

Study for Reducing Fuel Consumption of Internal Combustion Engine Vehicles using OBD Driving Data and Machine Learning

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Since Alpha Go 'Google's AI Go program' won Lee Se-dol in Korea in March 2016 there is a growing interest in AI and machine learning in various fields. In the automotive field many studies are being conducted to apply AI and machine learning. Artificial intelligence and machine learning applications require huge data sets. In the case of companies such as Hyundai Motor Company, engine data such as driver's driving pattern, speed, and RPM are converted into big data using the connected function of its specialized program, but general researchers do not have easy access to car data. However, there is one way to access the vehicle's engine-related information. In 1970, the US Environmental Protection Agency (EPA) required the standard OBD established by the American Automobile Manufacturers Association (SAE) to be installed in all vehicles to monitor the legal regulations of the vehicle. Korea has also mandated the installation of the OBD-II system on all passenger cars sold in Korea since 2005.

In this study, a machine learning model for predicting vehicle fuel consumption was studied based on the data measured through vehicle OBD-II equipment. Reducing CO₂ emissions is directly related to fuel consumption. Vehicle speed, engine rotational speed (RPM), fuel level, voltage, fuel/air ratio, throttle position, and manifold pressure were measured every day and big data was produced by inputting the weather and traffic volume of the day. The latitude, longitude, and altitude of the test road were measured using the XGPS 160 model that can measure 10hz, and ELM327 was used as the OBD-II scanner. In future research, deep learning (CNN, RNN, Decision Tree, SVM) is applied to model fuel efficiency prediction models of various eco-friendly vehicles with higher accuracy.

Reference

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