ARTIFICIAL INTELLIGENCE / CASE STUDY

Danske Bank Fights Fraud with Deep Learning and AI

Danske Bank is a Nordic universal bank with strong local roots and bridges to the rest of the world. Founded in October 1871, Danske Bank has helped people and businesses in the Nordics realize their ambitions for over 145 years. Its headquarters are in Denmark with core markets being Denmark, Finland, Norway and Sweden.

Mitigating fraud is a top priority for banks. According to the Association of Certified Fraud Examiners, businesses lose more than $3.5 trillion each year to fraud. The problem is pervasive across the financial industry and becoming more prevalent and sophisticated each month.

As customers conduct more banking online across a greater variety of channels and devices, there are more opportunities for fraud to occur. Adding to the problem, fraudsters are becoming more creative and technologically savvy—they're also using advanced technologies like machine learning—and new schemes to defraud banks are evolving rapidly.

Old methods for identifying fraud, such as using human-written rules engines, catch only a small percentage of fraud cases and produce a significantly high number of false positives. To improve probability predictions and identify a much higher percentage of actual cases of fraud while simultaneously reducing false alarms, banks need new forms of analytics. This includes using artificial intelligence (AI).

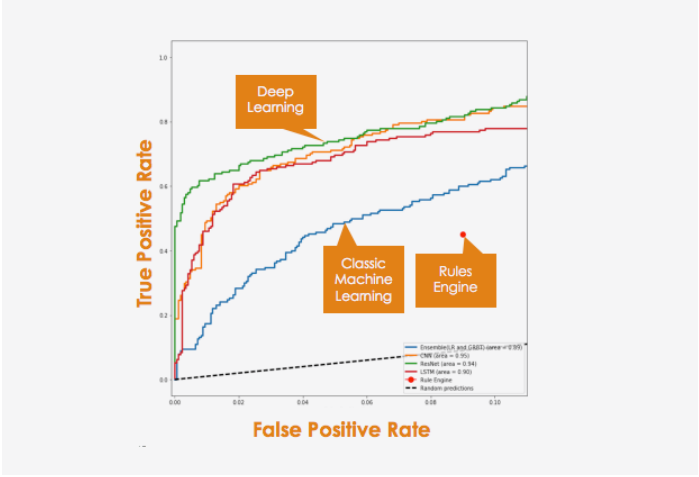
AI Improves Business Outcomes

Danske Bank, a Nordic universal bank, like other global banks, is seeing a seismic shift in customer interactions. In the past, most customers handled their transactions in a bank branch. Today, almost all interactions take place digitally through a mobile phone, tablet, ATM, or call center. This provides more "surface area" for fraud to occur.

The bank needed to modernize its fraud detection defenses. It struggled with a low 40 percent fraud detection rate and was managing up to 1,200 false positives per day—and 99.5 percent of all cases the bank was investigating were not fraud related. That large number of false alarms required a substantial investment of people, time, and money to investigate what turned out to be dead ends. Working with Teradata Consulting, Danske Bank made a strategic decision to apply innovative analytic techniques, including AI, to better identify instances of fraud while reducing false positives.

Danske Bank implemented a modern enterprise analytic solution leveraging AI, and it paid big dividends. The bank was able to:

- Realize a 60 percent reduction in false positives, with an expectation to reach as high as 80 percent.



teradata.

- Increase true positives by 50 percent.
- Focus resources on actual cases of fraud.

The graph shows how true and false positive rates improved with advanced analytics. The red dot represents the old rules engine, which caught only about 40 percent of all fraud. Deep learning improved significantly upon machine learning, allowing Dankse Bank to better detect fraud with much lower false positives.

Deep Learning Enhances Fraud Detection

Dankse Bank integrated deep learning software with graphical processing unit (GPU) appliances that were also optimized for deep learning. The software helps the analytic model identify potential cases of fraud while intelligently avoiding false positives. Operational decisions are shifted from users to AI systems.

However, human intervention is still necessary in some cases. For example, the model can identify anomalies, such as debit card purchases taking place around the world, but analysts are needed to determine if it's fraud or if a bank customer simply made an online purchase that sent a payment to China, then bought an item the next day from a retailer based in London.

Danske Bank's analytic approach employs a "champion/challenger" methodology. With this approach, deep learning systems compare models in real time to determine which one is most effective. Each challenger processes data in real time, learning as it goes which traits are more likely to indicate fraud. If a process dips below a certain threshold, the model is fed more data, such as the geo-location of customers or recent ATM transactions. When a challenger outperforms other challengers, it transforms into a champion, giving the other models a roadmap to successful fraud detection.

New Capabilities Deliver New Value

Enterprise analytics are rapidly evolving and moving into new learning systems enabled by AI. At the same time, hardware and processors are becoming more powerful and specialized, and algorithms more accessible, including those available through open source. This gives banks the powerful solutions needed to identify and mitigate fraud.

As Dankse Bank learned, building and deploying an enterprise grade analytic solution that meets its specific needs and leverages its data sources delivers more value than an off-the-shelf model could have provided. With AI and deep learning, Dankse Bank now has the ability to better uncover fraud without being burdened by an unacceptable amount of false positives.

