Traffic Jam Detection using Flock Mining

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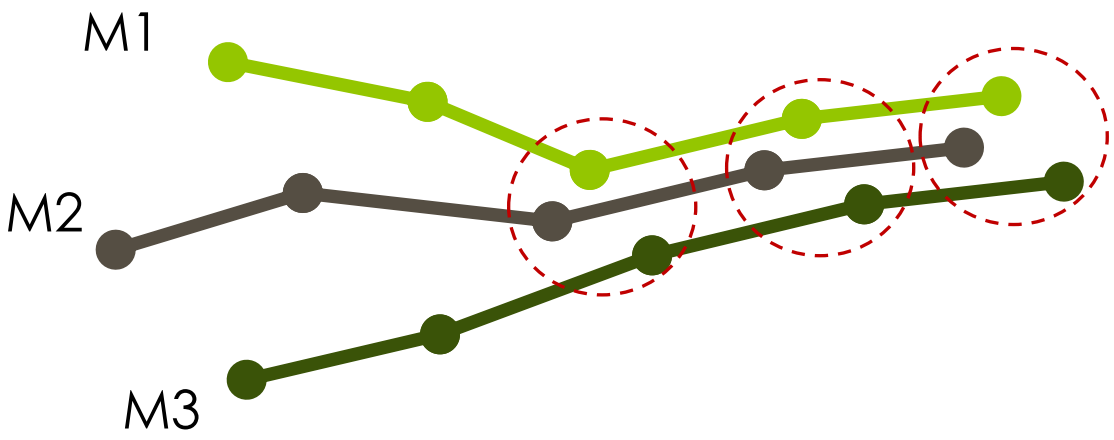
Objective

Detecting traffic jams in trajectory data.

A **traffic jam** is defined as a group of cars moving close and slowly.

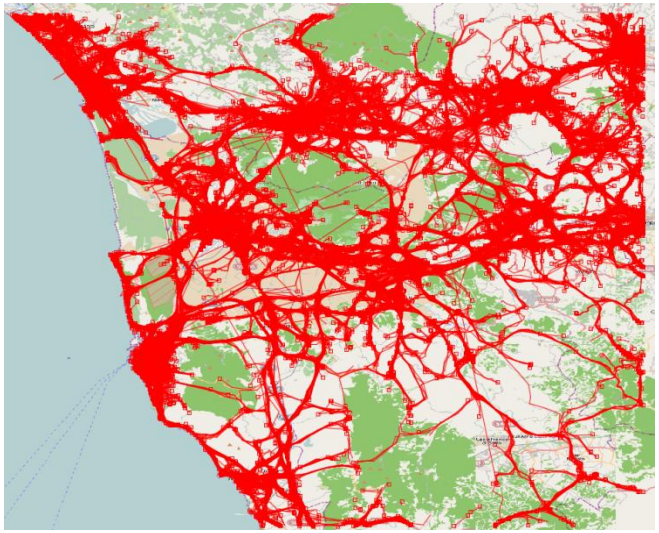
T-Flock as Traffic Jams candidates

The T-Flock pattern represents the spatio-temporal concidence of moving objects. This can be used as first step of the analysis.

