**Intrusion Detection System for Internet of Vehicles Using Optimized CNN**

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**Abstract:**

In today's fast-changing technological environment, advancements like smart cars, autonomous vehicles, and connected cars have become widespread. However, these developments have also made modern vehicles vulnerable to cyber threats due to their integration with external networks. Therefore, implementing intrusion detection systems (IDS) is vital to improve security in vehicle networks. This research presents a new approach for deploying IDS in the Internet of Vehicles, utilizing machine learning, ensemble learning, and transfer learning methods. By analyzing datasets such as Car-Hacking and CICIDS2017, the study showcases the effectiveness of IDS in identifying cyberattacks using recurrent neural networks (RNN) and hyper-parameter optimization techniques. These findings emphasize the importance of IDS in strengthening security in contemporary automotive systems.

**Keywords**: Intrusion Detection System, RNN, Transfer learning, Ensemble learning, Internet of Vehicles.