Driving Behaviour Analysis at Sag Sections on Expressway

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Background

- Sag sections are the main traffic bottleneck of Japanese expressways.
- The congestion occurs at sag section probabilistically.
- Only when the congestion occurs, the bottleneck capacity can be observed. Thus the observable case for high traffic demand is limited.
- Behavior variations cause propagation of unrecognized speed reduction leading to severe capacity decrease at sag sections.

Objective

- Quantify the probability of congestion occurrence

Car-following model

Car Following Model

Observation

A trajectory data was obtained from 1.2km section of roadway including a sag section in Tomei Expressway Japan during congestion formation.

- Acceleration, speed, distance were observed every 1/30 s.
- 550 m section including sag section was used to prevent
- 393 observed samples, 328 following vehicles (efficient samples)

Methodology

- Desired spacing with regression
- Reaction time with correlation analysis
- Other parameters with cross-entropy

Results

Probability of congestion occurrence grows with overall flow rate