

Research Title:

From Data on Shared E-Scooters to Two-Wheel Vehicle Riders' Behavior: Route Choice as a Driver for Cycling Infrastructure Development

Primary Investigator:

Name: **Prof. Itzhak Benenson**

Faculty: **School of the Environment and Earth Sciences**

Academic Institute: **Tel Aviv University**

Two-wheel electric vehicles, bikes and scooters represent a new and very efficient mode of urban mobility that help riders avoid traffic jams. There are two large fleets of these vehicles in the city – private and shared ones, and our research is based on data collected by the shared scooters operators - anonymized data on the shared electric scooter (SES) use during 2022 – 2024 in Tel Aviv and surrounding areas. Two sources we base on are the POPULUS database, and similar database of one of the leading SES providers there.

The first year of study was devoted to the harmonizing and analysis of the data on SES use. This includes identifying trajectories anomalies, processing of incomplete SES trajectories (more than 50% of the data), and projection of trajectories on road network.

The analysis of the personal use reveals very high share of the SES users who make very few trips or tried to use SES for a short period of time only. The share of riders who make on average 1 trip per month is 44.6%, another 21.9% of users make between 2 and 1 trip per month. That is, only 33.5% of users make more than two trips per month. Yet, trips of these “frequent users” make up 87.6% of all SES trips.

The harmonized data on the SES trajectories was analyzed to reveal clusters of the parked scooters and trajectories between them. In Tel Aviv center, scooters parking is possible in parking cells only, and, thus, clusters are inevitable. However, outside the area of cell-only parking, majority of scooters are also organized in groups due to the operators' policy.

Analysis of trajectories based on clustered parking locations shows a significant diversity of the actively used routes between the same pair of clusters. Instead of just a couple of best paths, as suggested in academic studies, the number of k shortest paths necessary to cover the frequent routes between the clusters is very high, often higher than 50.

The current analysis focuses on constructing the model of users' decision to perform ride depending on distance between user and scooter, parameters of user and a scooter, and of the infrastructure around the user's location.