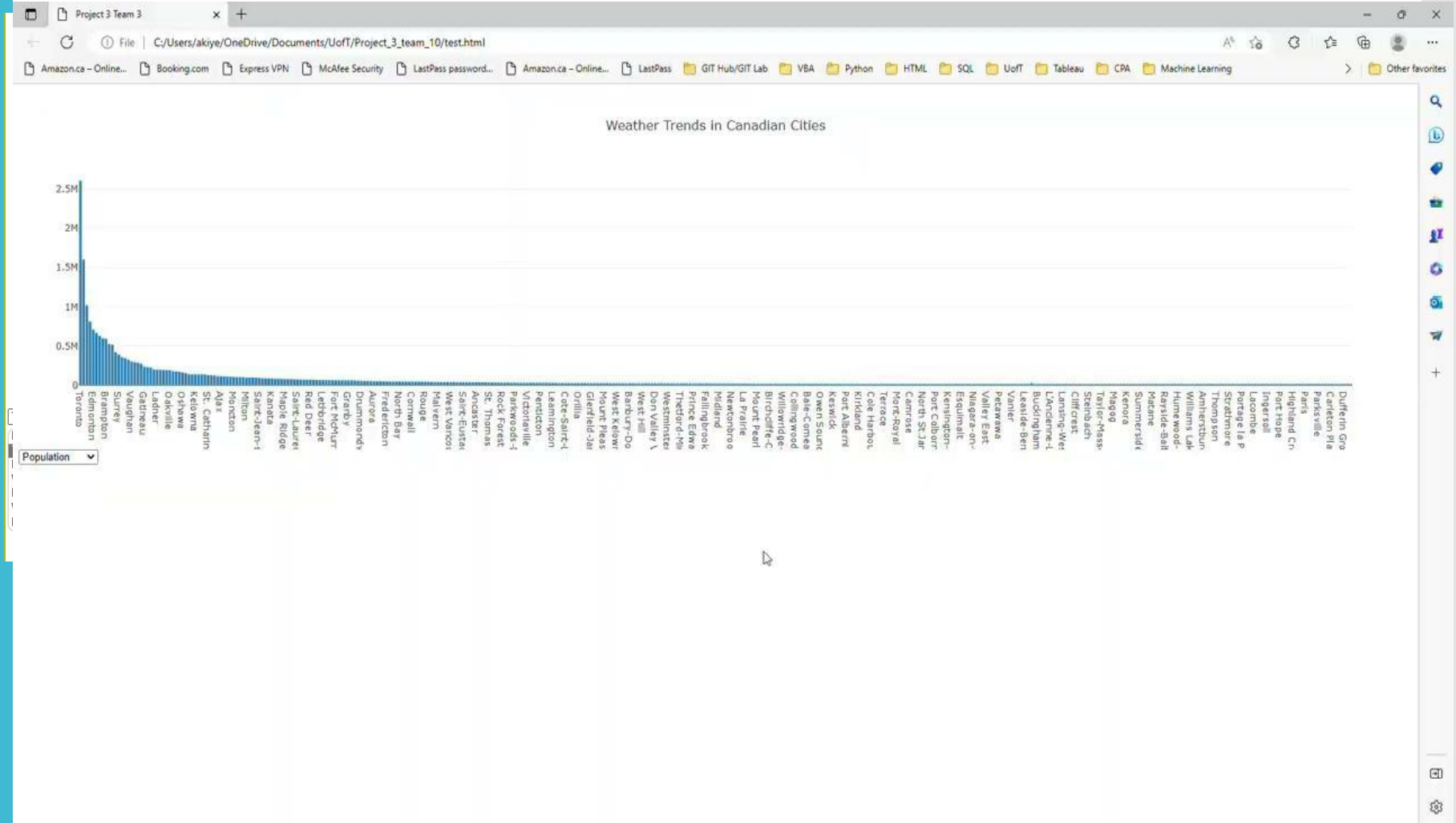5. Precipitation
6. Pressure
