

# Dynamic Voting based Explainable Intrusion Detection System for In-vehicle Network

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**Abstract**— A modern vehicle contains a large number of electronic components communicating over a large in-vehicle network. While the operation of this network is crucial, some implementations are vulnerable to a number of security attacks while lacking sufficient security measures. Intrusion detection systems have been proposed as a possible solution to this, with those using machine learning receiving much attention. However, such systems may be hard to interpret and understand. In this work, we propose an automotive intrusion detection system that utilizes Random Forest with a dynamic voting technique to provide a robust solution with interpretability through feature and model exploration. The proposed solution is evaluated using two publicly available datasets and demonstrates stable performance when compared to similar solutions.

**Keyword**— In-vehicle network, intrusion detection, random forest, ensemble learning, explainable AI



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