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AI-Powered Prediction of Email Spoofing Using Deep Learning Approach

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Abstract : Email spoofing poses a significant threat to cybersecurity, as it exploits vulnerabilities in email systems to mislead individuals and organizations, leading to data breaches, financial losses, and compromised systems. To tackle this issue, this research presents an AI-powered framework that leverages deep learning techniques to detect spoofed emails with high accuracy. The framework analyzes various factors, including email content, metadata, and sender authenticity, to identify fraudulent messages effectively. Furthermore, the study evaluates machine learning approaches for phishing detection using a balanced dataset of legitimate and phishing emails. Among seven tested algorithms, Gradient Boosting demonstrated superior performance, achieving an accuracy of 96.1% and an AUC score of 97.9%. These findings highlight the advantages of ensemble and neural-based models in capturing intricate phishing patterns. However, challenges such as dependence on specific datasets and the difficulty of detecting deceptive emails that mimic legitimate ones underscore the need for further advancements. The deep learning model, trained on diverse datasets that include linguistic and header information, showed robust results with high accuracy and minimal false positives. This research highlights the crucial role of automation in improving detection systems and strengthening email security. By providing a scalable and efficient solution, it strengthens efforts to combat email spoofing and phishing. Integrating such AI-driven tools into existing email platforms can proactively mitigate these threats, fostering a more secure digital communication environment.

Keywords : neural networks (NN), gradient boosting (GB), decision forest (DF), support vector machine (SVM), false positives and negatives (FPFN), adaptive detection models (ADM)
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