

# VACANCY INTERNSHIP PROJECT

*We are looking for students interested in carrying out their master thesis project at DATLAB*

## Using big data to improve route set generation in transport models

### Problem description

To support the (quasi) dynamic traffic assignment models in OmniTRANS transport planning software (Madam and STAQ) a routesetgenerator is applied to pre-generate route-alternatives between all origins and destinations in a transport network. This routesetgenerator uses a method known as the accelerated Monte Carlo approach (Fiorenzo-Catalano, 2007) and was calibrated using a single dataset with routes observed using GPS tracking and implemented in OmniTRANS. Since then, a large body of datasets describing (indirectly) observed routes has become available to us (i.e. observed GPS sets from spitsmijden 2004, Spitscoren A15, Spitsvrij Utrecht, other spitsmijden projects (through ministry of I&M) and various floating car data sets are likely to be available for this study). Furthermore, the google maps api can be used to retrieve multiple route-options for some OD relation, and thus this could also be used as a reference (<https://developers.google.com/maps/documentation/directions/>).



### Internship assignment

Research focuses on optimizing the settings and/or enhancement of the methodology of the current routesetgenerator in OmniTRANS. The student is encouraged to define his/her own assignment definition, but a rough sketch up of the most obvious tasks is outlined below:

- Review calibration of current routesetgenerator (Fafieanie, 2009). Why do these settings not lead to intuitive routes compared with e.g. google maps alternatives? One likely reason is that solutions from the routesetgenerator are always based on one initial shortest path and will never truly deviate from that (example: for the relation Deventer → Rotterdam travelers will choose between routes via A1-Utrecht and A50/A15, whereas the routesetgenerator will currently not come up with the latter solution).
- Investigation of a closely related problem: routes on highways with separate carriageways due to e.g. tunnels that were added to expand the capacity of an existing motorway are now often filtered by the route overlap filter.
- Practical tests comparing routesets:
  - generated using freeflow travel times
  - generated using observed travel times (HERE data is available in-house)
  - generated by OtTraffic (first apply streamline routefilters on them to reduce their size)
  - observed GPS sets
- optimize current routesetgenerator
- propose improved routesetgenerator
- (if time allows) implement and test prototype of improved routesetgenerator

## Research group

DAT.Mobility Deventer

Daily supervisor: ir. Luuk Brederode (DAT.mobility, TU Delft)

## Information

When interested in this internship assignment, please contact ir. L.J.N. Brederode (lbrederode@DAT.nl, tel 0570666801)

## References

- Fafieanie 2009 – calibrating route set generation by map matching gps data – masters thesis
- <http://algo2.iti.kit.edu/documents/routeplanning/weaOverview.pdf>
- <http://stackoverflow.com/questions/430142/what-algorithms-compute-directions-from-point-a-to-point-b-on-a-map> and references therein
- Fiorenzo-Catalano, M.S., 2007. Choice set generation in multi-modal transportation networks. TRAIL.