

Visualization of traffic flow and/or people density changes with animated texture/particles.

Supervisors

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The problem

We model traffic situation / human mobility situations based on passive mobile positioning data and create an aggregated model about flows of people along roads. We would like to visualize the data in a nice way catching attention, e.g. with animation. In animation the moving elements are not one-to-one the observed phones/ vehicles, but texture expressing movement and intensity. Texture can be particles or random noise texture, there are many open choices. Somewhat related to visualization of fields and flows in physics.

The traffic flow attributes can be mapped into visual attributes. Experimenting and selecting the most expressive visual attributes is part of task.

It would be nice to blend a map into visual background.

There are in general two separate use cases that could be addressed:

- Offline prepared video.
- Online exploratory analytics tool where visualization is done in real time.

This work will focus on offline usecase, where one can use more sophisticated visuals and do less optimized programming.

The video can be done with fixed view area „as with fixed camera“ but it would be nice to be able to do „moving camera“ video where area is smoothly changing by pan/zoom.

The data provided as visualization input

The code created will be used to visualize real human mobility data, so one can test if visualization really reveals interesting patterns in real world data.

Traffic flow on road segment level

- Coordinates of road segment
- Traffic flow (vehicles/hour) and average traffic speed (km/h) through given road segment over time, e.g. one week (separately for 2 directions)
- Density of people over time (might be used as another layer of visualization behind traffic animation)
- Possibly some other attributes can be provided (e.g separating people by their current semantics „at work“, „at home“, „other“).

Publishing the results

If high quality visuals are created then it will be included into publications: conference presentations and/or journal paper. The student will be a coauthor.

Links

Some links in this direction (only as visual inspiration, no need to do exact copy):

https://www.youtube.com/watch?v=Tfx_O75bzY0

<https://www.youtube.com/watch?v=MWL4WebRfzs>

<https://www.youtube.com/watch?v=yOo6fh0pEi4>

<https://www.youtube.com/watch?v=aQt3n2S2Akk>