

CSE523 - Machine Learning

Weekly Report 2

**Classification of Drivers based on their Driving Patterns**

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The paper "Driver Identification Based on Wavelet Transform Using Driving Patterns" explores a novel approach to driver identification utilizing driving pattern analysis enhanced by wavelet transform. Here are some key pointers we made for this literature :

**1. Objective:** Introduces a driver identification method focusing on driving patterns without relying on biometric information, aiming to improve vehicle security and offer personalized services.

**2. Data Utilization:** Employs vehicle status data extracted from the On-board diagnostics II (OBD) port, capturing information at a frequency of 1 Hz to analyze driving patterns.

**3. Machine Learning Algorithms:** Assesses the performance of Support Vector Machine (SVM), Random Forest, and XGBoost in both binary and multiclass classifications for driver identification.

**4. Wavelet Transform:** Implements wavelet transform for driving pattern analysis, enabling detailed feature extraction from time-series driving data.

**5. Feature Extraction:** Focuses on extracting meaningful features from driving data, including statistical measures and wavelet energy, to capture the essence of driving behaviors.

**6. Classification Approach:** Uses machine learning algorithms for classifying drivers based on extracted features, evaluating the system's accuracy in identifying individual drivers.

**7. Data Preprocessing:** Includes normalization, time-window segmentation, and application of wavelet transform to prepare data for analysis.

**8. Accuracy and Performance:** Reports high classification accuracy, with XGBoost achieving up to 96.18% in binary classification and 91.6% in multiclass classification on motorway data.

**9. Future Directions:** Suggests further exploration of the method's applicability to other driving contexts and improvements in feature extraction and model performance.

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### **References:**

1. B. I. Kwak, M. L. Han and H. K. Kim, "Driver Identification Based on Wavelet Transform Using Driving Patterns," in IEEE Transactions on Industrial Informatics, vol. 17, no. 4, pp. 2400-2410, April 2021, doi: 10.1109/TII.2020.2999911

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