



The *TranLIVE Spotlight* is a bi-weekly update from the University Transportation Center research collaboration led by the University of Idaho

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DEVELOPING COOPERATIVE ADAPTIVE CONTROL SYSTEMS TO REDUCE VEHICLE EMISSIONS

MOSCOW, Idaho – TranLIVE researchers at Virginia Tech University Hesham Rakha and Raj Kishore Kamalanathsharma, are working to reduce vehicle emissions by utilizing vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication systems.

Speed variation is a major factor contributing to increased fuel consumption. Speed variation due to vehicle-vehicle interaction, traffic control device constraints, infrastructure limitations and driver distraction result in additional fuel consumption because the extra power exerted by the engine while accelerating requires an increase in fuel and consequently an increase in emissions.

The framework developed by Rakha and Kamalanathsharma utilizes advanced signal-change information, information about vehicles at intersections, and the speed and headway of the lead-vehicles through a V2V and V2I systems in order to decrease instances of speed variation and therefore fuel consumption and vehicle emissions.

The system was modeled and tested in multiple simulation environments to effectively measure the success of the framework in reducing the average fuel consumption and travel-time for a 400 meter vicinity between intersections. The results tests show over 30 percent fuel savings combined with an increase in the average travel-speed of vehicles by more than 210 percent. Fuel savings were also found to be greater on major streets than minor streets, and lower volumes of traffic also yielded fuel savings and increased travel speed; proving that the utilization of a V2V and V2I communication systems is an effective method of reducing fuel consumption and emissions.

The complete report is available at: bit.ly/tranlive030915

ABOUT TRANLIVE UNIVERSITY TRANSPORTATION CENTER

TranLIVE is the Transportation for Livability by Integrating Vehicles and the Environment a research collaboration lead by the University of Idaho in partnership with Old Dominion University, Syracuse University, Texas Southern University, and Virginia Polytechnic Institute and State University. TranLIVE works to find solutions to transportation challenges that minimize environmental impacts while educating students to enter the transportation workforce and creating and transferring tools and knowledge to practicing transportation professionals. TranLIVE is sponsored by the United States Department of Transportation (USDOT) University Transportation Centers Program. For more information visit: www.tranliveutc.org