# Information Content of Aggregate Speed Measurements and Autonomous Vehicles

Ilker Karaca
Instructor, Iowa State University, ikaraca@iastate.edu

Public transportation agencies routinely gather vast amounts of vehicle speed data. Yet such data largely remain underutilized to investigate potential shifts in today's traffic speed profiles as autonomous, automated, and connected vehicles become more mainstream. With the advancement of automated driving technologies such as adaptive speed control, for instance, potential changes to aggregate traffic patterns may include, among others, shifts in average hourly speeds, and dispersion in acceleration and deceleration rates and changes in vehicle queuing and speed shockwave patterns. Although such technologies are subject to vigorous development and implementation tests given the well-known navigation challenges in realistic roadway conditions, the aggregate traffic flow patterns where autonomous and automated vehicles make up a sizeable share of the overall traffic remain untested under similar environments. Thus, a better understanding of the collective speed profile of such future traffic patterns is needed more than ever. Before such changes in aggregate traffic flow patterns can be identified, however, a reassessment and consolidation of the existing body of knowledge on naturalistic speed data would significantly contribute to future efforts to identify potential shifts in traffic flow characteristics. This study, thus, seeks to identify the main features of aggregate speed data that are expected to vary under increasingly autonomous driving conditions. To this end, it proposes a framework to compare the basic speed characteristics of prevailing traffic flow under both urban and rural roadway conditions as the share of vehicles using autonomous driving technologies increases. The study leverages a driving speed dataset collected in Iowa and proposes a number of traffic flow attributes (such as average vehicle headway, average travelling speed, and mean deceleration and acceleration rates) that are expected to assist agency efforts in calibrating speed and traffic data collection. The study's main finding is that transportation agencies could benefit from an active approach that positions their data measurement programs to capture such anticipated shifts in aggregate traffic speed profiles.

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