UTC Project Information	
Project Title	Development of AI-based and control-based systems for safe and efficient operations of connected and autonomous vehicles
University	Purdue University
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Funding Source(s) and Amounts Provided (by each agency or organization)	CCAT: $370,000 Cost share partners: ETH Zurich $100,000; Nanyang Technological University $150, 000; DELFT University $120,000
Total Project Cost	$740,000
Agency ID/Contract #	69A3551747105
Start and End Dates	01/01/2020 – 09/30/2022
Brief Abstract of Research Project	This research is in three parts. The first part recognizes the range limitations of onboard sensors such as LiDAR and cameras, and develops an AI control system that fuses sensed (local) information and longer-range information to make CAV lane-changing decisions. Deep Reinforcement Learning is being used to provide an end-to-end framework that will help identify the optimal connectivity range for each domain of prevailing operating traffic density. The second part is developing a method to demonstrate a CAV's catalytic efficacy for addressing stop-and-go traffic perturbations that adversely affects operational efficiency, fuel economy, emissions, travel time, and driver/passenger comfort. The third part is developing a collision avoidance framework for CAVs, to reduce the likelihood of collision with surrounding vehicles, particularly HDVs that drive aggressively or have uncertain or unpredictable behavior.
Most Relevant CCAT Research Thrusts	__X__ Control & Operations __X__ Enabling Technology _____ Human Factors _____ Infrastructure Design & Management __X__ Modeling & Implementation __X__ Policy & Planning
Describe Implementation of Research Outcomes	Study is in progress. No implementation yet.
Impacts/Benefits of Implementation (actual, not anticipated)	This study framework is intended to improve CAV operational efficiency without compromising unduly, traffic safety, through the use of the joint decision-making protocols and the sharing of real-time information that is made available via vehicle connectivity.
Web Links (Reports, website)	ccat.umtri.umich.edu