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Project Title	A Data-Driven Autonomous Driving System for Overtaking Bicyclists	
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Most relevant CCAT research thrusts (choose all applicable)	<input type="checkbox"/> Control & Operations <input type="checkbox"/> Enabling Technology <input checked="" type="checkbox"/> Human Factors <input type="checkbox"/> Infrastructure Design & Management <input checked="" type="checkbox"/> Modeling & Implementation <input type="checkbox"/> Policy & Planning	
Funding Request	\$137,670	
Matching Funds and Source (if any)	N/A	
Total Project Cost	\$137,670	
Contract Number	69A3551747105	
Project start/end dates	February 1, 2021 – December 31, 2022	
Project Abstract	<p>Many bicyclists share the roadway with motor vehicles that drive much faster. Once an accident occurs with bicyclists involved, the death rate of the bicyclist is extremely high. To date there is no mature and reliable technology that helps drivers overtake bicyclists safely and can be as well as accepted by bicyclists. This study follows a systematic method to develop a prototype for an automated overtaking system, specifically for overtaking bicyclists. Naturalistic driving data based on pre-extracted overtaking events with more other critical factors will be mined to create three models that covers four phases of an overtaking: approaching, overtaking, passing, and returning. These models will then be implemented as an automated</p>	





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	<p>overtaking prototype to a simulated platform for a motor vehicle to overtake bicyclists based on different strategies. An experiment of human study will be conducted to evaluate the prototype from both the viewpoints of the driver and the bicyclist that how they want to overtake and be overtaken safely. It is expected that the outcomes can offer the OEMs and suppliers who are keen on developing safe and human-centered automated vehicle systems with useful insights. Furthermore, the insights can be helpful for legislation on the act or guidelines of protecting on-road vulnerable bicyclists.</p>
<p>High-level implementation plan</p>	<ul style="list-style-type: none"> • Mine SPDM naturalistic driving data for the scenario of drivers overtaking bicyclists and generate overtaking profiles, classification model, and trajectory model. • Implement the models to an automated overtaking system prototype on a simulated platform • Evaluate the prototypes by human subject experiments and provide useful insights for system implementation and improvement and bicyclist protection.
<p>Project Metrics</p>	<p>Schedule</p> <ul style="list-style-type: none"> • Bi-weekly checkpoints on 11 tasks allocated in the 12 months • Bi-monthly progress meeting with the industry principal • Quarterly reports for CCAT <p>Deliverable</p> <ul style="list-style-type: none"> • One journal article, 2 conference presentations • One final report
<p>Web Links: [leave blank until project approval]</p>	<p>ccat.umtri.umich.edu</p>

