**Weather and Pollen data for IP Address**

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**Abstract**

Everyone has days when fresh air would be enjoyable, but many, are unable to enjoy the fresh air due to weather conditions and or allergies. Although many applications exist that provide weather and pollen data, they do not provide much detailed data. In this work, we design and develop an API that will provide more detailed pollen and weather data using the location from an IP address. Open-Meteo, ip-api, and Pollen API APIs are used in the creation of this API called WPI.

1. **Introduction**

There are days when fresh air would be enjoyable for everyone. Although, for many individuals, there are days they are unable to enjoy fresh air due to weather conditions and or allergies. Of course, some applications can be used to check weather and pollen to determine if they can enjoy some fresh air. For instance, individuals can use the Meteomatics API to fetch historical, current, and forecast data for any location (n.d.). The Meteomatics API provides weather data from temperature to precipitation and pollen concentration data for types such as birch. However, many of these applications, such as Meteomatics API, that provide weather and pollen data do not provide much detailed data.

In this paper, WPI, a Weather and Pollen data for IP addresses API is designed and developed. While there are existing APIs that provide weather and pollen data for different locations, WPI will provide more detailed data. For example, when requesting pollen data users will receive all the available pollen types including their color, category, seasonality, index, index description, health recommendations, and plant description for the requested location. In creating WPI the APIs Open-Meteo, ip-api, and Pollen API are APIs used. Open-Meteo was used for weather data, ip-api for location data, and Pollen API for pollen data.

1. **Motivations and Background**

In this section, there will be a description of the terminology used in this paper and a motivating example for IPW.

*II.I Terminology*

* **Internet Protocol address (IP address)** is a numerical identifier assigned to a device connected to the internet. It allows a device to send and receive data, communicate with other devices, identify the host or network being used, and identify the device's location.
* **Internet Service Provider (ISP)** is a company that provides access to the internet such as Verizon.
* **Latitude (Lat)** is a coordinate that identifies the distance north or south of the earth’s equator. It ranges from -90 degrees at the south pole to 90 degrees at the north pole.
* **Longitude (Long)** is a coordinate that identifies the distance east or west of the meridian at Greenwich, England. It ranges from 0 degrees at the meridian to 180 degrees eastward and -180 degrees westward.
* **Temperature (temperature\_2m)** is the degree of heat in an object or substance that can be measured in Fahrenheit or Celsius. In this paper, temperature will be measured in Fahrenheit and at 2 meters above ground.
* **Humidity (relative\_humidity\_2m)** is the amount of water vapor in the air at 2 meters above ground**.**
* **Precipitation** is the sum of rain, showers, and snow for the last hour.
* **Snowfall** is the amount of snow that has fallen for the last hour in centimeters.
* **Universal Pollen Index (UPI)** is a global unified index that uses a scale of 0 (None) to 5 (Very High). UPI helps simplify comparing pollen in different locations.
* **DayInfo** provides the date of the represented forecast.
* **PollenTypeInfo** provides the seasonality of available pollen types, UPI, and health recommendations for the requested location.
* **PlantInfo** provides the names and descriptions of plants at the requested location including their seasonality, appearance, and cross-reactions.

*II.II Motivating Example*

Given an IP address, it is processed through the ip-api API returning the latitude and longitude coordinates. The ip-api API allows users to look at other information that is related to IPV4 and IPv6 addresses such as time zone, country, region, etc. The latitude and longitude coordinates are used to make a request to Open-Meteo API and fetch the temperature data. Open-Meteo API gives users access to the current weather data, such as temperature and rain, for any location on Earth. The coordinates are also used to make a request to Pollen API and fetch pollen information including types, indexes, and health recommendations. This API allows users to identify and learn more about the plants that affect their allergies.

1. **Proposed Approach**
2. **Discussion**

The development of the IWP API started with choosing three APIs from a list provided through GitHub. This list included a variety of APIs from animal to weather-based APIs. The process of choosing three APIs was difficult, however, the final ones chosen were Open-Meteo, ip-api, and Pollen API. The process was difficult because of the list contained many APIs that were image or random fact-based or the link included did not work. Another issue that was crossed was with API keys. One of the APIs that was considered in the development of IWP was OpenWeather which did require an API key. However, the goal of accessing the data in this API was not accomplished because of limited time. To resolve the problem of needing weather data, another API was chosen that did not require an API key called Open-Meteo. Apiip was another API that required an API key but did not work. Since Apiip did not work ip-api was chosen to gain access to IP address information. Although the API key did not work for OpenWeather and Apiip, it did work for the Pollen API. Using a Google account an API key was created through the APIs & Services section under the Credentials menu.

1. **Related Work**
2. **Conclusion and Future Work**

**References**

[Meteomatics] (n.d.). Particles. Retrieved April 1, 2024, from <https://www.meteomatics.com/en/api/available-parameters/particles/#pollen_concentrations>