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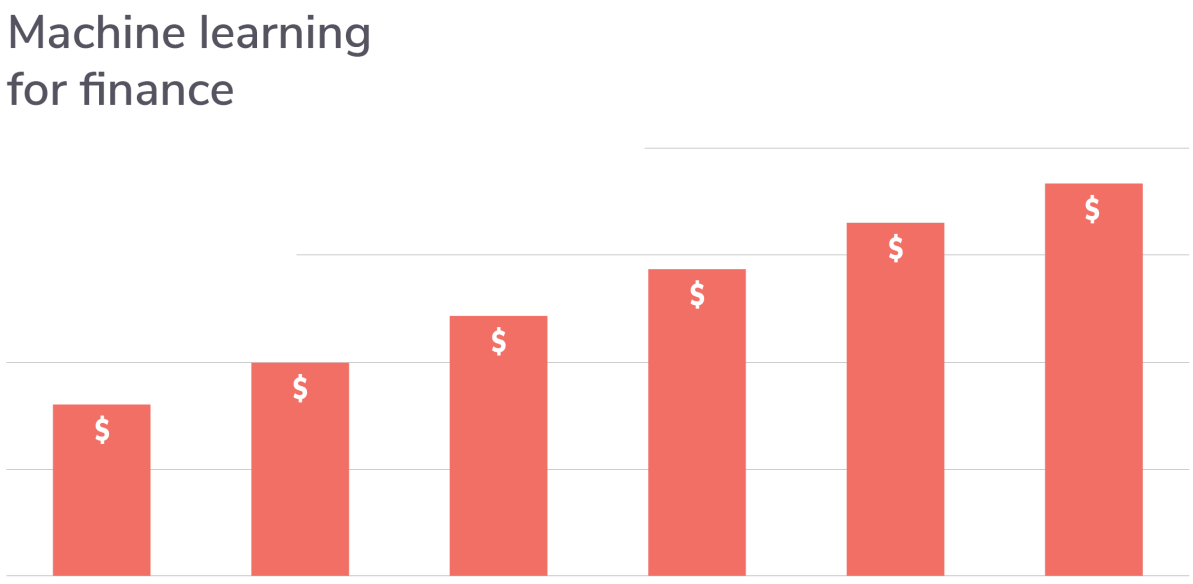
The state of machine learning in financial services



The financial services industry has often been at the forefront of using new technology to solve business problems. It's no surprise that many firms in this sector are embracing machine learning, especially now that increased compute power, network connectivity, and cloud infrastructure are cheaper and more accessible.

This post will detail five important machine learning use cases that are currently providing value within financial services organizations.

Fraud detection

The cost of financial fraud for a financial services company jumped 9 percent between 2017 and 2018, resulting in a cost of $2.92 for every dollar of fraud. We have previously discussed machine learning applications in fraud detection in detail, but it's worth mentioning some

additional reasons why this is one of the most important applications for machine learning in this sector.

Most fraud prevention models are based on a set of human-created rules that result in a binary classification of “fraud” or “not fraud.” The problem with these models is that they can create a high number of false positives. It’s not good for business when customers receive an abnormally high number of unnecessary fraud notifications. Trust is lost, and actual fraud may continue to go on undetected.

Machine learning clustering and classification algorithms can help reduce the problem of false positives. They continually modify the profile of a customer whenever they take a new action. With these multiple points of data, the machine can take a nuanced approach to determine what is normal and abnormal behavior.

Creditworthiness

Creditworthiness is a natural and obvious use of machine learning. For decades, banks have used very rudimentary logistic regression models with inputs like income 30-60-90-day payment histories to determine likelihood of default, or the payment and interest terms of a loan.

The logistic model can be problematic as it can penalize individuals with shorter credit histories or those who work outside of traditional banking systems. Banks also miss out on additional sources of revenue from rejected borrowers who would likely be able to pay.

With the growing number of alternative data points about individuals related to their financial histories (e.g., rent and utility bill payments or social media actions), lenders are able to use more advanced models to make more personalized decisions about creditworthiness. For example, a 2018 study suggests that a neural network machine learning model may be more accurate at predicting likelihood of default as compared to logistic regression or decision-tree modeling.

Despite the optimism around increased equitability for customers and a larger client base for banks, there is still some trepidation around using black box algorithms for making lending decisions. Regulations, including the Fair Credit Reporting Act, require creditors to give individuals specific reasons for an outcome. This has been a challenge for engineers working with neural networks.

Credit bureau Equifax suggests that it has found a solution to this problem, releasing a "regulatory-compliant machine learning credit scoring system" in 2018.

Algorithmic trading

Simply defined, algorithmic trading is automated trading using a defined set of rules. A basic example would be a trader setting up automatic buy and sell rules when a stock falls below or rises above a particular price point. More sophisticated algorithms exploit arbitrage opportunities or predict stock price fluctuations based on real-world events like mergers or regulatory approvals.

The previously mentioned models require thousands of lines of human-written code and have become increasingly unwieldy. Relying on machine learning makes trading more efficient and less prone to mistakes. It is particularly beneficial in high frequency trading, when large volumes of orders need to be made as quickly as possible.

Automated trading has been around since the 1970s, but only recently have companies had access to the technological capabilities able to handle advanced algorithms. Many banks are investing heavily in machine learning-based trading. JPMorgan Chase recently launched a foreign exchange trading tool that bundles various algorithms including time-weighted average price and volume-weighted average price along with general market conditions to make predictions on currency values.

Robo-advisors

Robo-advisors have made investing and financial decision-making more accessible to the average person. Their investment strategies are derived from an algorithm based on a customer's age, income, planned retirement date, financial goals, and risk tolerance. They typically follow traditional investment strategies and asset allocation based on that information. Because robo-advisors automate processes, they also eliminate the conflict of financial advisors not always working in a client's best interest.

While robo-advisors are still a small portion of assets under management by financial services firms ($426 billion in 2018), this value is expected to more than triple by 2023. Customers are enticed by lower account minimums (sometimes $0), and wealth management companies save on the costs of employing human financial advisors.

Cybersecurity and threat detection

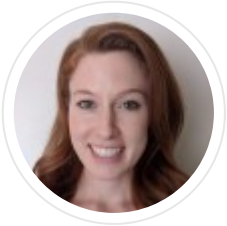
Although not unique to the financial services industry, robust cybersecurity protocols are absolutely necessary to demonstrate asset safety to customers. This is also a good use case to demonstrate how machine learning can play a role in assisting humans rather than attempting to replace them. Specific examples of how machine learning is used in cybersecurity include:

Malware detection: Algorithms can detect malicious files by flagging never-before-seen software attempting to run as unsafe.

Insider attacks: Monitoring network traffic throughout an organization looking for anomalies like repeated attempts to access unauthorized applications or unusual keystroke behavior.

In both cases, the tedious task of constant monitoring is taken out of the hands of an employee and given to the computer. Analysts can then devote their time to conducting thorough investigations and determining the legitimacy of the threats.

It will be important to watch the financial sector closely because its use of machine learning and other nascent applications will play a large role in determining those technologies' use and regulation across countless other industries.



Whitney Nistrian

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