7. Wind
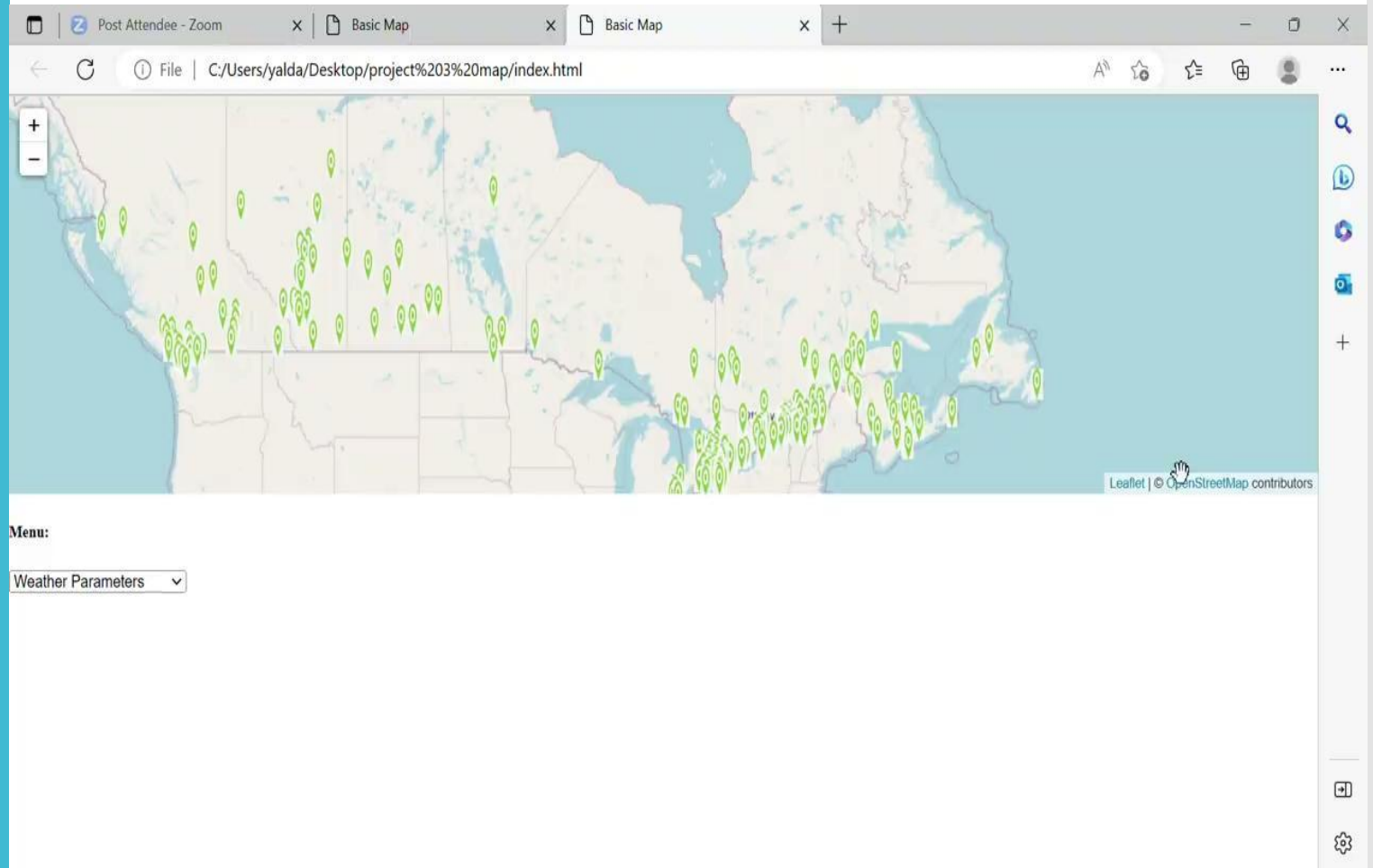
Bubble chart

