Dataset

UTD19
Understanding traffic capacity of urban networks

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UTD19: Urban traffic data from 40 cities

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Contents

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Abstract

This document provides the dataset used for the analysis of *Understanding traffic capacity of urban networks* published in Scientific Reports written by Loder et al. The mentioned reference should be cited when using this dataset. The publicly accessible dataset only provides the data from 40 out of 41 cities.

Keywords

Traffic flow data, MFD, congestion

Preferred citation style

Loder, A., Ambühl, L., Menendez, M. and Axhausen, K.W. (2020) UTD19: Urban traffic data from 40 cities, , , Institute for Transport Planning and Systems (IVT), ETH Zurich, Zurich.

1 Study description

1.1 General

The empirical data for MFD estimation is collected from stationary traffic sensors, namely inductive loop detectors, supersonic detectors, cameras, bluetooth detectors or similar. From these sources, we collected for each city at least two out of the three fundamental traffic variables speed, flow and density. In case of density, the sensors usually report occupancy levels, the fraction of time a detector is occupied, during an observation period.

For most of the cities, the flow-occupancy datasets are received directly from the local authorities, while for other cities APIs or the OpenData access points have been used. We processed all data in such a way that the final datasets are similar across cities. Additionally, we received information from the cities about the whereabouts of each single detector. We verified the location using aerial photography and images of the street publicly and freely available on the internet. We marked the location of each detector in a GIS application. The detector information dataset and the actual are measurements are linked with the variable detid.

We enriched location information of sensors with further attributes describing the location of the sensor with respect to the road network. In detail, we marked the monitored lane of the detector in a GIS application to measure the total lane length (variable length) and the distance to the downstream signal (variable pos). The lane is drawn in driving direction from upstream to downstream intersection. Lane and detectors are linked with the variable linkid. Note that several detectors can be located on a single lane. With the given geogprahic information of each detector, OpenStreetMap attributes are queried from the closest link: the road name for attribute (variable road), the functional road class for attribute (variable fclass) and the speed limit (variable limit) when available.

1.2 Funding and acknowledgements

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2 Detector location information: File description

Title: detectors.csv

Contents: Geospatial information about detector location with OpenStreetMap attributes and lat-long coordinates. Linked to measurements via detid and to links via linkid.

Unit of analysis: Detector

Number of cases: 23577. Variables per record: 11.

File format: comma-seperated values (csv)

3 Detector location information: Variables

detid: Detector identificiation.

citycode: Name of the city.

length: Length of the monitored lane in km.

pos: Distance to downstream traffic signal (or major intersection) in km.

long: Longitude of detector location.

lat: Latitude of detector location.

lanes: Number of lanes monitored.

linkid: Link id of the monitored lane.

fclass: OpenStreetMap's functional road class classification

road: Road name.

limit: Speed limit, if available.

4 Detector link information: File description

Title: links.csv

Contents: Spatial lines object for each monitored traffic lane or link converted to a text file. Linked to detectors via linkid. Detectors not matched to a link or lane have a missing value for the linkid. Order of poitns in direction of traffic.

Unit of analysis: Lane or link.

Number of cases: 140858. Variables per record: 7.

File type: comma-seperated values (csv)

5 Detector link information: Variables

citycode: Name of the city.

linkid: Link id of the monitored lane.

order: Order of waypoint sequence.

piece: Spatial feature number of that link id (should be one).

group: Group number of that spatial feature.

long: Longitude of waypoint.

lat: Latitude of waypoint.

6 Traffic measurements: File description

Title: UTD19.csv

Contents: Traffic measurements with original and filtered data. Note that not all detectors report occupancy, speed and flow, i.e., where no data was recorded or is available, missing values are stored. Detectors do not provide all variables at every interval. Some detectors that only provide flow and occupancy while others report flow and speed. In some cases (e.g., Melbourne), loops provide either flow *or* speed.

Unit of analysis: Detector. Number of cases: 169032955. Variables per record: 8.

File type: comma-seperated values (csv)

7 Traffic measurements: Variables

city: Name of the city.

detid: Detector identificiation.

day: Day of recording.

interval: Beginning of recording interval in seconds from midnight.

flow: Flow in vehicles per hour for that detector. A reporting detector can span several lanes. The flow given in the data set is adjusted for this, i.e. it gives flow per hour and lane (veh/h-lane)).

occ: Detector occupancy.

speed: Average speed in recording interval in km per hour.

error: identified or reported error if a non-missing value is reported.