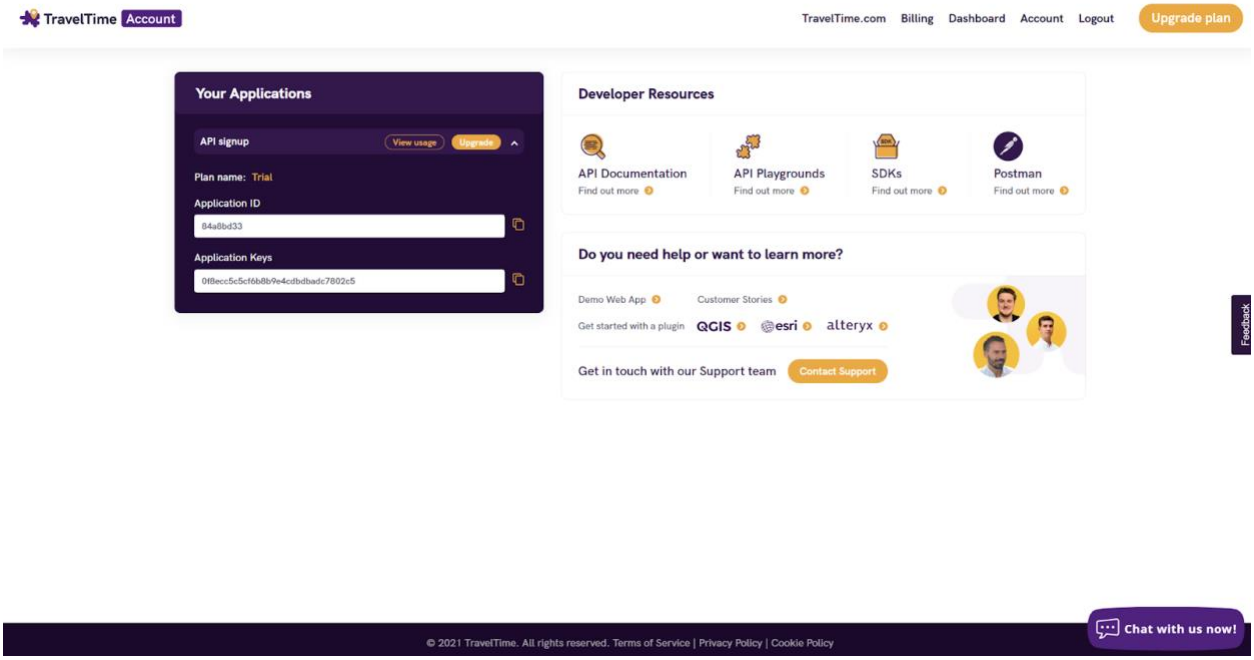
Appendix 5: How to use Isochron Web Application

