UNIVERSITY OF SOUTH FLORIDA

Major Research Area Paper Presentation

Comparing Deep Learning and Traditional Machine Learning on Android Malware Detection on Market-Scale Apps
by
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For the Ph.D. degree in Computer Science and Engineering

Machine learning has been extensively studied for its utility in Android malware detection. The recent success of deep learning (DL) in other domains has inspired researchers to explore using DL in Android malware detection. In this paper, we present a systematic study to compare traditional machine learning (ML) and deep learning (DL) when they are applied to Android malware detection on market-scale apps. We methodically collected a large-scale dataset, which contains around 240 thousand apps, reflecting real-world app distribution. The train and evaluation data cover a continuous 4-year range, organized by quarters, to simulate practical use patterns of such learning methods and capture natural app evolution in the dataset. In our study, we conducted a fair comparison between traditional ML and a DL model based on the cutting-edge Capsule Graph Neural Networks (CapsGNN). The experiment results show that the deep learning approach does not outperform traditional machine learning when no significant changes are introduced in Android application development. However, when sudden changes occur in the dataset, the negative impact is more profound for traditional ML models. We make the dataset (with app IDs, hash values, and their labels) available to the research community for further research in this area.

Monday, November 15th, 2021
12:30 PM
Online ([Microsoft Teams](#))
Please email guojunl@usf.edu for more information

THE PUBLIC IS INVITED

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