PROJECT TITLE: VEHICLE CLASSIFICATION USING MOBILE SENSORS

PRINCIPAL INVESTIGATORS: DR. XUEGANG (JEFF) BAN

Real world traffic consists of vehicles ranging from small passenger cars to heavy trucks. Vehicle classification information is a crucial input to transportation planning, facility design and operations. Many techniques have been proposed in the past to perform vehicle classification. The current state-of-the-practice vehicle classification relies on sensing and detection techniques deployed at fixed locations.

In this project, the feasibility of using mobile traffic sensors for binary vehicle classification (i.e., to distinguish passengers from trucks) on arterial roads is investigated. Here mobile sensors refer to those that move with the traffic flow they are monitoring such as global positioning system (GPS), smart phones, among others. Features of vehicle dynamics (e.g. speed related, acceleration/deceleration related, among others) are extracted from vehicle traces collected from real world arterial roads. Machine learning techniques are applied to distinguish passenger cars from trucks using these features.

Despite many issues and future research questions still remaining unsolved in this exploratory project, the proposed research does show the feasibility and potential of using mobile data for vehicle classification. It reveals that acceleration/deceleration related features are the most critical for vehicle classification using mobile data. Such acceleration/ deceleration based vehicle classification methods using advanced machine learning techniques have the potential to help build a low-cost, wide-area vehicle classification system.
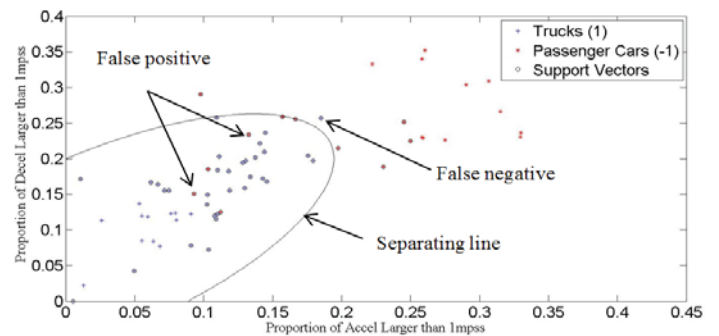

Figure . Classification results (proportion of acceleration and deceleration)