Weather Forecast Website using Flask and OpenWeather API

Task Given:

Fetch data from a specific website using an API. The retrieved data, provided in JSON format, should be stored in a structured format such as CSV.

Task Description

The Weather Forecast Website is a web-based application developed using Python's Flask framework. It integrates the OpenWeather API to fetch real-time weather information for a given city. The app displays weather data such as temperature, humidity, wind speed, and weather conditions in a user-friendly format using HTML and CSS. It also supports dynamic display of weather-related images based on conditions like "Few Clouds", "Rain", etc.

Technology Used	Purpose
Python Core	Backend logic
Flask	Web framework
OpenWeather API	Real-time weather data
HTML & CSS	Frontend UI
CSV	User input history

How the Application Works

1. User Interface (Frontend)

- The app starts at the / route.
- The user enters a city name in a form.
- On submission (POST method), the backend processes this city name.

2. Weather API Integration

- The app constructs a request to **OpenWeatherMap** API using the given city:

```
url = f"https://api.openweathermap.org/data/2.5/weather?q={city}&appid={API_KEY}&units=metric"
```

- The requests library sends the API call and gets the response in JSON format.
- Example API response includes:
    - weather[0].main: condition (e.g., Clear, Rain)
    - weather[0].description: more details (e.g., light rain)
    - main.temp: temperature in Celsius

3. Data Extraction & Formatting

- The response is parsed to extract:
  - city name
  - temperature
  - description
  - condition (e.g., Clear, Clouds)
- A corresponding image URL is selected from a predefined dictionary:

image_url = weather_images.get(condition, default_image)

4. Rendering Results (Backend to Frontend)

- The weather_data dictionary is passed to the index.html Jinja2 template:

python

Copy code

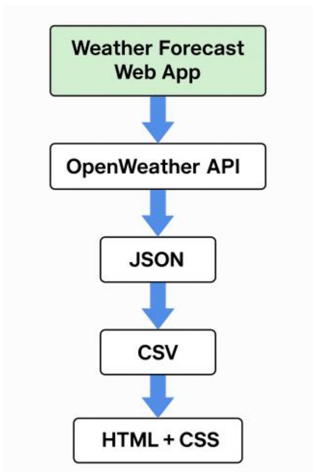
return render_template("index.html", weather_data=weather_data)

- This template displays:
  - The temperature
  - The weather condition description
  - The image icon (based on condition)

How the API Integration Was Done (Simplified View)

Step	What Happens
User Input	User types city name in form on web page
Send API Request	Flask app sends GET request to OpenWeatherMap API with API key + city
Get Response	API returns JSON containing weather details
Process JSON	Flask extracts condition, temperature, and description
Select Image	Based on condition, app picks a matching image URL from weather_images
Display on Webpage	Flask sends data to template and shows result with icon and weather details

Workflow:



