An Intelligent Risk Management Framework for Monitoring Vehicular Engine Health

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ABSTRACT

The unwanted vehicular engine irregularities diminish vehicular competence, hinder productivity, waste time, and sluggish personal/national economic growth. Transportation sectors are essential infrastructures that require practical vulnerability assessment to avoid unexpected consequences through risk severity assessment. Artificial intelligence would be vital in the Industry 4.0 era to eliminate these issues for seamless activity and ultimate productivity. This article presents a risk management framework that includes an efficient decision model for monitoring and diagnosing vehicular engine health and condition in real-time using vulnerable components information and advanced techniques. To do this, we used the vulnerability identification frame to identify the vulnerable objects. We created a decision model that used an infrastructure vulnerability assessment model and sensor-actuator data to diagnose and categorise engine conditions as good, minor, moderate, or critical. We used machine learning and deep learning algorithms to assess the effectiveness of the risk management system's decision model. The stacked ensemble of the deep learning algorithm outperformed other standard machine learning and deep learning algorithms in providing 80.3% decision accuracy for the 80% training data and efficiently managing large amounts of data. Anticipating the proposed framework might assist the automotive sector in advancing with cutting-edge facilities that are up to date.

KEYWORDS: VHMS, Vulnerable Components, Fault Diagnosis Model, IoV, Engine Health Management

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