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# Using Generative Adversarial Networks for Improving Classification Effectiveness in Credit Card Fraud Detection

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## Abstract

In the last years, the number of frauds in credit card-based online payments has grown dramatically, pushing banks and e-commerce organizations to implement automatic fraud detection systems, performing data mining on huge transaction logs. Machine learning seems to be one of the most promising solutions for spotting illicit transactions, by distinguishing fraudulent and non-fraudulent instances through the use of supervised binary classification systems properly trained from pre-screened sample datasets. However, in such a specific application domain, datasets available for training are strongly imbalanced, with the class of interest considerably less represented than the other. This significantly reduces the effectiveness of binary classifiers, undesirably biasing the results toward the prevailing class, while we are interested in the minority class. Over-sampling the minority class has been adopted to alleviate this problem, but this method still has some drawbacks. Generative Adversarial Networks are general, flexible, and powerful generative deep learning models that have achieved success in producing convincingly real-looking images. We trained a GAN to output mimicked minority class examples, which were then merged with training data into an augmented training set so that the effectiveness of a classifier can be improved. Experiments show that a classifier trained on the augmented

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