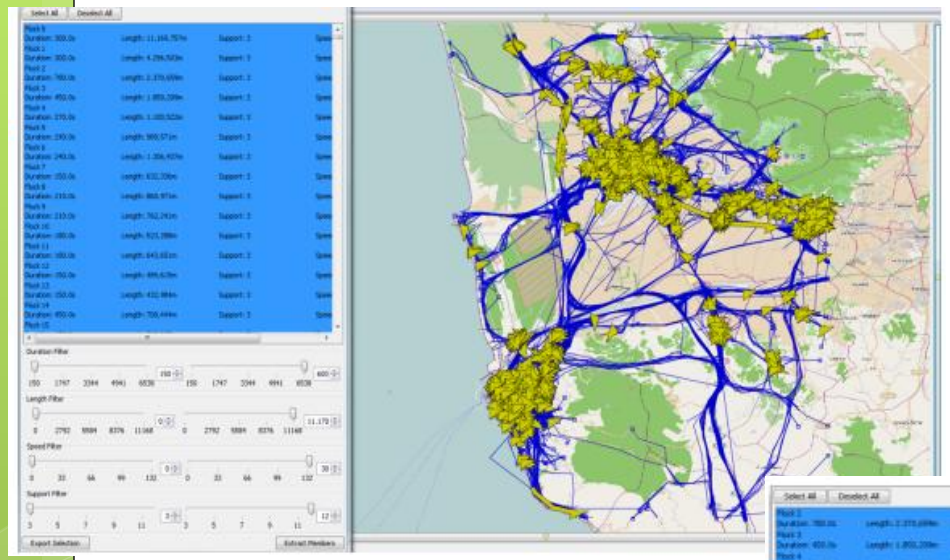


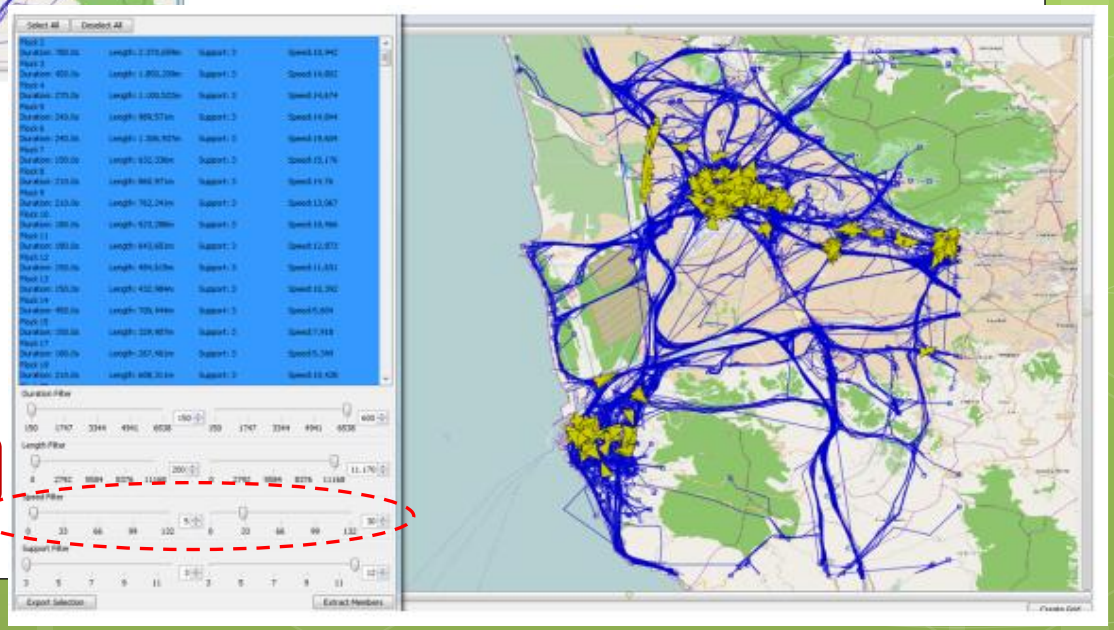
The Dataset

The presented case study is based on a dataset of around 40,000 GPS-real car users in Tuscany in a time period of 12 days covering an area of 4671.86 Km^2. The area contains different kind of territories such as urban and suburban areas.



