Data-driven Micromobility Analysis

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Work Research Group

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Background

- Micromobility has seen a massive increase in recent years, specifically scooters.

- This influx has caused a multitude of management issues.

- There is a clear need for some sort of management strategy; we propose parking locations.

Initial Objective

- Set out to solve an optimization problem which minimized distance from location to trip endpoint and maximized trip endpoint capture by a location.

- Due to the complexity of this problem, we had to formulate a new solution.
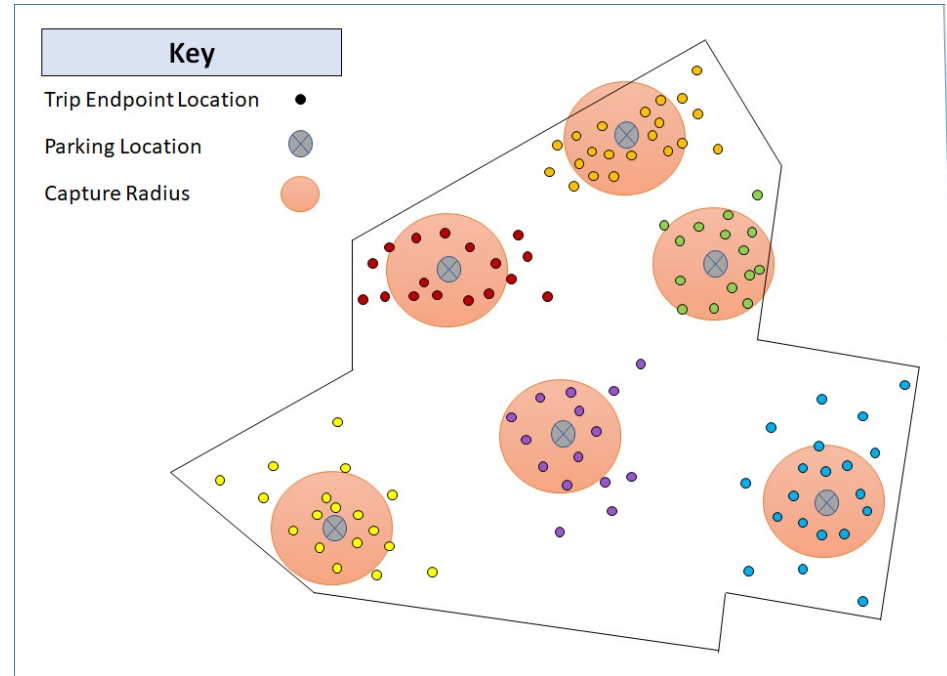
Scooter Parking

- To deal with our complexity issue, we used unsupervised machine learning algorithms (clustering) in python to determine locations on Vanderbilt's campus.

- We then assigned a buffer to each cluster to see how many trips a location would "capture".
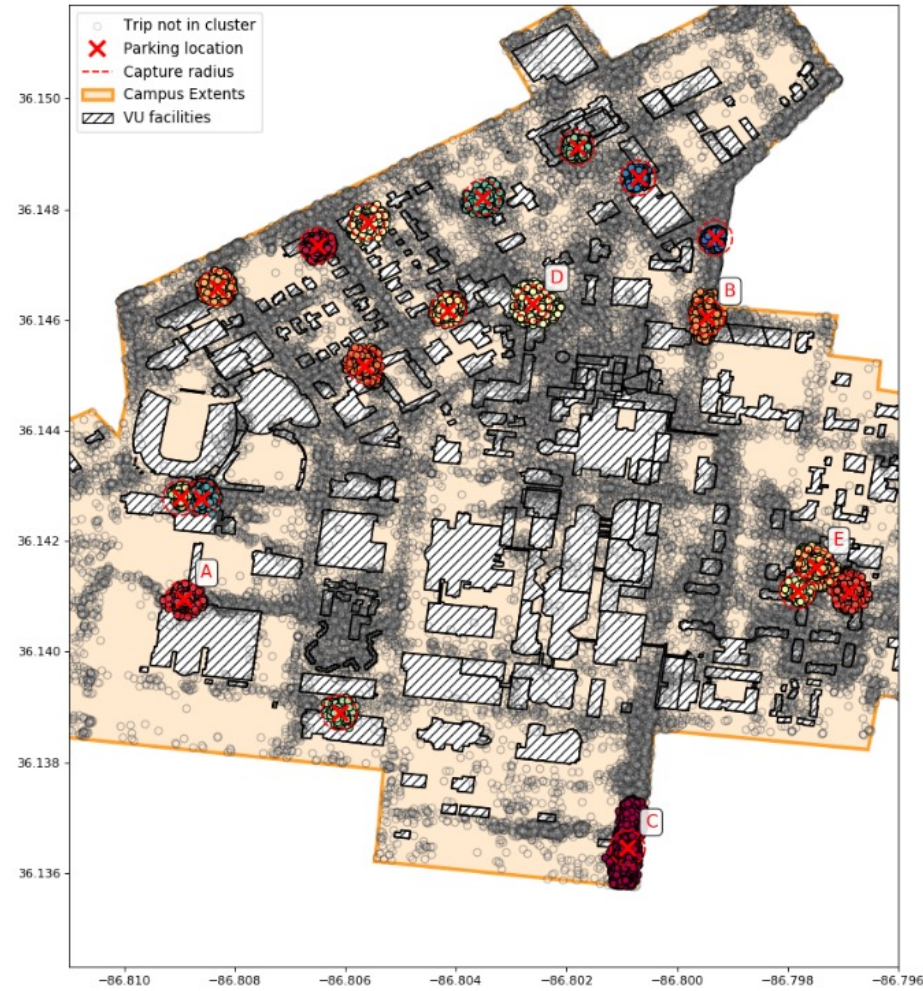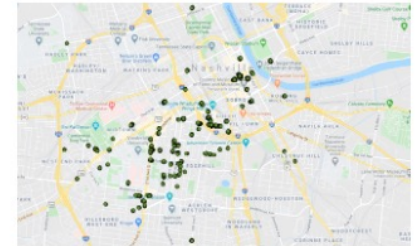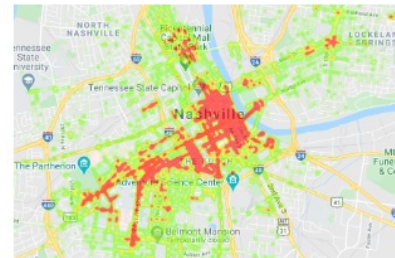
ADA Consideration

