Exercise 4

# Calculating the Shortest Driving Time Using StreetMap Premium

We will use the Incidents data, which was just geocoded, to calculate the shortest driving time from each point to the Facilities.

Load the Facilities Shapefile.

A map of the california state

Description automatically generated

In the Catalog panel, click on the Portal tab. You will see three NetworkAnalysis toolboxes. These are the analysis tools provided by StreetMap Premium.

A screenshot of a computer

Description automatically generated

For this exercise, select the FindClosestFacilities tool from the NetworkAnalysis toolbox.

A screenshot of a computer

Description automatically generated

This tool helps you find one or more facilities that are closest to an incident based on travel time or distance. The output includes the best routes, driving directions, and a copy of the chosen facilities. For example, it can be used to find the closest hospital to an accident or the closest police station to a crime scene.

We first input the corresponding data into the Incidents and Facilities fields.

A close-up of a white panel

Description automatically generated

Incidents: The locations that will be used as starting points.

Facilities: The locations that will be used as ending points.

Setting Calculation Parameters

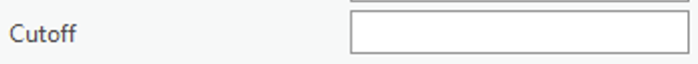
* Measurement Units: Defines whether travel time or distance is measured. Choose a time unit to measure driving time or a distance unit for driving distance.



* Number of Facilities to Find (Optional): Specifies how many closest facilities to find per incident. For example, you can find up to 100 facilities, such as multiple fire stations for a fire.



* Cutoff (Optional): Limits the maximum travel time or distance. For example, setting a 15-minute cutoff will only return facilities within 15 minutes of an incident.



* Travel Mode (Optional): Specifies the mode of transportation, such as car, truck, or walking. You can customize it if needed. The default value, Custom, allows you to configure a custom travel mode using the custom travel mode parameters (UTurn at Junctions, Use Hierarchy, Restrictions, Attribute Parameter Values, and Impedance).
* Use Hierarchy (Optional): When checked, it will prioritize higher-order roads like freeways over local roads.



* UTurn at Junctions (Optional): Specifies whether U-turns are allowed at intersections.

A close up of a sign

Description automatically generated

* Restrictions (Optional): You can impose restrictions like avoiding toll roads or restricted access roads.

A screenshot of a computer

Description automatically generated

* Attribute Parameter Values (Optional): Set additional values for restrictions like preferring certain types of roads.
* Route Line Simplification Tolerance (Optional): Simplifies route geometries to speed up processing.
* Impedance (Optional)，Time Impedance (Optional)，Distance Impedance (Optional)：
  + Defines the effort or cost of travel based on time, distance, or other factors.
  + If the impedance for the travel mode, as specified using the Impedance parameter, is time based, the values for the Time Impedance and Impedance parameters must be identical. Otherwise, the service will return an error. So as Distance Impedance.

A white rectangular object with black lines

Description automatically generated with medium confidence

* Travel Direction (Optional): Specifies the direction of travel.

A white rectangle with a black stripe

Description automatically generated

* Time of Day (Optional): The time and date the route will begin or end.
* Time of Day Usage (Optional): Specifies whether the Time of Day parameter value represents the arrival or departure time for the route.

A screenshot of a phone

Description automatically generated

* Barriers: Defines temporary restrictions such as road closures.

For more details on each parameter, check the official documentation <https://pro.arcgis.com/en/pro-app/latest/tool-reference/ready-to-use/itemdesc-findclosestfacilities.htm>

After configuring the parameters, click Run.

Derived Output

A map of a route

Description automatically generated

* Output Routes: Displays the best routes between Incidents and Facilities.

A screenshot of a computer

Description automatically generated

* Output Incidents: Shows the Incidents used in the analysis.
* Output Facilities: Shows the facilities used in the analysis.
* Output Closest Facilities: Provides the closest facilities in the analysis.