

# Globetrotters' Guidebook

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## **Abstract**

Our project aims to create an all-encompassing travel dashboard to simplify trip planning. The authors recognized that planning a trip involves multiple components such as identifying optimal weather conditions, organizing hotels, finding interesting attractions, and making a concise plan, which often requires the use of multiple applications and tools. In creating our dashboard, we focused on three key components: weather information, details on attractions, and an itinerary to help users plan out activities. In order to build the dashboard, Google Maps API and Weather API provided the necessary data used to display the information that we want on the dashboard. Data cleaning and data retrieval focused on obtaining a list of states and city names from SimpleMaps website and extracted a wealth of data related to each attraction using the Google Maps API, along with weather forecast data from Weather API. Python and the Dash and Plotly libraries were used to display the attraction data and weather forecast on the dashboard, and initial cleaning allowed to the data to be transformed into a format suitable for display. The authors created three separate tabs to help the user plan out their trip. The attractions tab allows the user to generate an itinerary list, and the Weather Forecast tab allows the user to see the temperature line graph. Overall, our project serves as a single, user-friendly travel dashboard that consolidates key travel factors into one tool to enhance the traveler experience and simplify the process. While there are some limitations to the capabilities of our dashboard, hashing them out and continuing to develop our capabilities will create a stronger resource for travelers.

## **Introduction**

For our project, we decided to create an all-encompassing travel dashboard to display travel information for users to observe and manipulate. Our primary motivations stem from dealing with the various logistical difficulties that go into planning a trip which can often become overwhelming. Successful journeys require planning for many different components, such as identifying optimal weather conditions, organizing hotels, finding interesting attractions, making a concise plan, etc. In considering these factors, we observed that they often require the use of multiple applications and tools to properly consider, which led to our goal of consolidating these components all into one interface. The goal of this project was to create a single, user-friendly travel dashboard which considered these components and displayed this data in a single tool. Not only would this dashboard be useful to streamline travel planning, but continued development to flesh out these key components could lead to larger applications for our dashboard.

Our plan for this dashboard is to focus on three key components: weather information, details on attractions, and an itinerary that helps users plan out activities. By focusing on these factors specifically, we tackle the largest components of travel planning and work towards creating comprehensive tools for travelers to use while planning their trips. We believe our work is unique due to the encompassing nature of our dashboard. In likelihood, there will be better existing applications to cover each of the individual factors, but the value of our project comes in the consolidation of the key travel factors into one tool. Rather than rely on multiple tools and create a considerable amount of extra work, having a single dashboard to display this information will not only enhance the traveler experience, but also simplify the process.

## **Methods**

To start building our dashboard, we decided to use Google Maps API [1] and Weather API [2] to obtain the data we needed to display on our dashboard. We began by obtaining a list of states and city names from the SimpleMaps [3] website. This would allow our users to select a location of their choice from a dropdown list, and our application would fetch the relevant data from the APIs. Using the Google Maps API [1], we were able to extract a wealth of data related to each attraction, such as the name, address, price level, ratings, and operating hours. However, we found that the API returned a lot of unnecessary data as well, so we filtered and cleaned up the data to extract only the relevant information. For example, we parsed the operating hours to extract the opening and closing times, and we removed any extraneous data points such as photos and reviews.

We also used the Weather API [2] to retrieve the weather forecast data for the selected location. We parsed this data to extract the temperature information, and we displayed it in the form of a line graph to allow users to easily visualize the weather forecast for their selected location. We also used the WeatherAPI to retrieve different data for all the cities in our datasets, retrieving data regarding the coordinates of each location, precipitation, snowfall, and minimum, maximum, average temperatures. We extracted this information for a couple major cities in the US and visualized it by mapping it using the Plotly library. For this, the data was loaded into a pandas dataframe to work with after loading into our python files.

To display the attraction data and weather forecast on our dashboard, we transformed the data into a format suitable for display. We displayed the attraction data in a table format, with each row representing an attraction and each column representing a different data point. For the weather forecast, we displayed the temperature data in a line graph, with each point on the graph representing a day in the forecast.

Overall, we assumed that the data we obtained from the APIs was accurate and up-to-date, and we did not generate any data as part of the prototype. Our goal was to provide users with a simple and intuitive way to explore different attractions and plan their trips based on the weather forecast for their selected location.

## Analysis

In our final dashboard, we created three separate tabs to help the user plan out their trip; they can find and save attractions to an itinerary, see the weather forecast, and more weather details for major cities. We decided to keep the range of the available destinations within the US, so that above the tabs, the user can select a state and a city within the state from dropdown menus.

The attractions tab consists of multiple components that all help the user generate an itinerary list. The slider allows the user to choose the radius in kilometers to filter search results for attractions only within that distance of the selected city. Then, they can type into the search bar either different types of attractions (eg. museums, parks, restaurants), a specific attraction (eg. the Statue of Liberty, the Natural History Museum), or even more specific queries (eg. French Restaurant on Newbury Street) and select how many results they want to show. The results are displayed in a table with the name of the attraction, its address, rating, price level, and operating hours. The user can select attractions, click the “Add to Itinerary” button, and then they appear in a new table. In addition, new attraction search results can be added to the same itinerary.

