**Motivation:**

A scooter sharing system is a shared transportation service in which electric scooters are available for short-term rentals. E-scooters are often "unparked" compared to shared bikes, meaning they don't have fixed racks but drop off and pick up from certain locations in the service area. Scooter sharing system aims to provide a fast and convenient means of transportation for the public. Due to the growing popularity of scooter sharing, the municipal government has implemented regulations on electric scooters to improve the safety of riders and pedestrians, while avoiding visual pollution. Scooter sharing systems are one of the cheapest and most popular micro transportation options.

Job one for expanding transportation choices is shoring up current transit system, and then helping the communities connect to transit stops. Therefore, we need to improve local, block-by-block transit access for folks who are most in need or who are less likely to live within walking distance of a convenient bus or train option. Every neighbor deserves the same access to our entire city — a neighborhood network. shared e-scooters can provide that missing link, giving people the means to access transit stops that were previously accessible only by a long walk or expensive car ride. It is importance to know whether there is an imbalance in demand for Scooter and whether it will give residents an unfair right to use the scooter.

Demand for parking Spaces, Uber rides, bike sharing, road access, and many urban traffic phenomena are dependent on time and space, and modeling them often involves simply controlling dates, times, places, weather, and other temporal phenomena. If users don't have a scooter available within walking distance when they want to use one, they're likely to give up looking, and sharing a scooter is useless. It is worth thinking about how we should properly and efficiently redistribute scooters to ensure they are available for everyone. Combined with the population, social economy and other characteristics of the city, the prediction is conducted to check whether the potential demand for scooters is different in different census areas, which will also affect the impact of the fleet management and distribution choice of scooter companies. Here, this project answers the question, who currently has the access to E-Scooters? Companies need to invest in more equipment so we can better allocate resources.

To solve this, we will build a model using these features, including the city's demographic characteristics, socioeconomic and natural & built environment characteristics, to make predictions.

If suppliers do not rebalance aggressively, vehicles will be concentrated in a few regions and user in other region will not have scooter in time. The task of rebalancing is complex because there are many factors that affect the user's choice, including time of day, day of the week, location, distance, weather, built environment and so on. The project will focus on the Chicago area and incorporate these key features into a model to predict the spatial/temporal requirements of shared scooters. We can see when the demand for scooters might lead to running out of vehicles, and then remove the excess scooters from elsewhere. Therefore, the company can reasonably predict demand and deploy in advance. Lime has more cyclists because of its lower prices in priority areas throughout the pilot phase, combined with population and built environment characteristics, whether the current priority area can give more people access to scooters or whether it needs to be improved are worth thinking.

**Dataset Identified:**

E-Scooter Trips - Census Tract Summary – 2020 (<https://data.cityofchicago.org/Transportation/E-Scooter-Trips-Census-Tract-Summary-2020/3srm-twg4>)

E-Scooter Trips – 2020 (<https://data.cityofchicago.org/Transportation/E-Scooter-Trips-2020/3rse-fbp6>)

Chicago Public Schools - School Locations SY1920 (<https://data.cityofchicago.org/Education/Chicago-Public-Schools-School-Locations-SY1920/tz49-n8ze>)

1. University and College data 2. restaurant 3. public transport 4. retail store 5. tourist attraction --- open street map

**Methods:**

A temporal and spatial model will be created to predict where and when scooter demand will peak in the city of Chicago.

Using the city of Chicago's publicly available 2020 scooter TRIP data, a machine learning approach was used to create a model. We will design several different linear regressions. Divide the data into training sets and test sets. Start by creating an initial model reg0 that contains all variables to help determine the exclusion of variables unrelated to the number of shared scooters. reg1 focuses on time, reg2 focuses on spatial effects, reg3 includes time and spatial fixed effects and so on.

**Deliverables:**

This project was designed to help city officials have a better understanding of the current scooter accessibility and predict the geographic distribution of scooter riders in this year and understand its relationship to the social and economic geography of the city. The company can learn how to better allocate scooter resources. They should put more vehicles into areas with large demand and which time of day, or a week, and which time of the month there is more demand for scooters.