Title: Machine Learning Approaches to Vehicle Power Management

Abstract:

Power management in Hybrid Electric Vehicles (HEV) has been widely studied recently because of its potential to significantly improve fuel economy. Because of the dual-power-source nature and the complex configuration and operation modes, power management in a HEV is more complicated than in that of a conventional vehicle. Our research in HEV power management has been focused on the development an intelligent power control system that determines proper power split between the power sources to minimize fuel consumption and emissions, while satisfying constraints such as drivability, charge sustaining and component reliability. I will present a machine learning framework designed to emulate the optimal solutions generated by Dynamic Programming for various roadway type and traffic conditions, generalize the optimal power setting to the real world vehicle operations through predicating driving environment and driving trend. I will show that the intelligent power controller, UMD-IPC, trained by the machine learning algorithms gave significant performance improvement over fuel economy.