

IBM Detecting Fraud in Financial Transactions (DRIFT)

Overview

With the number of credit card fraud occurrences rising sharply all the time, today's financial institutions are facing serious challenges. According to the annual report of Visa Europe, in 2010, 0.055% of their total volume is considered fraud. This amounts to approximately 805M Euros of fraud related losses in a single year.

As people begin to select their credit cards based on security levels, banks and credit card companies are looking into updating their systems to include more advanced mechanisms that can both detect and prevent fraud.

The fraud detection technology developed at IBM Research - Haifa is a unique solution that applies sophisticated machine learning techniques to help financial institutions detect banking frauds in a smarter and more effective manner.



Advantages

The technology provides financial institutions with a number of benefits:

- Smarter machine learning algorithms identify patterns and connections between transactions, activities, and fraud occurrences.
- Improved rate of identified fraud for the same number of false positives.

- Measurement of the amount of money stolen vs. the number of false positives for more valuable metrics.
- State-of-the-art algorithms identify which activities precede fraud to enable prevention.

How It Works

There are three stages:

- **Deployment** of the system: integrating it to the specific customer infrastructure and building the initial ML model based on several months of real life data.
- On-line running of the model built on the streaming data. This stage supports the rate and volume of the incoming transactions. Our score can be used as is or combined with existing legacy systems. This stage is performed at the customer site.
- Routinely retrain the model on real data to ensure it continuously reflects the company business. This step is run every few months or once a year, depending on the data. This is done either by IBM Haifa researchers or by the customer after training.



Success Stories

Credit card company

Working closely with a leading credit card provider, IBM researchers used this technology to successfully outperform a state-of-the-art fraud detection system and provided the following value add:

 Value detection – instead of measuring our success in the traditional Receiver Operating Curve (ROC) comparing the number of false alarms to the number of true positives, we trained our system to maximize performance for the number of false alarms vs. the value of the frauds caught. The ROC of our system, compared to existing state of the art was remarkable.



 Pre-fraud – By detecting the last benign transaction before the first fraud, companies can take action to prevent the fraud, without blocking transactions in real time.

Automatic Teller Machine (ATM)

Working with a leading bank, IBM researchers used fraud detection technology to compete with a state-of-the-art system. The team also developed a unique tool to visualize the data, where users can synchronously track the transactions for different cards in the account while clearly visualizing the sequence of events.



While working on the data, the team discovered additional features that can be directly used to predict fraud and indicate situations where fraud is more likely to occur. For example, benign withdrawals that occur during the day exhibit a reasonable behavior, whereas fraud activities show a high peek at mid-night, which occurs because the withdrawal limit is reset at midnight.

Smarter Fraud Prevention

Fraud has been a problem since the beginning of time. Our current economic turmoil means that motivation is higher than ever.

By using innovative ideas to garner new value from the massive amounts of existing data, we can help financial institutions find smarter and more effective ways to prevent fraud.

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