- To take our analysis further, we considered factors in addition to demand.

- Using GIS, we were able to determine the width of sidewalks associated with scooter trips and were able to prioritize streets for parking likely to be in violation of ADA regulations.
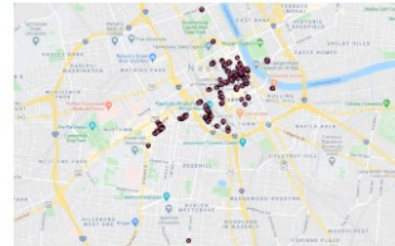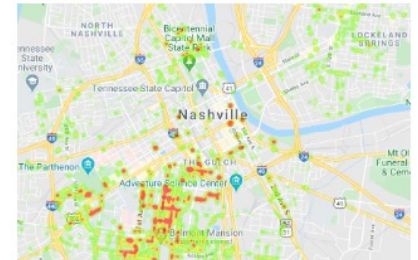

(a) Clusters for small ω values

(b) Clusters for large ω values

(c) Frequency of all trips end locations

(d) Frequency of ADA non-compliant trips end locations

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Future Work

- Currently working on a paper exploring the idea of contrasting a "scooter score" and availability of scooters to see if these devices are utilized effectively.

- Trying to answer the question of "Are there areas where scooters could have potential?"
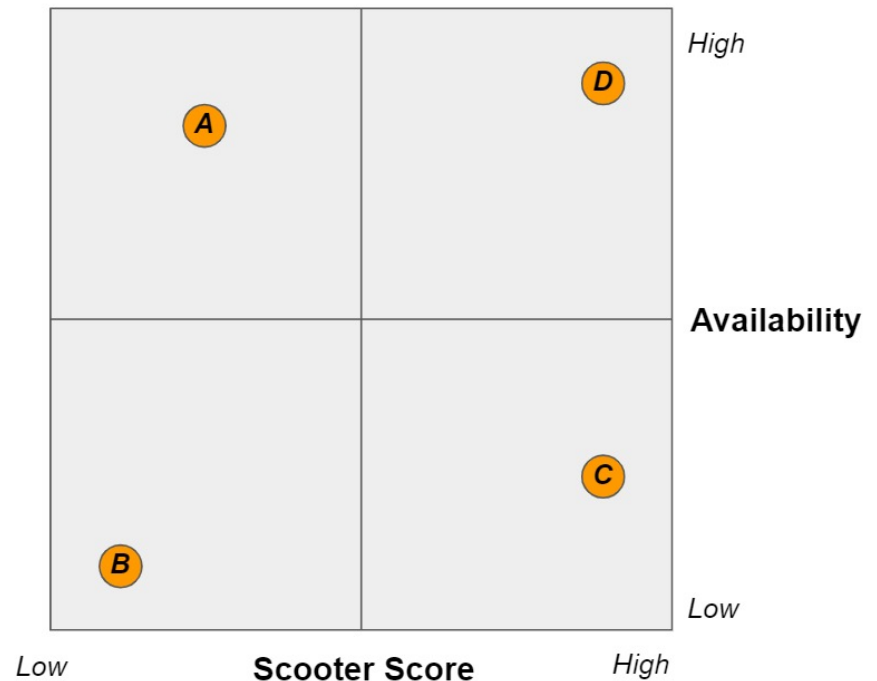
Lessons Learned

- Research is very different from anything I've ever done and requires a lot of self-direction.

- Continuing off that thought, it is vital to have a group that you enjoy working with and feel comfortable asking questions to.

- Working remotely can be really hard to find a work-life balance, so finding a schedule is essential.