Additional Notes

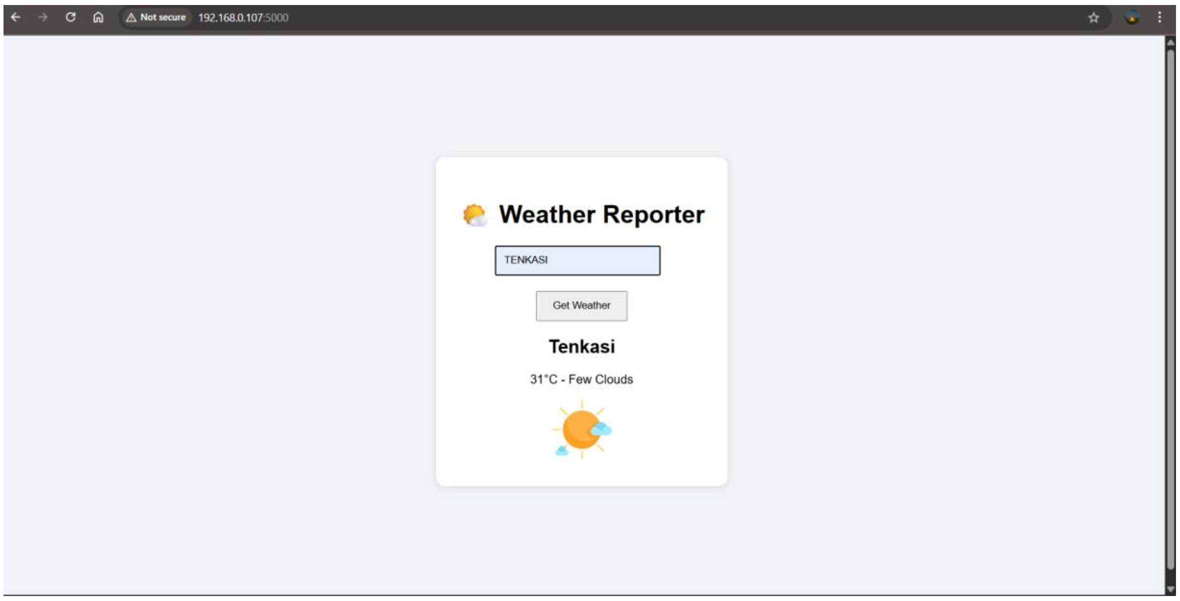
- **Security**: API key is stored directly in code; for production, use environment variables.
- **Cross-Platform**: os.chmod handles file permissions on non-Windows systems.
- **CSV Logging**: You could log weather queries into **weather_data.csv** if desired.
- **Fallback Image**: A base64 image is used if condition doesn't match known types.

Reference API Link:

- https://home.openweathermap.org/api_keys

Reference Snaps

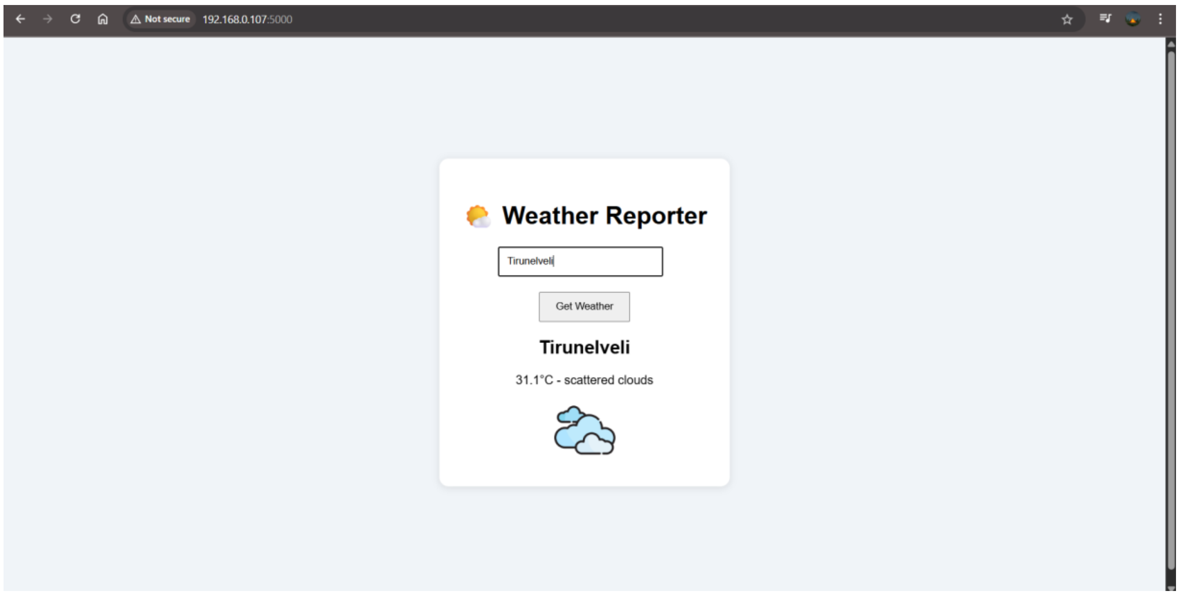
- Data is fetched using API and shows the current weather of the given city.



Tenkasi

31°C - Few Clouds

- The application retrieves real-time weather data using an API and displays the current conditions for the specified city.



Tirunelveli

31.1°C - scattered clouds