UTC Project Information	
Project Title	A Hybrid Platform for Context-aware V2X Communications
University	University of Idaho
Principal Investigator	Mohamed Hefeida
PI Contact Information	hefeida@uidaho.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	University of Washington PacTrans $40,000 University of Idaho $ 40,000
Total Project Cost	$80,000
Agency ID or Contract Number	69A3551747110
Start and End Dates	August 16, 2019-August 15, 2021
Brief Description of Research Project	This project aims to design and implement a hybrid context-aware Vehicle-to-everything (V2X) communication platform that incorporates different wireless communication technologies under a unified architecture. The platform will expand transportation network capabilities, extend accessibility of transportation information, establish a strong interface for the transportation network with other infrastructures (e.g. cellular networks), which will open new horizons for various applications. The proposed platform will collect information from various sources, such as Advanced Traffic Signal Controllers (ATCs), Roadside Unites (RSUs), and Global Positioning System (GPS). This data will be fused, analyzed, and prioritized according to the context in which it's being used. For example, expanding real-time accessibility to traffic data beyond the vicinity of incidents can greatly improve efficiency of traffic controllers as well as vehicles' operation (e.g. autonomous braking). This platform will facilitate incorporating vehicles (properly equipped) as active communication beacons that not only have the ability to relay transportation information but can also generate very useful transportation-related data. This will enable data-driven optimizations, improving efficiency of transportation networks, while extending their accessibility to a plethora of commercial applications that were otherwise not feasible due to the transportation networks' limited communication abilities.

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	This project developed a new paradigm of Mobile Edge Learning "MEL" that enables the implementation of realistic distributed machine learning (DML) tasks on wireless edge nodes while taking into consideration the heterogeneous computing and networking environments. Therefore, a heterogeneity aware (HA) scheme is designed to solve the problem of dynamic task allocation for MEL in a way that maximizes the DML accuracy over wireless heterogeneous nodes or 'learners' while respecting the time constraints. The implementation of this MEL-DML based paradigm will enable context aware V2X communications.
Impacts/Benefits of Implementation (actual, or anticipated)	The hybrid context-aware Vehicle-to-everything (V2X) communication platform developed as part of this project incorporates different wireless communication technologies under a unified architecture. The platform will expand transportation network capabilities, extend accessibility of transportation information, establish a strong interface for the transportation network with other infrastructures (e.g. cellular networks), which will open new horizons for various applications.
Web Links • Reports • Project Website	