Building Better Traffic Ecosystem through Balanced Navigation
- Concept and Practice

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Abstract
With state-of-the-art vehicular navigation systems still devoted to sensing accurate traffic conditions, their routing strategy only achieves suboptimal result since, in face of congestion, navigation systems tend to greedily shift all traffic to previously light-traffic roads and causes new traffic jams. In this talk, present Themis, a cloud based vehicle navigation system that adopts a different, namely balanced, routing strategy into practice. Themis depends on the participants time-stamped position reports and routing confirmations to estimate not only current traffic condition but also the future traffic flow. Based on the crowd-sourced knowledge, Themis computes alternatives and incentivizes drivers to abandon the over-popular routes.

The Themis prototype system has been implemented as an Android application and a back-end server. Field experiments was carried out to validate the system in real world and synthetic experiments using real data from over 26,000 taxis was also performed to model the city-scale deployment. Results from the experiments demonstrated that Themis can reduce both traffic congestion and travel time for different penetration rates.

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