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From: Chasing FOX

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## Summary

- The results of the data analysis part were organized and compared.
- The task of calculating the risk of the node through the risk of the edge has been completed.
- Polygon, Polyline, and Taking a marker function were applied.
- The draft of the methodology part was written.
- The contents of the presentation were organized.

## What Chasing FOX completed this week:

- **Data analysis**
  - The results of the correlation using KDE and Euclidean distance were compared.
- **Algorithm**
  - The flow of the algorithm is as below.
    - Get the origin, destination from the user.
    - API passes the user's origin and destination location to the algorithm.
    - Get the nearest nodes from the origin and destination, and find the shortest path between the two nodes.
    - In that process, consider the riskiness of the node in the route.
    - The riskiness of the node is the mean of the riskiness of the edges connected to that node.
    - The paths considered length, travel time, and riskiness are transferred to the user.
  - Until this week, random numbers were applied in the algorithm to apply the node's riskiness.
  - The information of the node is as below.

	y	x	street_count	ref	highway	geometry	mean_edge	riskiness
osmid								
26794558	41.954224	-87.678770	6	NaN	traffic_signals	POINT (-87.67877 41.95422)	86.401200	3.400000
26794572	41.961461	-87.678962	4	NaN	traffic_signals	POINT (-87.67896 41.96146)	139.819750	2.500000
26808653	41.946869	-87.678550	4	NaN	traffic_signals	POINT (-87.67855 41.94687)	126.487000	2.250000
35034250	41.925026	-87.677893	4	NaN	traffic_signals	POINT (-87.67789 41.92503)	95.798000	3.250000
35034253	41.921390	-87.677766	4	NaN	traffic_signals	POINT (-87.67777 41.92139)	88.105250	2.750000
...	...	...	...	...	...	...	...	...
6993685342	41.871000	-87.678528	2	NaN	NaN	POINT (-87.67853 41.87100)	64.614000	3.500000
7614087408	41.954122	-87.678766	4	NaN	traffic_signals	POINT (-87.67877 41.95412)	71.353667	3.666667
9194897523	41.914358	-87.677559	2	NaN	NaN	POINT (-87.67756 41.91436)	51.443000	2.500000
9223647400	41.888861	-87.676859	2	NaN	NaN	POINT (-87.67686 41.88886)	87.208000	3.000000
9223647403	41.888164	-87.676833	2	NaN	NaN	POINT (-87.67683 41.88816)	66.172000	4.000000

197 rows × 8 columns

**Fig 1. Information on the nodes  
including the mean of all connected edges and riskiness**

- **Front-end**
  - Polygon and Polyline functions were applied on the map.
  - A function to take a marker in a specific area was created. When users search for a destination, a marker is selected on the map.
- **Paper**
  - The draft of the methodology part was written. The methodology part consists of the data analysis and safety algorithm part.
- **Midterm Presentation Preparation**
  - Organized the Python code to organize the result.
  - Picked up the plot that will be used in the presentation.
  - Organized the contents in the presentation.

#### **Things to do by next week**

- The REST API for the navigation function will be developed. The navigation model will include the origin and destination coordinates, the fastest and safest waypoints, and user's crime option indexes.
- In the algorithm part, the nine nodes in the route will be selected, considering the riskiness. And it will transfer to the Google Map API.
- The prototype application will be designed using Figma regarding the route recommendation page.
- 1st mid-paper and mid-presentation will be completed.

#### **Problems or challenges:**

- In the algorithm part, getting used to the OSMnx library and using its functions took time.
- Finding a way to deliver academic content more effectively was challenging.

#### **References**