Using velocity fields in evaluating urban traffic congestion via sparse public transport data and crowdsourced maps

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Heatmap of travel times with the centre of Cambridge as destination
Bus journey durations (Impington/Histon → Histon Road → Victoria Road)
Snapshot visualisation of the velocity fields

10am, 15 June 2010

10am, 22 June 2010
ABC of velocity field construction from sparse movement data

**A** snapping and map matching
monotonic spline interpolation

**B** velocity approximation
derived from the fitted spline
speed near bus stops and on bus lanes

**C** calculating local time profiles
applying velocity field transformation
mapping back to the road network

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### ABC of velocity field construction from sparse movement data

#### A. Snapping and map matching
- Monotonic spline interpolation

#### B. Velocity approximation
- Derived from the fitted spline
- Speed near bus stops and on bus lanes

#### C. Calculating local time profiles
- Applying velocity field transformation
- Mapping back to the road network

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1. How to use velocity fields for characterisation of road traffic and classification of congestion levels?

2. Traffic patterns may depend on and regularly vary with the time of day, day of week, school term time and possibly weather. However, there are exceptions to any long-established context, when planned or unexpected incidents occur. Can velocity fields constructed as described be used for fast spotting of propagation of congestion due to accidents, traffic jams, roadworks for utilities, etc. and predicting the consequences?
References


The TIME Project: Transport Information Monitoring Environment, Computer Laboratory, University of Cambridge: [http://www.cl.cam.ac.uk/research/time/](http://www.cl.cam.ac.uk/research/time/).