**Quantum Artificial Intelligence-supported Trajectory Prediction for an Autonomous Truck Platoon**

# Technology Transfer Activities

by

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# Table of Contents

# Technology Transfer Activities

## 1 Outputs

The project output includes a simulation network and data of five automated trucks utilizing cooperative adaptive cruise control (CACC) based on the Intelligent Driver Model (IDM) and predicted trajectories from quantum artificial intelligence (AI) models.

## 2 Outcomes

This study developed and evaluated a long short-term memory network (LSTM) model and a hybrid quantum-classical LSTM (QLSTM) model for predicting the trajectory of each leading truck (i.e., a truck that has at least one follower truck) of an autonomous truck platoon. This study also evaluated an autonomous truck platoon's operational efficacy with trajectory predictions from classical LSTM and QLSTM.

## 3 Impacts

This study would support autonomous truck platooning research and development. Autonomous truck platooning has the potential to greatly enhance the operational efficiency of freight movement on U.S. corridors, leading to improved commercial productivity and stronger economic vibrancy. By leveraging AI to accurately predict the trajectory of each leading truck in an autonomous truck platoon, the platoon's operational efficiency can be enhanced. Furthermore, it is anticipated that the integration of quantum AI in real-time autonomous truck platoon management would offer even greater efficiency and reduced computational costs once fully developed quantum computers become available for large-scale deployments in the future.

Also, a master thesis was published based on this research.[1]

[1] Biswas, Pronab Kumar, "Quantum Artificial Intelligence Supported Autonomous Truck Platooning" (2023). All Theses. 3987. https://open.clemson.edu/all_theses/3987