Detecting road state and predicting traffic congestion using cooperatively collected probe vehicle data

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In order to improve traffic flow, road authorities require accurate insight into the current traffic flow, the predicted traffic flow, and the condition of the road.

Currently, this information is gathered with road loops and Road Weather Information Systems (RWIS), but the information gathered with these systems is limited to major roads, and RWIS systems can only infer, not measure, the road condition. The existing Dynamic Traffic Management systems no longer suffice to overcome the increasingly negative economic and environmental impacts of growing traffic. This thesis aims to broaden the information set available to road authorities using collectively collected probe vehicle data ("talking traffic") by making possible direct measurements of the road condition, and prediction of traffic flow impediments using this probed vehicle data as roving sensors, with the aim of giving these road authorities more effective tools in managing traffic.