Android Malware Detection using Genetic Algorithm

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Abstract: *The rapid proliferation of Android applications has significantly increased the occurrence of malware attacks on mobile platforms. Traditional signature-based detection techniques are ineffective against zero-day and obfuscated malware. This paper proposes a robust Android malware detection framework using Genetic Algorithm (GA) optimized Machine Learning and Deep Learning models. The system incorporates dataset preprocessing, EMBER feature extraction, multi-class classification, graphical performance evaluation, and malware family prediction through a GUI-based interface. Comparative analysis is conducted using SVM, KNN, Naïve Bayes, Decision Tree, Logistic Regression, Random Forest, CNN with Genetic Algorithm, and LSTM with Genetic Algorithm. Experimental results on the Kaggle MALIMG dataset demonstrate improved accuracy, precision, recall, and F1-score, achieving nearly 90% accuracy with enhanced robustness and reduced false positives*

Keywords: Android Malware Detection, Genetic Algorithm, EMBER Features, CNN, LSTM, Malware Family Classification, Cybersecurity