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Cross-Domain Adversarial Reprogramming of a Recurrent Neural Network

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Abstract

Neural networks are vulnerable to adversarial attacks. These attacks can be untargeted, causing the model to make any error, or targeted, causing the model to make a specific error. Adversarial Reprogramming introduces a type of attack that reprograms the network to perform an entirely new task from its original function. Additional inputs in a pre-trained network can repurpose the network to a different task. Previous work has shown adversarial reprogramming possible in similar domains, such as an image classification task in ImageNet being repurposed for CIFAR-10. A natural question is whether such reprogramming is feasible across any task for neural networks a positive answer would have significant impact both on wider applicability of ANNs, but also require rethinking their security. We attempt for the first time reprogramming across domains, repurposing a text classifier to an image classifier, using a recurrent neural network a prototypical example of a Turing universal network.

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