Adaptive Neural Controller for Future Renewable Fuels

Research project, 2020 – 2021

The sustainable fuel resources are urgently required to the replace of the conventional fossil fuels. Alternate fuels including alcohols and biodiesel have been introduced as an important solution.

The goal of this project is to develop a new engine control system with the ability to perform online recalibration of the engine control parameters in order to optimize the combustion efficiency together with minimizing the exhaust emissions. A trained and adaptive artificial neural network (ANN) model to predict different fuel qualities is the core of this proposal. By implementing such an online fuel quality sensor, it will provide the ability of robust engine operation with respect to different fuel quality, fuel variety and also considering the variation in combustion due to engine wear and aging. Also, the proposed technique will be used to predict emissions (e.g. NOX concentration) from readily available engine operating parameters, possibly eliminating the need for physical sensing and the cost associated with it.