Static constraint on speed



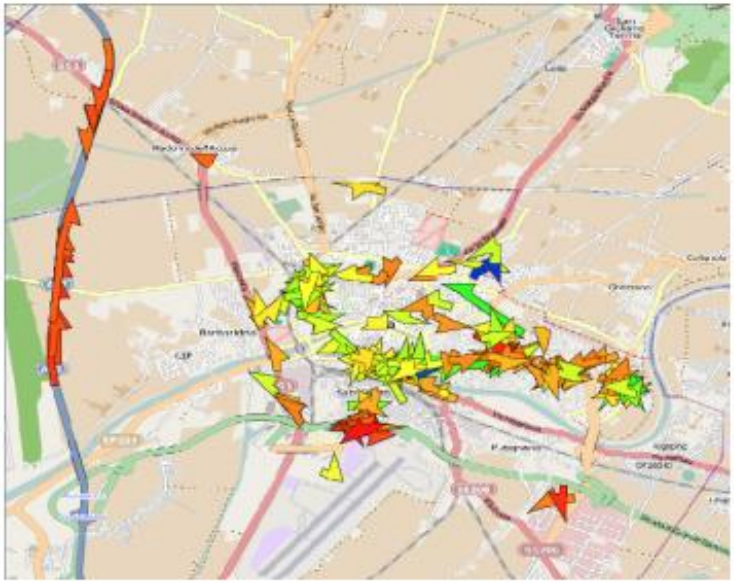


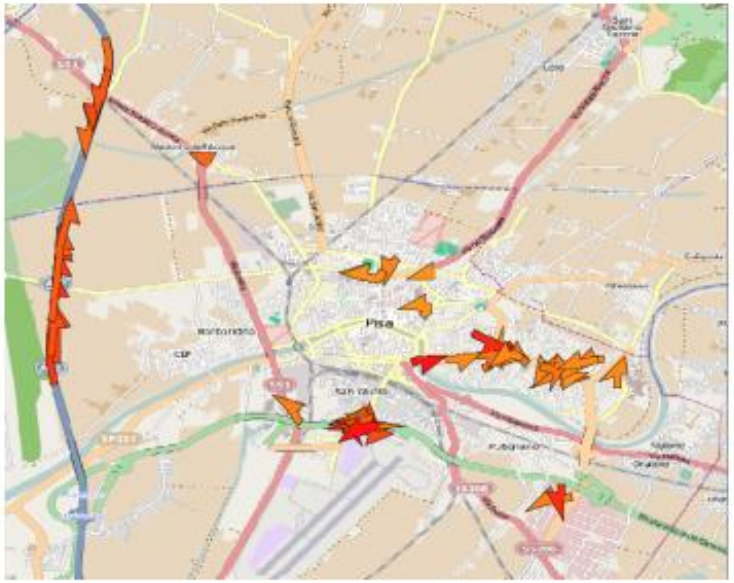
30 km/h >= Speed(x) >= 5 km/h

Dynamic constraint on speed

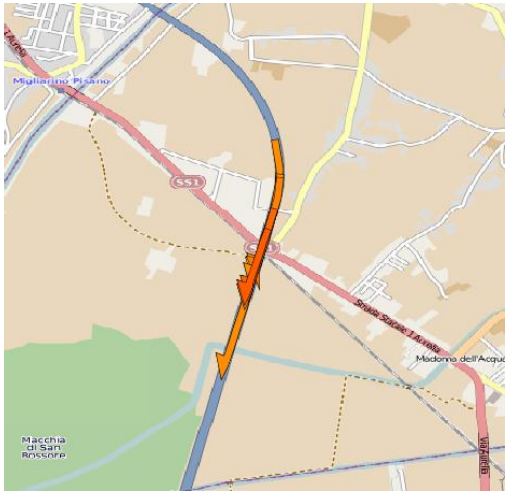
the ratio of the speed of a flock *f* with the average speed of the set of cars *S* passing through the same area in all the period.

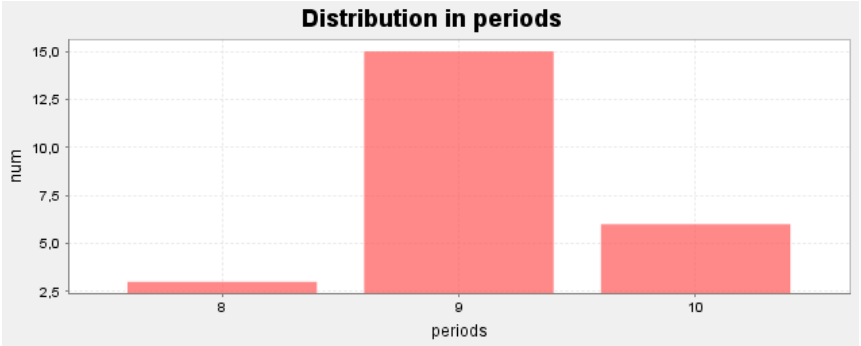
$$TL(f) = speed(f) / Avg(\{speed(s_1),\ldots,speed(s_n), s_k \square S\})$$

