Credit Card Fraud Detection Ai Layer

Proposal Overview/Past experiments

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Objective

According to a 2019 Forbes article, Artificial Intelligence is projected to add 15 trillion dollars to the world economy. I had also mentioned a similar trillion dollar valuation, in 2018, in a gleaner article.

Beginning on Tue 2/26/2019 (February 2019), this project sought to supplement current Fraud Guard method with neural network based code/method that I prepared/wrote, for the goal/purpose of improved fraud detection by > 50%.

The current method of fraud detection though well structured, could be enhanced/supplemented by automatic means of credit card fraud detection, namely via the use of artificial intelligence. Artificial neural networks are quite general; there are neural networks that enable self-driving cars, while the same neural network types also enable disease diagnosis, language translation etc.

The history of Ai has seen where expert systems with years of hand crafted rules/knowledge by experts, are enhanced considerably by automated systems that learn how to build rules. In some cases, hybrid systems have been constructed that make use of both learning ai, and rule-based ai.

Nowadays, most modern systems, including ones that other banks are using, make great use of the second wave of ai, namely statistical learning, or machine learning. The goal is to utilize the second wave of Ai, in tandem with current fraud guard systems, to greatly increase detection of frauds, while reducing the number of false positive detection.

As the bank gets more complex, we'll reasonably need to use neural networks or some similar method to do fraud detection, because it is already hard for rule builders to keep up with fraud patterns with the current non-neural network based method, and neural network or similar methods capture more frauds, and minimizes the amount of transactions that are falsely detected as fraudulent, by up to 54%.

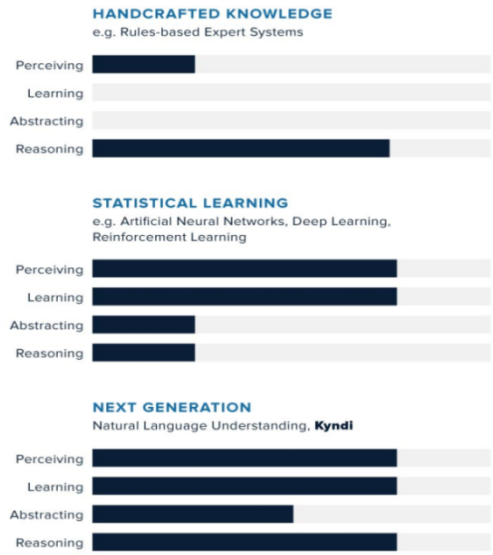


Figure taken from https://kyndi.com/blog/the-waves-of-ai/. See also https://www.sharper.ai/taxonomy-ai/.

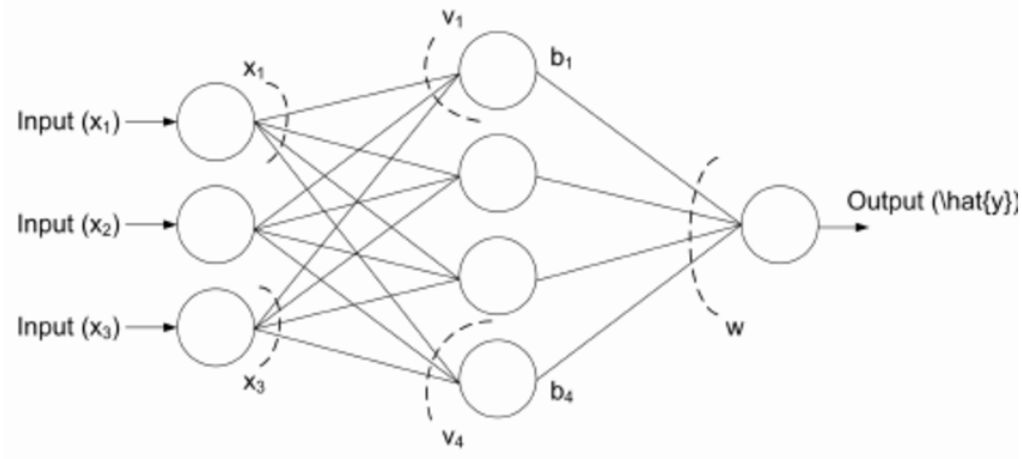
Credit Card Fraud Detection Neural Network Pipeline (CCFDNN Pipeline)

