UNIVERSITY TRANSPORTATION CENTER

RESEARCH BRIEF

A Hybrid Platform for Context-aware V2X Communications

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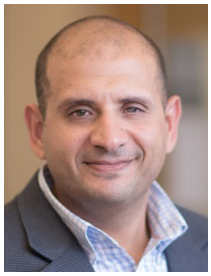

Background

It's projected that 60% of new light weight vehicle sales will soon have cellular connectivity, many applications based on connected vehicles' technology are often developed without full utilization of the transportation network infrastructure (i.e. Vehicle to Vehicle V2V). The development of each system independently results in adopting different technologies, based on constraints/demands that have many similarities, such as data/congestion management, throughput, and latency. Although the basic communication requirements of transportation networks are rather limited, compared to those of V2V (e.g. autonomous vehicles), there has been little penetration from the communications technology onto transportation networks. This gap has continued to grow over the last few years resulting in two main campaigns supporting different technologies for different purposes. On the one hand, the transportation network community along with some automotive manufacturers and government agencies are very comfortable and have heavily invested in the well-established DSRC technology. On the other hand, many technology giants and automotive manufacturers are pushing for cellular technology due to its versatility and wide spread. Each of these groups have valid concerns and solid reasons, and have yet to come to an agreement on technology adoption.

Research Project

This project aims to design and implement a hybrid context-aware Vehicle-to-everything (V2X) communication platform that incorporates different wireless communication technologies under a unified architecture. The platform will expand transportation network capabilities, extend accessibility of transportation information, establish a strong interface for the transportation network with other infrastructures (e.g. cellular networks), which will open new horizons for various applications. Adopting an application-driven architecture requires multimodal operation. The proposed platform will collect information from various sources, such as Advanced Traffic Signal Controllers (ATCs), Road Side Unites (RSUs), and Global Positioning System (GPS). This data will be fused, analyzed, and prioritized according to the context in which it's being used. For example, expanding real-time accessibility to traffic data beyond the vicinity of incidents can greatly improve efficiency of traffic controllers as well as vehicles' operation (e.g. autonomous braking). This platform will facilitate incorporating vehicles (properly equipped) as active communication beacons that not only have the ability to relay transportation information, but can also generate very useful transportation-related data. This will enable data-driven optimizations, improving efficiency of transportation networks, while extending their accessibility to a plethora of commercial applications that were otherwise not feasible due to the transportation networks' limited communication abilities.

ABOUT THE AUTHORS

The research team consisted of Mohamed Hefeida of the University of Idaho.

ABOUT THE FUNDERS

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EXPECTED DATE OF COMPLETION

August 2021

FOR MORE INFORMATION

http://depts.washington.edu/pactrans/research/projects/a-hybrid-platform-for-context-aware-v2x-communications/