A bubble chart was created to allow the user to test the impact of different parameters on each other and observe if the parameters are correlated.
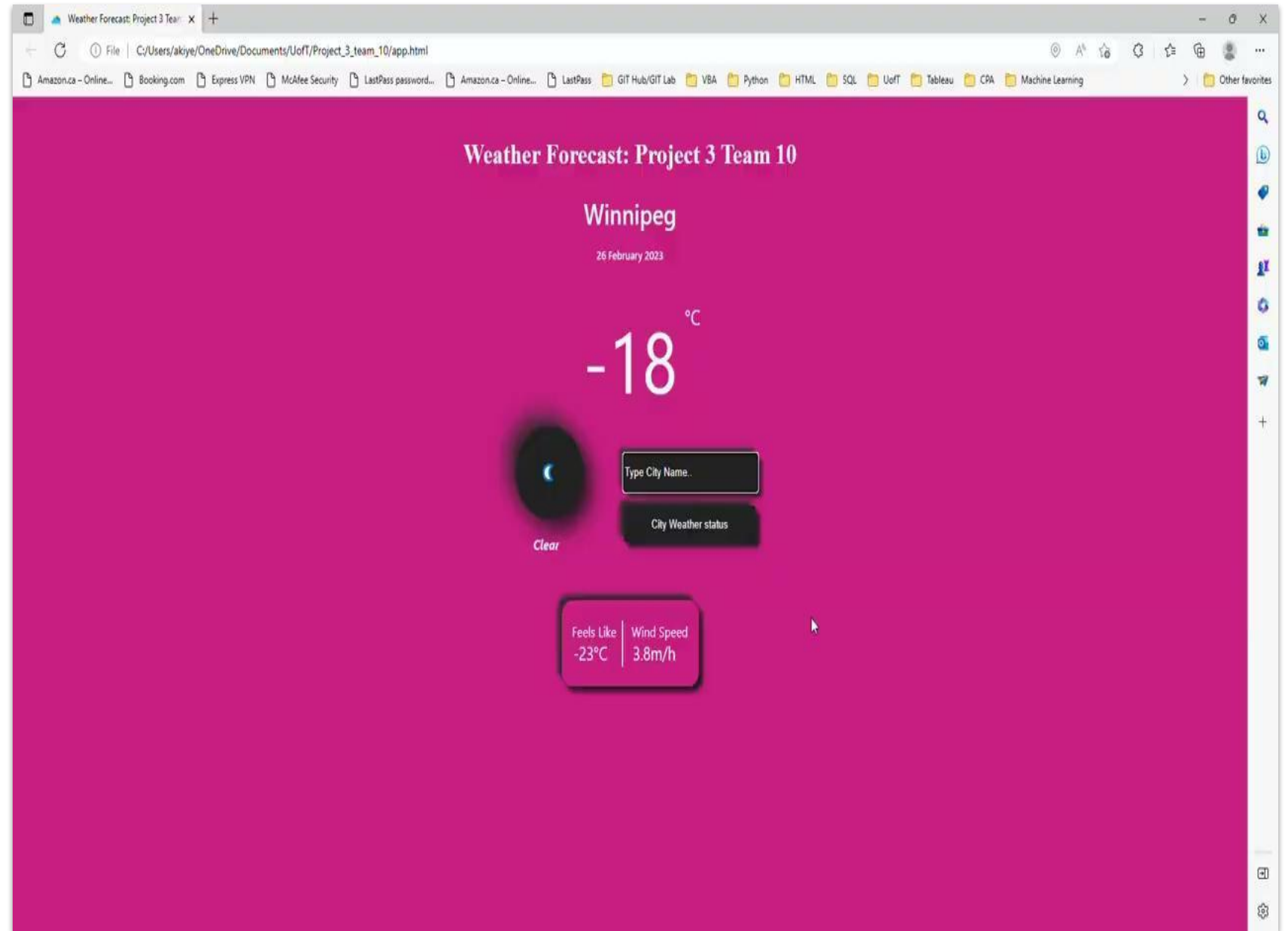
Weather elements in 10 Canadian Cities in Real Time!

Cities Weather Exploration

Canadian City Weather App

WEATHER DASHBOARD

- Flask powered API
- Bootstrap for styling
- Data stored in SQLite

Weather Dashboard

Conclusions/ Limitations

When planning your trip, it helps to know the weather conditions one may encounter. Using various tools, we created interactive visualizations displaying weather condition parameters to help travelers in Canadian cities plan with ease.

Users can be 'weather-smart' by using these interfaces.

There are some updates which still need to be considered to improve the interfaces.

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References

- Bausch T, Gartner WC, Humpe A. (2021). How weather conditions affect guest arrivals and duration of stay: An alpine destination case.Int J Tourism Res. 2021;23:1006–1026.
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- https://en.wikipedia.org/wiki/Temperature_in_Canada
- https://www.kaggle.com/datasets/hemil26/canada-weather
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