Machine Learning for Real-Time Fuel Consumption Prediction and Driving Profile Classification based on ECU Data

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Abstract: *This paper represents a machine learning- based system for real-time fuel consumption prediction and driving profile classification using ECU (Electronic Control Unit) data from vehicles. Key engine parameters such as vehicle speed, engine RPM, throttle position, and mass air flow are used to train predictive models.*
Algorithms used for fuel prediction are XGBoost, SVR, Ridge Regression, Random Forest, and AdaBoost. Similarly, Logistic Regression, Random Forest, and AdaBoost algorithms are used to classify the type of driver behavior along with suggestions into seven categories. The models are evaluated using standard metrics. Results indicate high accuracy in both prediction and classification tasks. This system supports applications in eco-driving systems, fleet management, and driver behavior analysis, promoting fuel efficiency and safer driving habits...

Keywords: ECU Data , Driver Behavior Analysis , XGBoost , Machine Learning