



DAFNI



DAFNI Champion update – 10/12/2020

Champion update

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Current work update

- Running on DAFNI
 - OpenMOLE embedding: sensitivity analysis, calibration
 - Road network preprocessing for MATSim on Functional Urban Areas
 - SPENSER model for synthetic population generation
 - Synthetic population preprocessing for MATSim on Functional Urban Areas
 - One-mode MATSim model coupled with road network and synthetic population processors
- Current work:
 - Fixing population preprocessing and coupling with MATSim
 - Four-stage model for travel demand
 - SPENSER and MATSim visualisations
 - Multimodal data
- Future work:
 - Health indicators downstream MATSim
 - Sensitivity analysis, calibration and validation using OpenMOLE

Visualisation of road network processing

Not Secure | workflow-visualisation-5234ab39-0.secure.dafni.rl.ac.uk/lab

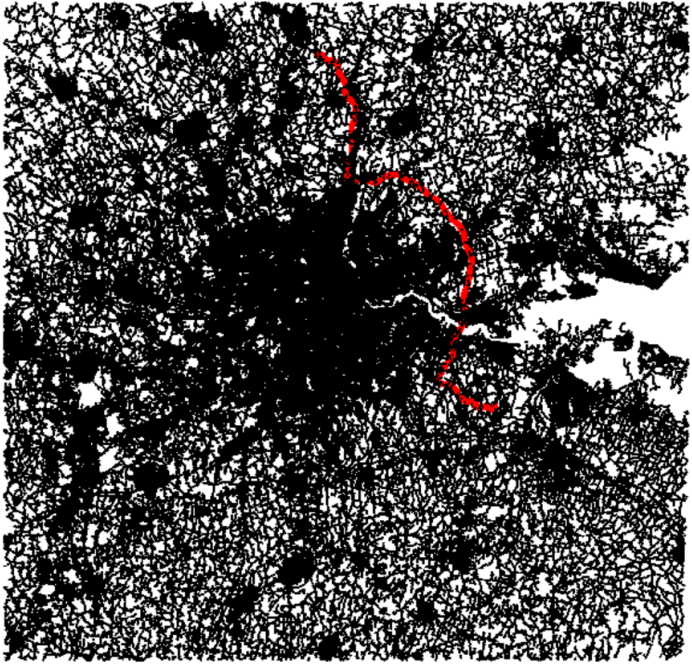
File Edit View Run Kernel Tabs Settings Help

map_network.ipynb

```
links = data.frame(from=from,to=to)
g = graph_from_data_frame(links,directed = T,vertices = vertices)
#g

[3]: # random shortest path for illustration
path = shortest_paths(g,from = sample(V(g),1),to=sample(V(g),1),output = 'both')
spedges = path$epath[[1]];ecolor = ifelse(E(g)%in%spedges,'red','black');esizes=ifelse(E(g)%in%spedges,0.5,0.01);spnodes=path$vp[1];vcolor = ifelse(V(g)%in%spnodes,'red','black');v
# summary(E(g)%in%spedges)

[4]: #options(repr.plot.width=10, repr.plot.height=5)
#par(mfrow=c(1,2),mar = c(0,0,0,0))
#plot(roads)
plot.igraph(g,vertex.size=vsizes,vertex.color=vcolor,vertex.label=NA,vertex.frame.color=NA,
edge.label=NA,edge.arrow.size=0,edge.width=esizes,edge.color=ecolor)
```



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Full MATSim workflow on DAFNI

facility.secure.dafni.rl.ac.uk/workflows/523ae3a1-deb2-4180-8b2a-6e3d3102afd9

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Reset position

Click and drag on the white area around the Workflow to pan the canvas.

matsim

network

population

matsim

visualisation

+

Execute

Create workflow



SPENSER synthetic population microscopic distribution

- Synthetic individuals and households at the OA level in 2020 for all UK, integrated in the NID
- Implemented in *spatialdata*: distribute uniformly within the OA on network nodes; attribute jobs randomly within the FUAs given the OA employment distribution; basic home-work plans with uniform start/end times – ***Failing on DAFNI, currently being fixed***
- **In progress (design):** “Four stage model”
 - Distribute households within OAs according to population density grid (100m Eurostat or 1km GHSL) and buildings (OpenStreetMap; OSM pbf implemented in *spatialdata*) – individuals already matched in SPENSER data
 - Use QUANT calibrated parameters to estimate potential home-work flows
 - Sample workplace given these flows, accessibility patterns and car ownership

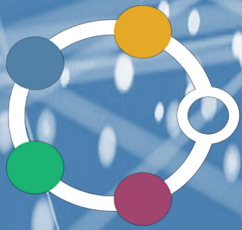


MATSim visualisation

- ❑ Test of the OTFVis tool: conversion of MATSim output events into movie files
- ❑ Online/interactive visualisation not possible within DAFNI (for now?)
- ❑ Integration into Jupyter notebook with python

Multimodal data

- ❑ Java library to convert GTFS data into matsim schedule files
- ❑ Multimodal network?



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Next steps planning

- Communication
 - Event on DAFNI and transportation?
 - Abstract for Applied Urban Modeling conference
- Next steps:
 - Operational MATSim for mid-January
 - Coupling with health indicators for end of January (AUM Conference)
 - Validation and sensitivity analysis in February