The architecture of the neural network is a somewhat simple one that uses Google Tensorflow; a 3 layer neural network model that takes as input PCI compliant fields pertaining to a transaction record, and returns as output, a fraudulent or non-fraudulent transaction prediction. Source code is attached as:
"**bennett_credit-card-fraud-detection_neural-network.zip**".

an example transaction record

472	-3.04354	-3.15731	1.088463	2.288644	1.359805	-1.06482	0.325574	-0.06779	-0.27095	-0.83859	-0.41458	-0.50314

A 3 layer artificial neural network model, that accepts transaction records



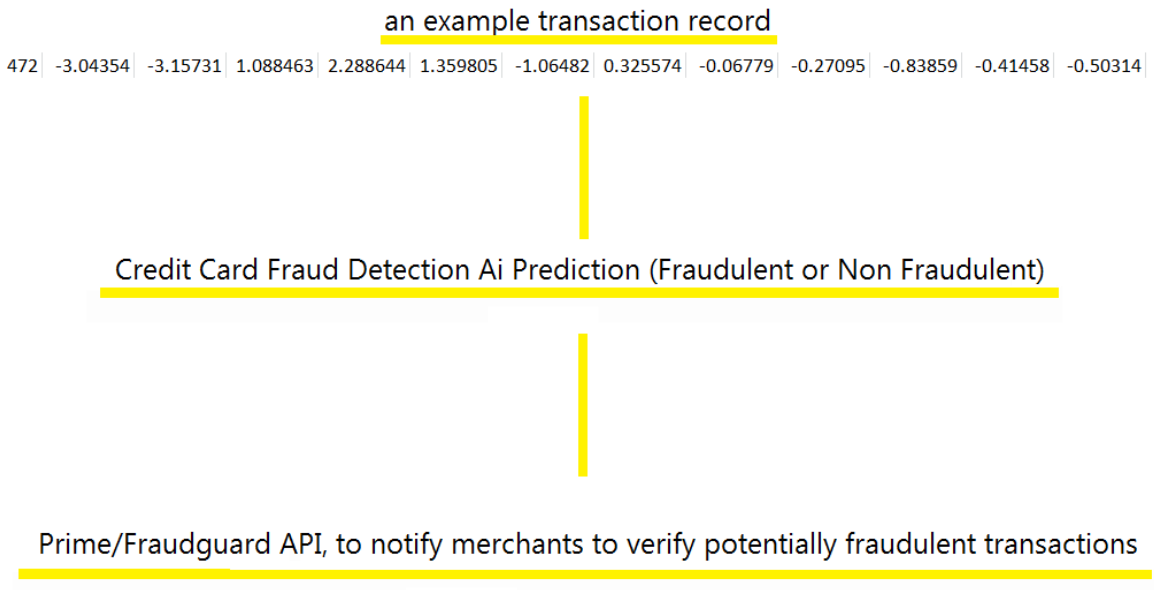
A prediction, fraudulent or non-fraudulent

Credit Card Fraud Detection Ai Layer Phase 1 Pipeline

Preliminary phase does a demo/trial run on a bank's transaction development (not production) data. (Target: small to mid-sized banks, that use only antiquated rules-based fraud detection and lack Ai driven fraud detection)

The phase 1 pipeline makes use of Prime and Fraudguard API, to contact/notify merchants/customers of potential frauds detected by (CCFDNN) CreditCardFraudDetectionNeuralNetwork/Ai.

Phase 2 concerns the use of CCFDNN, by integrating the solution into bank's flow.



Preliminary Results

Upon tests on 300k bank dev data transactions on a Jamaican bank, my artificial neural network project performs okay at 95% accuracy. Moving forward, a pilot program will be carried out to test the system in real time.