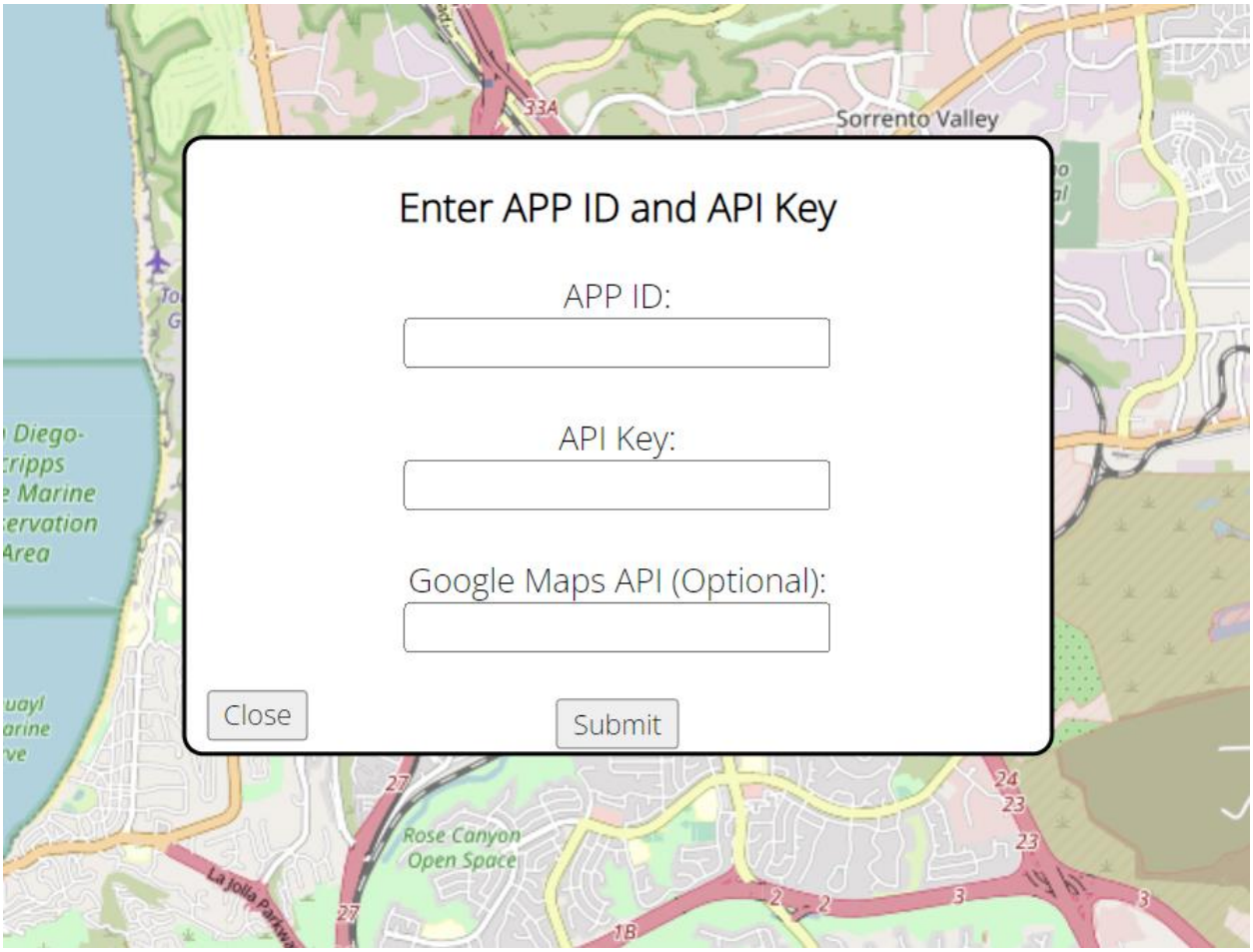
As part of the project, we have created an application → https://jackljk.pythonanywhere.com/ that allows users to visualize the distance they can reach when walking, biking, or using an E-bike from a public transit stop such as the MTS trolley system. The application also provides an estimate of the number of people in the catchment area given the selected means of travel to the transit stop.

First to use the API that performs the calculations for the travel times, go to the following website to create a free account → https://traveltime.com/. Once in the website click the “Sign Up” button and follow the instructions provided in order to create a free account.

When you are done with that you should land on the page shown below.

