

SURGE 2022

Analysis of UBER Travel times OD matrices data by statistical methods: midterm report

Keywords: UBER movement data, travel times, statistical analysis.

The aim of this project is to find consistent patterns and trends in the UBER movement data pertaining to travel-times in the new-delhi city taken from 2016 quarter 1 to 2020 quarter 1.

At the start we considered treating the travel-time data as an OD matrix that enumerates the aggregated travel-times for a specific time duration and then find its “distance” from the same matrix for a different time duration. To find the distance of the matrices that wasn’t trivial, we considered the Levenshtein distance between OD matrices for mass flows.

In the following week, I implemented the Levenshtein distance algorithm for model OD matrices and found various relations that arise when an OD matrix is compared to a matrix that has been transformed.

In conclusion, we found that the Levenshtein distance, albeit suitable for traffic flows or population travelled,

does not give useful results in reference to travel-times.

Hence, then we tried basic Euclidean difference of an OD travel times matrix from its transformed version, which is simply the difference between the element travel times taken cumulatively.

During this analysis, I chose one specific OD pair and plotted its cumulative daily, correlative and temporal trends by the R programming language that I learned in the interim.

We found that the frequency analysis showed the travel-times are distributed in a trailing normal-like distribution if plotted with respect to magnitude. But the temporal trends were the most interesting as it showed that the travel-time seemed to get shorter from 2016 to 2019.

This was indeed the case when the travel-times were further aggregated to the monthly, quarterly and yearly scales to filter out the random noise in the data-points. Hence, the next logical step is to validate if this trend is also followed by other OD pairs and if not, what is the spatial distribution of such pairings and what factors correlate with the definitive fall, rise or evening out of the travel-times in New-Delhi.