Limited Query Black-box Adversarial Attacks in the Real World

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Despite the success of machine learning models in an expansive range of tasks, they are still surprisingly brittle to seemingly inconspicuous input manipulations, called adversarial examples, which is a major security concern for their deployment. We study the creation of physical adversarial examples, which are robust to real-world transformations, using a limited number of queries to the target black-box neural networks, which provide very little information. We observed that robust models tend to be especially susceptible to perturbations to the foreground of a given image, which motivated our novel Foreground attack, which uses region priors. We demonstrated that gradient priors are a useful component that could be used during different attacks to improve their efficiencies and therefore introduced an improved version of the popular SimBA. We also proposed an algorithm for ensemble-based transferable attacks that selects the most similar surrogates to the target model. Both our black-box attacks outperform the current state-of-the-art approaches they are based on and support our belief that some deep learning models share a lot of similarities between themselves and that knowledge could be leveraged to build strong attacks in a limited-information setting.

Awards Won:
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