An Interactive Travel Dashboard

New York

Manhattan

Attractions

Weather Forecast

Daily Weather Details of Big Cities In the US

Choose the radius within which to return place results

1km5km10km15km20km25km30km35km40km45km50km

museum

5

Search

	Name	Address	Rating	Price Level	
<input type="checkbox"/>	The Museum of Interesting Things (advance appt only)	Georgetown Plaza, 60 E 8th St, New York, NY 10003, United States	4.6		
<input checked="" type="checkbox"/>	Town Museum	150 Plaza Center, Secaucus, NJ 07094, United States	4.8		Monday: Closed, Tuesday: Closed, Wednesday: Closed, Thursday: Closed, Friday: Closed, Saturday: Closed, Sunday: Closed
<input checked="" type="checkbox"/>	Hoboken Historical Museum	1301 Hudson St, Hoboken, NJ 07030, United States	4.6		Monday: Closed, Tuesday: 2:00 – 7:00 PM, Wednesday: Closed, Thursday: Closed, Friday: Closed, Saturday: Closed, Sunday: Closed
<input type="checkbox"/>	The Museum of Interesting Things Secret Speakeasy	177 Prince St, New York, NY 10012, United States	4.6		
<input type="checkbox"/>	Museum of Jersey City History	298 Academy St, Jersey City, NJ 07306, United States	0		

Add to Itinerary

Your Itinerary List

Name	Address	
Town Museum	150 Plaza Center, Secaucus, NJ 07094, United States	Monday: Closed, Tuesday: Closed, Wednesday: Closed, Thursday: Closed, Friday: Closed, Saturday: Closed, Sunday: Closed
Hoboken Historical Museum	1301 Hudson St, Hoboken, NJ 07030, United States	Monday: Closed, Tuesday: 2:00 – 7:00 PM, Wednesday: 2:00 – 7:00 PM, Thursday: 2:00 – 7:00 PM, Friday: 1:00 – 7:00 PM, Saturday: 1:00 – 7:00 PM, Sunday: Closed

Figure 1. displays the first tab of the dashboard, which allows users to search for attractions within a range of distances from the selected city and add them to an itinerary.

The Weather Forecast tab allows the user to select from a dropdown menu a range of days to be shown in a temperature line graph, which updates with changes in the day range. The x-axis is number of days into the future and the y-axis is the temperature in Celsius.

#### An Interactive Travel Dashboard

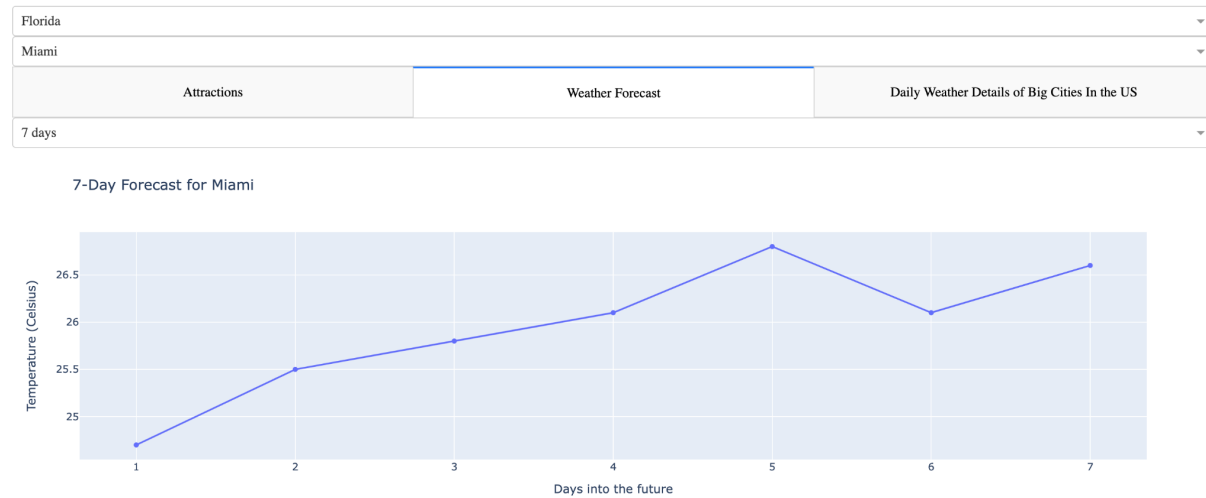


Figure 2. Displays the second tab, which allows users to select between a 1-7 day temperature forecast and generates a line graph.

Finally, the Daily Weather Details of Big Cities in the US tab allows the user to select a weather element (average temp in Celsius, average low temperature, total precipitation, and more), which then updates the map showing weather details for all the big cities. A color gradient on the left corresponds with the colors of the dots on the map representing the cities, and hovering over the dots will show the latitude, longitude, and the selected element.

