Predictive Use of Upcoming Traffic Signal Information for Improving Fuel Economy, Cutting Emissions, and Reducing Trip Time (2009-073)

Optimization algorithm for vehicle-to-infrastructure communication aiming to reduce vehicle emission and idle time at red lights.

Market Overview

This system utilizes traffic signal and vehicle data to calculate a reference velocity which enables a vehicle to travel through one or more traffic signals. The global intelligent transportation system market is valued at $23.4 billion in 2019 and is expected to reach a value of $30.7 billion by 2023 at a CAGR of 5.65%. The reason for this growth is due to the surge of interconnectivity and exchange of data in all market sectors, including transportation. Vehicle-to-everything (V2X) communication is attractive to both vehicle manufacturers and vehicle owners due to its ability to make the driving experience overall more efficient. Clemson University researchers have patented a method of utilizing traffic data to meet this market need which reduces idle traffic time and vehicle emissions.

Technical Summary

This method utilizes traffic data from one or multiple traffic signals to determine a discreet range of velocity values that correspond to velocities that will result in the operator not encountering a traffic signal in the red light state. Then, the algorithm finds velocity values that overlap from the ranges recovered from traffic signals. These overlapping velocity values are displayed to the operator of the vehicle in an effort to reduce or eliminate the number of red lights the operator will encounter. It is estimated that in New York City alone, idle cars and trucks produce 130,000 tons of carbon dioxide per year and costing drivers $80 billion per year.

Application
Automotive, Transportation

Development Stage
Proof-of-concept, road demo at Clemson

Advantages
- Communication between vehicle and infrastructure reduces idle time at red lights
- Less idle time at red lights reduces vehicle emissions and improves fuel economy
- Vehicle-to-infrastructure communication reduces traffic congestion

Patent Type	Country	Serial No.	Patent No.	CURF Ref. No.	Inventors
Utility	United States	12/872,567	US 8,478,500	2009-073	Dr. Ardalan Vahidi Dr. Grant David Mahler

About the Inventors

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Dr. Ardalan Vahidi earned his PhD in Mechanical Engineering from University of Michigan in 2005 after getting a Master's degree in Transportation Safety and Structural Engineering from George Washington University and Sharif University of Technology respectively. After receiving his PhD, Dr. Vahidi joined the Mechanical Engineering Department at Clemson University. He founded the EMC^2 lab focusing on vehicle connectivity and control. His research interests are intelligent transportation systems, alternative energy generation and storage, and real-time human health monitoring.

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