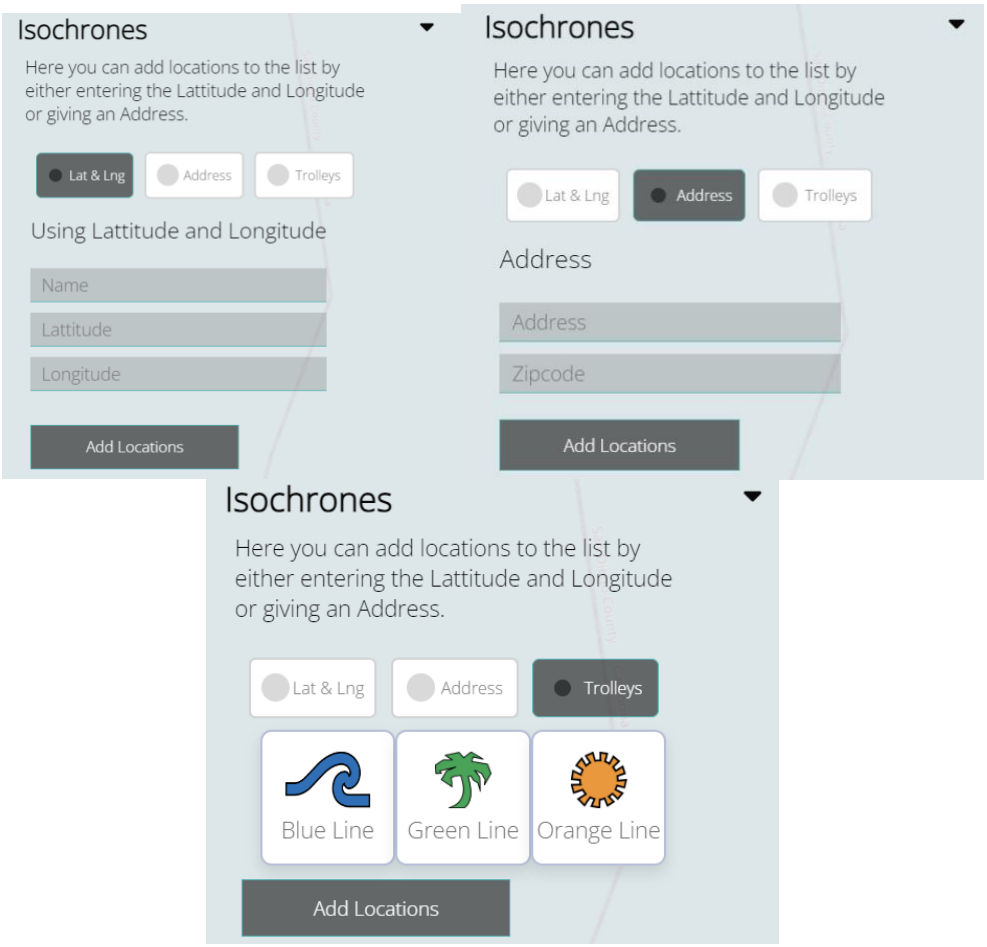


Now on the isochron Website click on the API tab and enter the “Application ID” and “Application Key” into their respective fields and hit submit.



