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Driving Cycle Development and Prediction by using DC-TRAD

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The driving cycle is a series of driving behaviors, such as acceleration, braking, and cruising, that occur over a set length of time. The driving cycle is essential in the manufacture and evaluation of the vehicle's performance. Predicting the driving cycle can help to improve vehicle performance or anticipate the range of an electric car. Based on prior data, long short-term memory (LSTM) networks by Recurrent Neural Network (RNN) can be used to forecast a vehicle's driving cycle. This article proposes and creates a driving cycle for Ipoh, Perak, Malaysia. The route for collecting driving cycle data was chosen based on the most typical route travelled by drivers to get to work according to 2019. In each run, the parameters for the driving data are collected using driving cycle tracking device (DC-TRAD) and calculated. The objectives of this paper are; to develop an Ipoh Driving Cycle (IDC) using k-means clustering method, to develop a prediction of future IDC using LSTM and to analyze the prediction of IDC. Firstly, the driving data is collected in three different routes in Ipoh city at back-from-work times. Then the data is divided into micro-trips and the driving features are extracted. The features are used to develop a driving cycle using k-means clustering approach. The prediction is developed after the training of neural networks by using LSTM network approach with RSME of 6.2252%.

Biography:

AP. Ts. Dr. Salisa Abdul Rahman received the B.E. and M.E. in Electrical & Electronics Engineering from University of Technology Petronas, Perak, Malaysia in 2004 and 2006, respectively while Ph.D. in Optimal Energy Management Strategy for the University of Technology Sydney Plug-In Hybrid Electric Vehicles from University of Technology Sydney (UTS), Australia. She is currently working as a senior lecturer at University Malaysia Terengganu, Malaysia. Her research interests are in hybrid electric vehicles, innovation powertrain, simulation and modeling, energy management strategy, driving cycles, driver behaviors, fuel economy, emissions, and optimization.