Methodology

Data from Bluetooth sensors in Chesterfield was used for the purpose of this research. For computational reasons the data for only one day, 14 February 2017 were used. Previous research done by other students at Institute for Transport Studies at University of Leeds focused on computing flows on OD pairs between the Bluetooth sensors in the area of Chesterfield. Data provided by Derbyshire County Council allowed for identification of movements of each of the vehicles in the network thanks to number plate detection data. The number plate data was previously hashed in order to anonymise it.

Previously, the research by students was conducted to create OD pairs between all sensors in Chesterfield and flows on each of the pairs were calculated using number plate detection from Bluetooth sensors. This time, the purpose of the research was to deduce what percentage of drivers uses the shortest route. To do that the possible origin and destination sensors were identified manually where there was a sensor on at least one of the possible routes linking origin and destination sensors, i.e. midpoint sensor.

In the previous research, routes were created between all the sensors. With 38 sensors used for the research, 38×37 routes were identified what equalled to 1406 combinations. Therefore, flows between an origin sensor A and destination sensor B were obtained by identifying the number of vehicles that travelled on that path using number plate detection data.

This time, however, the aim of the research was to examine the rationality of drivers. The aggregate flows between origin sensor A and destination sensor B is the amount of vehicles that were identified in both places but it does not mean that those vehicles followed the same route between the sensors. The objective of the research was to identify which routes the drivers used. In literature review, it was explained how drivers make choices about routes. We manually searched for the origin and destination sensor pair where it was possible to find some midpoint sensor C on one of the routes between sensor A and B but also a sensor D on some alternative route between sensor A and B. This enabled computation of flows on each of the routes. It was expected that there would be some flows not assigned to any of the two routes with midpoint sensors, where drivers used some routes which had no midpoint sensors and therefore, we were unable to investigate those route choices. This was done manually as only …. Were used due to limited number of sensors in Chesterfield area and their location. To reduce computation time it was decided that only flows on the manually chosen routes will be computed as otherwise there would have been 38×37×36 combinations equalling 50616 possible routes.

The distance for each of the route between origin and destination sensor was measured using Dijkstra Algorithm. For the purpose of this research it was assumed that distance is the only component of generalised cost. This time, congestion and therefore speed and actual travel time were not used to examine the effects on the network and route choices. What is more, using data for one day gave us no possibility to check for differences of behaviour of the same drivers with network conditions changing and learning process.

B

A

C

D

B

A