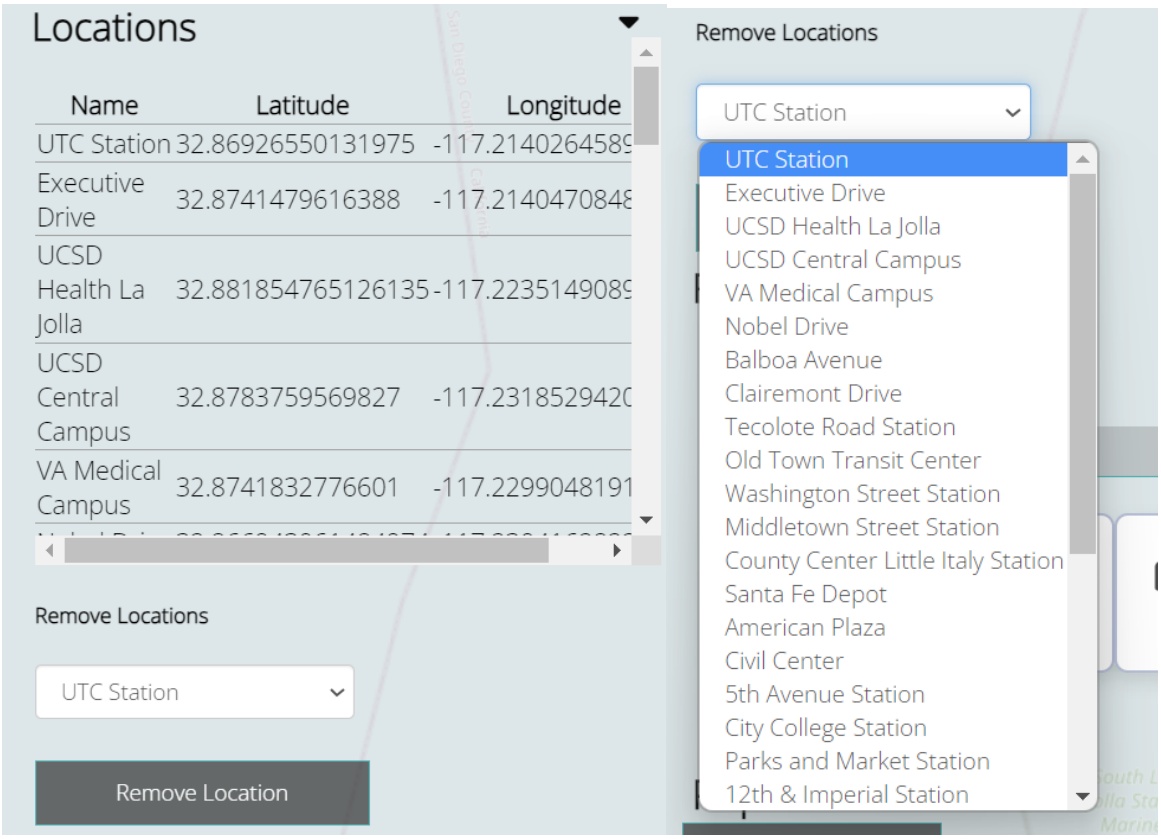
If a message that says “API Key and APP ID have been set” then you can move to the next step. The Google Api is an optional key in case you want to type in addresses to add custom locations. That can be obtained from https://developers.google.com/maps, and following the instructions given to gain access to the free trial for the Google Maps API Key.

Under the "Isochron" section, there are three tabs: "Lat and Lng", "Address", and "Trolleys". These tabs allow you to choose the inputs for the isochrons that you want to calculate. In the "Lat and Lng" section, you can enter a latitude and longitude to give the app a specific center point for calculating how far one can travel in a given number of minutes. The "Address" field allows you to input an address in the format "123 Main St, San Diego, CA, 92101", which is then converted into geographic coordinates using Google's geocoding and pinpointed on the map. Lastly, the "Trolleys" tab provides a quick way to add all the trolley stations for the respective trolley line.

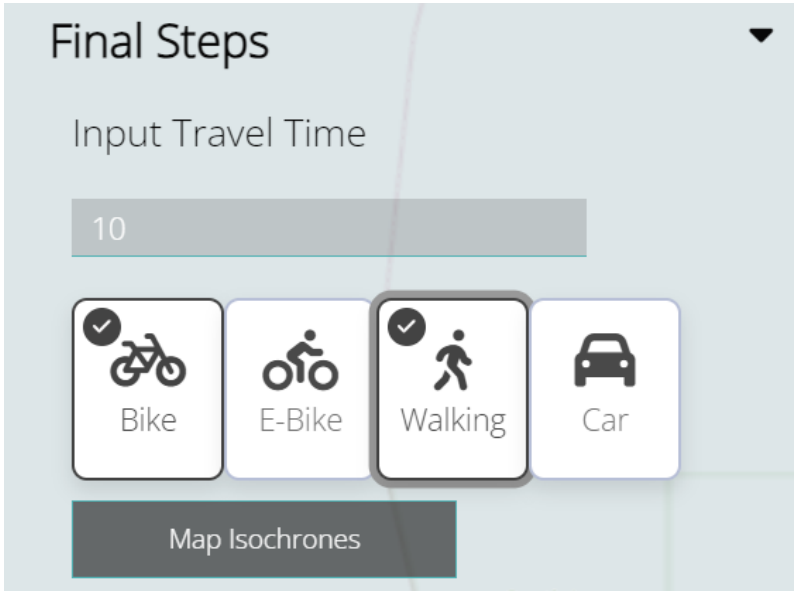


Each time you want to add a location or a group of Trolleys, to successfully add it to the list click the “Add Location” button.

