A Deep Neural Network Method for Steganographic Image Detection

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The ability to create and/or detect steganographic messages (messages hidden within images or other digital file types) is important for uses ranging from watermarking copyrighted materials to covert communications. Many mathematical techniques exist for detecting the presence of these messages, but because they can be hidden in many different ways, no single technique will always work in every case. In recent years machine learning (ML) has been used for steganographic image detection, but these ML models have typically relied upon statistical analysis of image noise in order to determine a probability that an image contains a hidden message. In this project I explore the possibility of detecting steganographic messaging in images using three neural network types: 1) a logistic regression (LR), 2) a deep neural network (DNN), and a convolutional neural network (CNN). Large training and test sets of steganographic images were created based on the openly available mini-ImageNet image dataset and were used to train the models. The hidden messages were first encrypted (with AES encryption) before being encoded in the images in order to make detection more difficult.

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