#### An Interactive Travel Dashboard

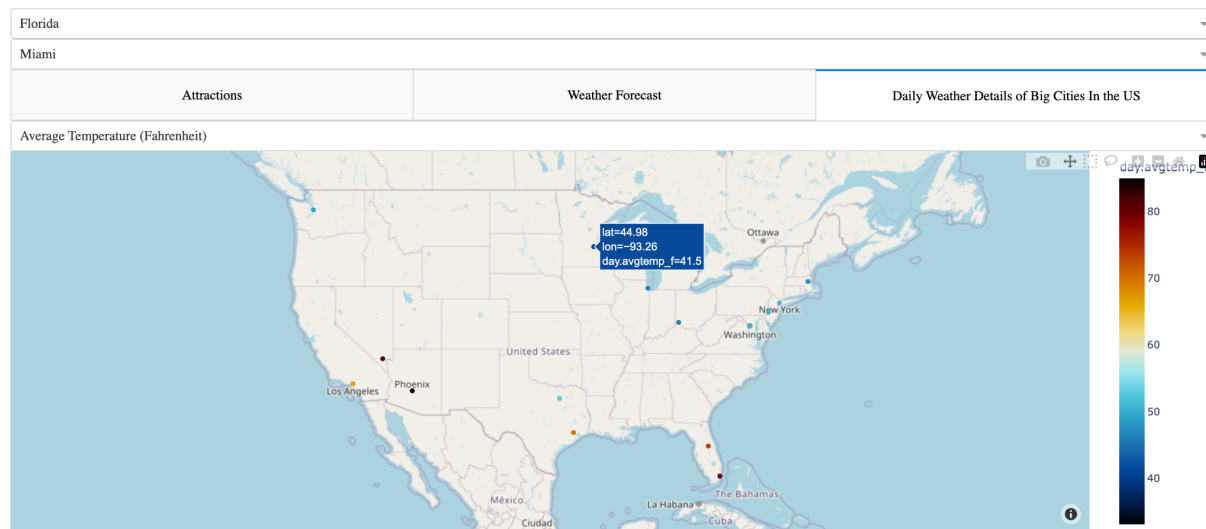


Figure 3. Displays the last tab, which allows users to select weather elements and visualizes the details for big cities in the US.

## Conclusions

We have successfully developed an interactive dashboard that generates a list of attractions and itinerary based on the user's selected state and city. In addition, we have integrated a live weather

map that displays real-time weather data for major cities across the US. The map offers users the flexibility to choose a weather index, including switching from Fahrenheit to Celsius for the average temperature. Furthermore, we have included a line plot that automatically updates the weather data for a week from each city that the user selects.

It is important to note that our dashboard has some limitations. We were unable to incorporate the time it takes to travel between destinations or the time required to get from one attraction to another. Moreover, due to the limited data available, we could only forecast weather up to 14 days into the future. In reality, travelers typically plan their trips weeks or even months in advance, so it would be ideal to incorporate historical weather data to predict weather conditions months in advance. Additionally, we have identified that it is not possible to remove items from the itinerary once added. These limitations serve as valuable lessons and challenges for us to address in the future. While our dashboard has a strong framework, there is still room for improvement. In particular, we need to collect more data to improve our forecasting capabilities and incorporate estimated time of arrival for destinations and attractions. Additionally, we plan to further enhance the user experience by developing better interactive features.

### **Author Contributions**

- Anh Nguyen contributed to the dash layout, weather graphs, weather maps, attractions, and report writing.
- Aayush Joshipura contributed in the process of weather API data scraping, attractions data scraping, and report writing.
- Julia Luo contributed to creating the dashboard wireframe, dash layout, weather graphs, weather maps, and report writing.
- Tung Giang contributed in the process of building the weather graphs, weather map, incorporating and assembling the dashboard, and report writing.
- Ai Hsiao contributed to the city and state input option and itinerary incorporation into dashboard and report writing.

### **References**

1. *United States Cities Database*. simplemaps. (n.d.). Retrieved April 8, 2023, from <https://simplemaps.com/data/us-cities>
2. Weather API, . Retrieved April 8, 2023, from [https://www.meteomatics.com/en/weather-api/?msclkid=bf329c6aea11123636b6f82a5e8a2c4e&utm\\_source=bing&utm\\_medium=cpc&utm\\_campaign=Weather%20API%20\(USA\)&utm\\_term=weather%20API&utm\\_content=Weather%20Api](https://www.meteomatics.com/en/weather-api/?msclkid=bf329c6aea11123636b6f82a5e8a2c4e&utm_source=bing&utm_medium=cpc&utm_campaign=Weather%20API%20(USA)&utm_term=weather%20API&utm_content=Weather%20Api)
3. Google Maps API. Retrieved April 8, 2023, from <https://developers.google.com/maps>