The solution also allows the bank's engineers, data scientists, lines of business, and investigative officers from Interpol, local police, and other agencies to collaborate to uncover fraud, including sophisticated fraud rings. With its enhanced capabilities, the enterprise analytic solution is now being used across other business areas of the bank to deliver additional value.

Advanced Technologies in Action

Danske Bank undertook a multi-step project to productionize machine learning techniques while simultaneously developing deep learning models to test those techniques. The integrated models helped identify the growing problem of fraud.

Technology-Enabled Approach Enables Automated Processes

Implementing deep learning and artificial intelligence (AI) modeling solutions can be difficult for companies to achieve on their own. They can benefit by partnering with a company that has the proven capabilities to implement technology-enabled solutions that deliver high-value outcomes.

Teradata has the expertise to configure specialized hardware and software frameworks to enable new operational processes. We work to integrate new hardware and software, along with foundational requirements such as an integrated data warehouse and data lake, with a customer's current system. This approach enables advanced analytics, new discoveries, and automated processes.

For example, Dankse Bank faced several challenges when moving beyond machine learning into a deep learning and AI environment. The solution had to have the capability to identify fraud across all channels and products, including mobile. This required gathering and

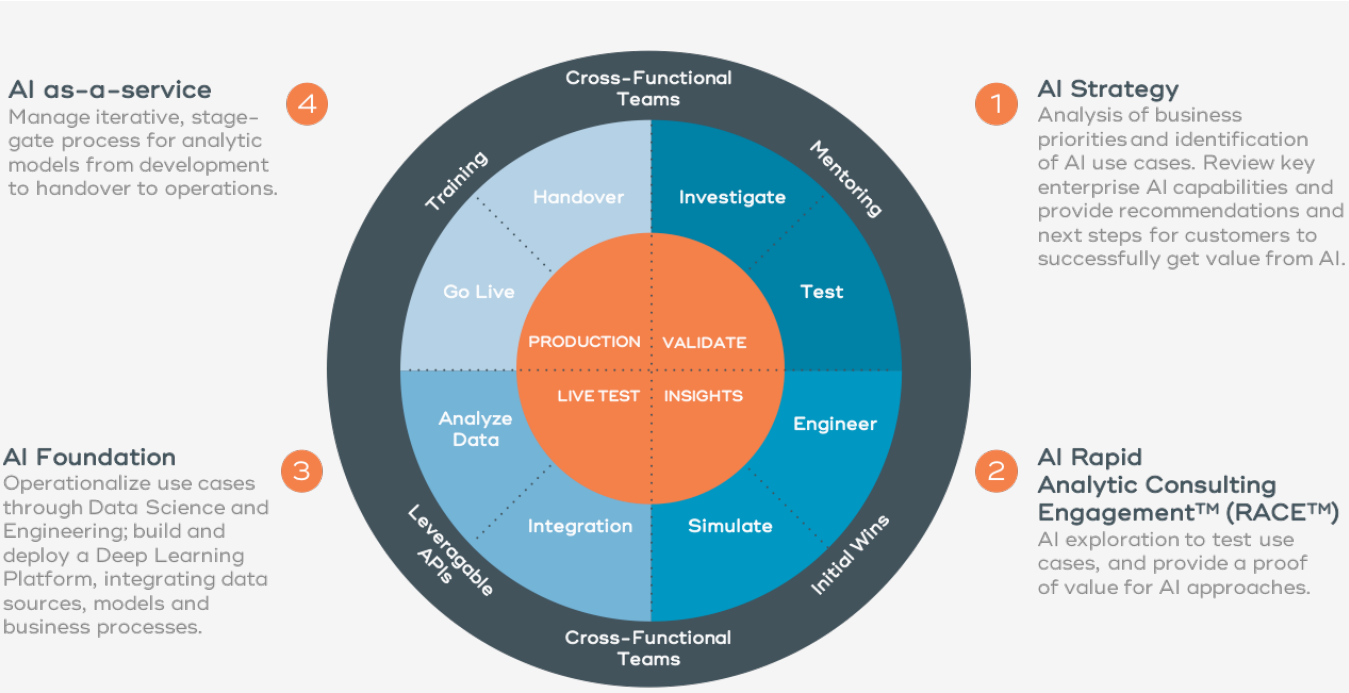


Figure 1. Bank Anti-Fraud Solution

integrating quality data from emerging and existing sources, establishing pipelines for data processing, and ensuring the right data was available for the right analytic techniques. It also required cross-functional collaboration with data scientists, IT professionals, engineers, bank representatives and others to make sure the solution would deliver the high-value outcomes the bank needed.

The project entailed integrating open-source solutions and deploying production models, then applying deep learning analytics to extend and improve the models. A framework was created to manage and track the models in the production system, and to make sure the models could be trusted.

Teradata enabled the system to make autonomous decisions in real time that aligned with the bank's procedures, security and high-availability guidelines. The solution provided new levels of detail, such as time series and sequences of events, to better assist the bank with its fraud investigations. The entire solution was implemented very quickly—from kickoff to live in only five months.

About Teradata

Teradata leverages all of the data, all of the time, so you can analyze anything, deploy anywhere, and deliver analytics that matter. By providing answers to the complexity, cost and inadequacy of today's analytics, Teradata is transforming how businesses work and people live. Get the answer at **Teradata.com**.

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