A Comprehensive Review of Phishing Attack Detection Using Machine Learning Techniques

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Abstract: *Phishing attacks have become a significant cybersecurity concern, affecting millions of users and organizations by stealing confidential information. The rise of machine learning (ML) techniques has provided innovative ways to detect and mitigate phishing attacks. This review paper explores various ML algorithms, including Decision Trees (DT), Random Forest (RF), and Principal Component Analysis (PCA), in detecting phishing attacks. Through a review of recent studies, it is evident that ML models such as RF can achieve high accuracy, up to 97%, in phishing detection. However, challenges such as evolving phishing strategies, data imbalance, and feature extraction remain critical issues. Future research directions should focus on deep learning models and real-time detection systems to enhance the robustness and effectiveness of phishing detection mechanisms*

Keywords: Phishing attack, machine learning, Random Forest, decision tree, Principal Component Analysis, Cybersecurity, deep learning