

Decision Systems Seminar

School of Computing, Informatics, and Decision Systems Engineering

Development and Validation of Naturalistic Agents in a Micro-simulation Environment

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Noon - 1.15 pm, BYENG 210**

Abstract

This presentation describes a novel methodology to model both safety and operational aspects of driver behavior in traffic (funded by the FHWA Exploratory and Advanced Research Program) using agent-based modeling and simulation techniques. Neuro-fuzzy reinforcement learning agents were developed and trained to clone the behavior of individual drivers during normal and safety-critical driving events. A naturalistic driving database was used for the training and validation of the developed agents. Robust agent activation techniques were also developed using discriminant analysis. The developed agents were implemented in VISSIM (a microscopic traffic simulation commercial software) and were evaluated by comparing the behavior of vehicles with and without agent activation. The results showed very close resemblance of the behavior of agents to driver data. This research is funded by the FHWA Exploratory and Advanced Research Program.

Bio

Dr. Montasir Abbas is an Associate Professor in the Transportation Infrastructure and Systems Engineering at Virginia Tech. He holds a Bachelor of Science in Civil Engineering from University of Khartoum, Sudan (1993), a Master of Science in Civil Engineering from University of Nebraska-Lincoln (1997), and a Doctor of Philosophy in Civil Engineering from Purdue University (2001).

Dr. Abbas areas of interests include traffic control, intelligent transportation systems, and traffic flow theory. He developed several algorithms and systems, including Purdue Real-time Offset Transitioning Algorithm for Coordinating Traffic Signals (Pro-Tracts), Platoon Identification and Accommodation system (PIA), Pattern Identification Logic for Offset Tuning (PILOT 05), Supervisory Control Intelligent Adaptive Module (SCIAM), and the Cabinet-in-the-loop (CabITL) simulation platform. He has been as a principal or co-principal investigator on more than \$2M sponsored research.



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