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## Malware Detection Using Machine Learning and Deep Learning: A Review

### Communication Info

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### Abstract

The rapid expansion of interconnected digital systems has significantly increased exposure to cybersecurity threats, with malware remaining one of the most persistent and evolving challenges. Traditional signature-based detection methods are increasingly ineffective against sophisticated and previously unseen attacks, motivating the adoption of machine learning and deep learning techniques for malware detection. This review analyzes recent ML- and DL-based studies focusing on static and dynamic malware analysis approaches. It examines data preprocessing strategies, commonly used algorithms, and evaluation practices reported in the literature. Rather than benchmarking individual models, the paper highlights the strengths and limitations of selected studies, with particular attention to dataset dependency, generalization capability, and robustness considerations. The review identifies key research gaps and emphasizes the need for scalable and reliable detection frameworks to improve real-world applicability.

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