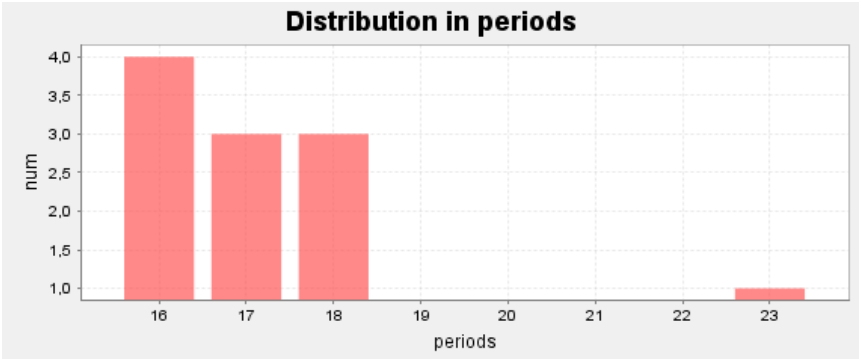




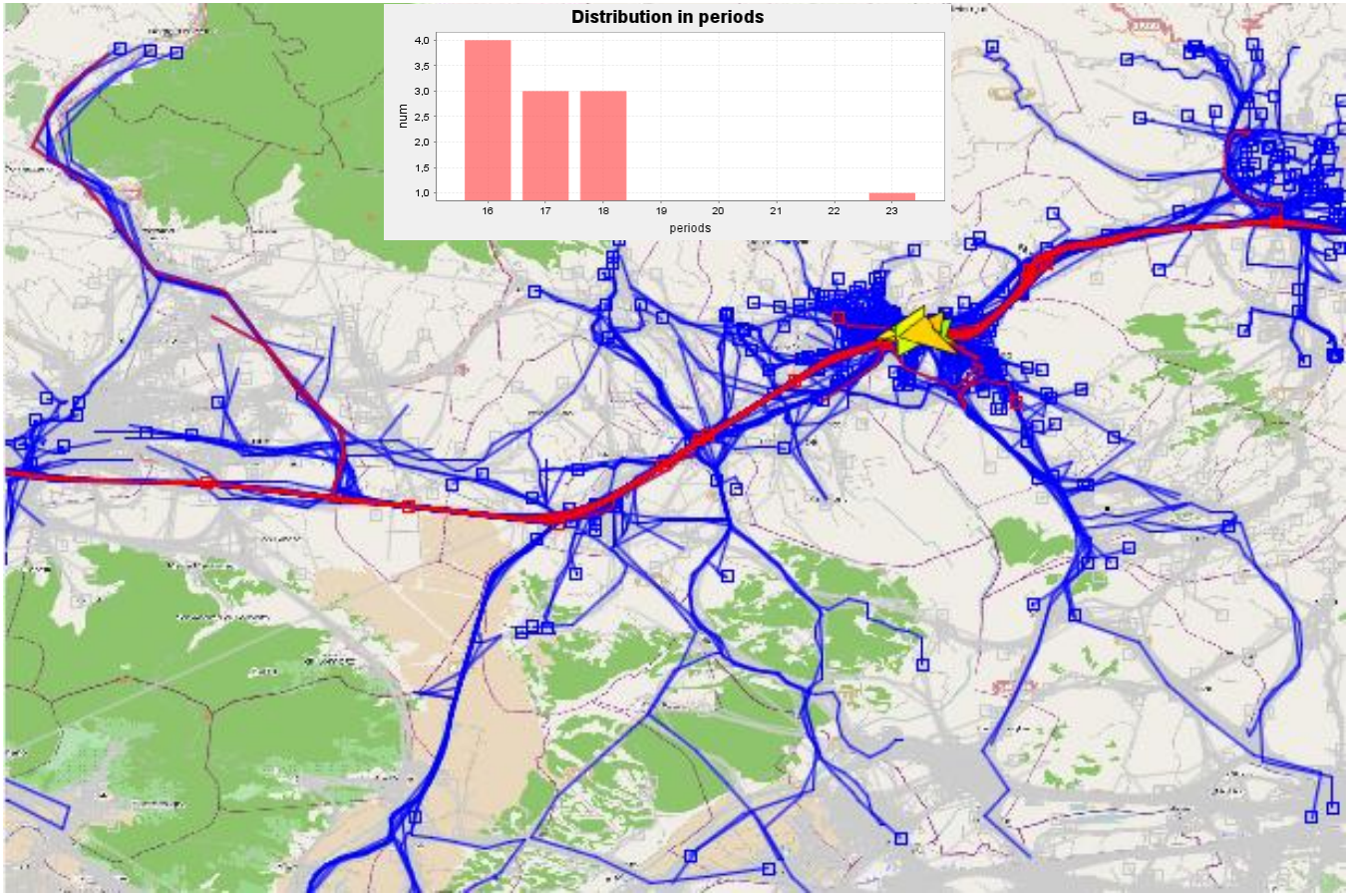
Temporal analysis







Which is the information we provide to a mobility agent?



References

1. Monica Wachowicz, Rebecca Ong, Chiara Renso and Mirco Nanni. **Discovering Moving Flock Patterns among Pedestrians through Spatio-Temporal Coherence**. *International Journal of Geographical Information Science (2011)*.

2. Fosca Giannotti, Mirco Nanni, Dino Pedreschi, Fabio Pinelli, Chiara Renso, Salvatore Rinzivillo, Roberto Trasarti: **Unveiling the complexity of human mobility by querying and mining massive trajectory data**. *VLDB Journal Special issue on Data Management for Mobile Services (2011)*.