Adversarial Machine LLearning

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Objectives

The field of adversarial machine learning is also useful for identification of vulnerabilities in a machine learning approach in presence of adversarial settings

- Illustrate the design cycle of a learning-based pattern recognition system for adversarial tasks.
- Performance of pattern classifiers and deep learning algorithms under attack, evaluate their vulnerabilities.
- Pattern recognition tasks like object recognition in images, biometric identity recognition, spam and malware detection.

Introduction

Deep neural networks and **machine-learning** algorithms are currently used in several applications, ranging from computer vision to computer security. Many areas of machine learning are **adversarial** in nature because they are safety critical, such as autonomous driving. An adversary can be a cyber attacker or malware author attacking the model by causing congestion among users, or may create accidental situations, or may even model expose vulnerabilities in the prediction module by creating undesired situation. [1].

Materials

Pattern classifiers can be significantly vulnerable to well-crafted, sophisticated attacks exploiting knowledge of the learning algorithms. Being increasingly adopted for security and privacy tasks, it is very likely that such techniques will be soon targeted by specific attacks, crafted by skilled attackers. Larger number of potential attack scenarios, respectively referred to as evasion and poisoning attacks.

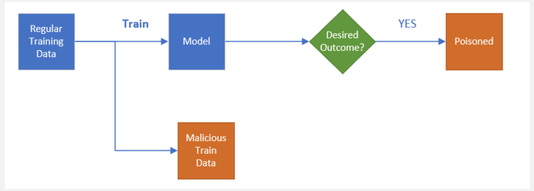
Mathematical Section

Poisoning attacks include those systems that exploit feedback from the end users to validate their decisions.PDFRate an online tool for detecting malware in PDF files.

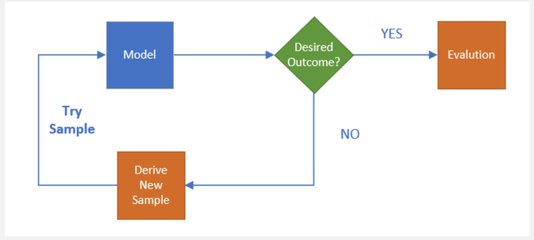
Evasion attacks consist of manipulating input data at test time to cause misclassifications. Which manipulation of malware code to have the corresponding sample undetected.

Methods

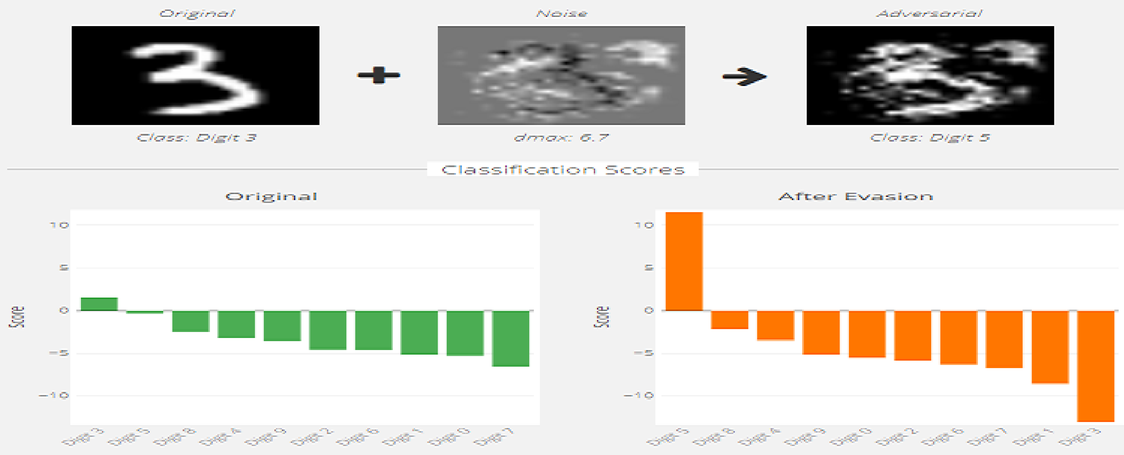
1. Poisoning (Causative) Attack : Attack on training phase. Attackers attempt to learn, influence, or corrupt the ML model itself.



2. Evasion (Exploratory) Attack : Attack on testing phase. Do not tamper with ML model, but instead cause it to produce adversary selected outputs.



Important Result



Images that can be misclassified by deep-learning algorithms while being only imperceptibly distorted. evasion attacks are thus already a relevant threat in real-world application settings.

Conclusion

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Additional Information

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- Curabitur pellentesque dignissim
- Eu facilisis est tempus quis
- Duis porta consequat lorem
- Duis porta consequat lorem

References

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