After adding any locations, you can verify that they have been correctly inputted by viewing the "Locations" tab. This tab displays a table of all the added locations. Below the table, there is a dropdown list that you can use to remove any unwanted locations from the current table.

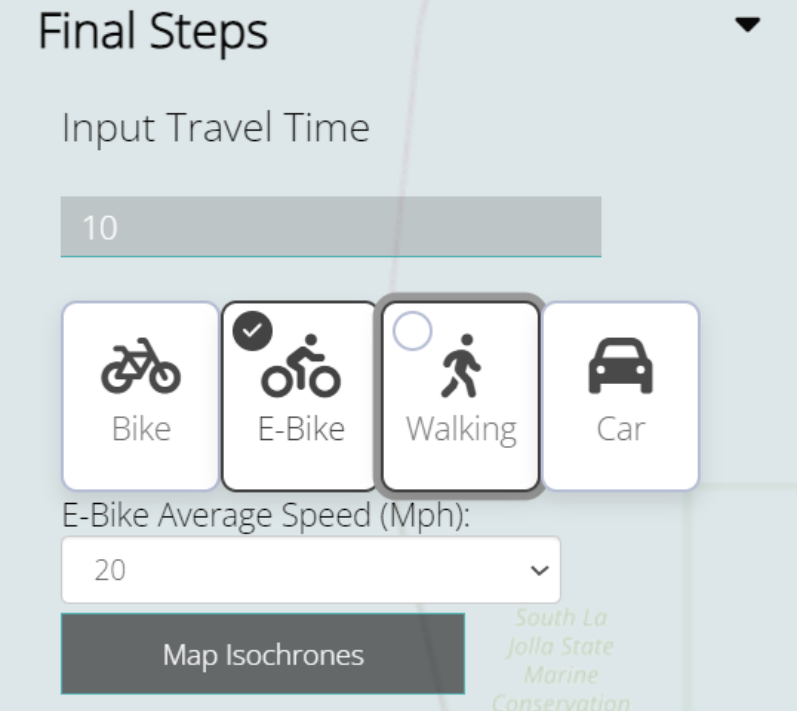


Finally, moving to the last steps, one can input the Travel Time in minutes and select the types of transport to calculate the distance you can travel in the given time. For example if the comparison to be made is how far someone could travel in 10 minutes by bike or walking the following will be entered.



Clicking on “Map isochrons” will then start the calculations and create the desired visualizations.

Note:
For the E-bike option due to the many different options available in the market and different speeds one is comfortable traveling at, when it is selected a dropdown will appear allowing the user to specify the speed in which their particular E-Bike is able to travel on average. The default is set to 20mph as that is the average speed of the more popular E-Bikes on the market and also what would be considered a comfortable speed to be traveling at for most people which complies with the E-Bike max speed laws.



Technical Architecture of Isochron Web Application

The app collects information from two APIs to perform its calculations and display the isochron visualizations. All code was written in Python by CCE Associate, Jack Lim, and is available on GitHub at https://github.com/jackljk/Isochrone-of-San-Diego-Trolleys.

API and Data Used

The first API that was used is the TravelTime API which is what is used to do the calculations of the area of the isochrons. The other API that was used is the US Census Bureau, this was used to get the necessary data for calculating the estimated number of people that is reached within the area of the isochron.

Conversion for Bike to E-Bike

Upon doing research the average speed of an E-Bike is 20 MPH, and the average speed used in the calculation of the isochron distance is 10 MPH, hence the conversion used is to say that we use 2 times the minutes on a bike as compared to using an E-bike. Example if we want to look for the distance traveled by an E-Bike in 10 minutes, we set the Travel time input to be 20 minutes by Bike.

Sources Used

- https://discerningcyclist.com/google-maps-cycling-speed/
- https://discerningcyclist.com/how-fast-are-electric-bikes/