TATA CONSULTANCY SERVICES

Transforming SME Lending:
Using Deep Learning to Create an Internal Data Marketplace

Abstract

Over the past few years, fintechs have been seen to uproot various existing banking operating models through the strategic use of platform-based digital technologies. Lending to small businesses is one of the areas that they have disrupted with the help of agile, platform-based lending marketplaces. To battle this onslaught, banks are now desperate to innovate and drive business change with newer technologies.
They are looking increasingly to adopt automation and artificial intelligence to optimize their business processes and improve customer experience. This paper talks about how banks can deal with this disruption through the implementation of a comprehensive two-pronged approach of automating the client onboarding process and creating a bank data marketplace consisting of their SME and retail customers.

How have fintechs captured the lending market for small businesses?

Fintechs have disrupted many steps in the banking value chain. Lending to small businesses is one such notable area. Lending marketplaces have gained prominence as they target unserviced segments through faster and competitive offerings and products. They make use of technologies such as artificial intelligence, machine learning and deep learning to automate the client onboarding process. They also make use of a wide variety of data for predictive analytics, thus expediting the decision-making process. These platforms have a clear-cut edge compared with banks as their operations are almost entirely run on online platforms, resulting in lower operating costs. They have also pioneered the use of alternate sources to create credit models with the help of data and technology. All this helps in faster and easier onboarding and processing.

What is the two-pronged approach that banks are using to deal with this disruption?

Banks need an out-of-the-box approach to be able to cater to this disruption. They need to completely automate and simplify their client onboarding process and use a combination of traditional and non-traditional data sources to be able to cater to the currently unserviced segment and accelerate the credit analysis process. In addition to automating their onboarding and decision-making processes, they also need to leverage their existing relationships with retail customers to create a marketplace of their own.
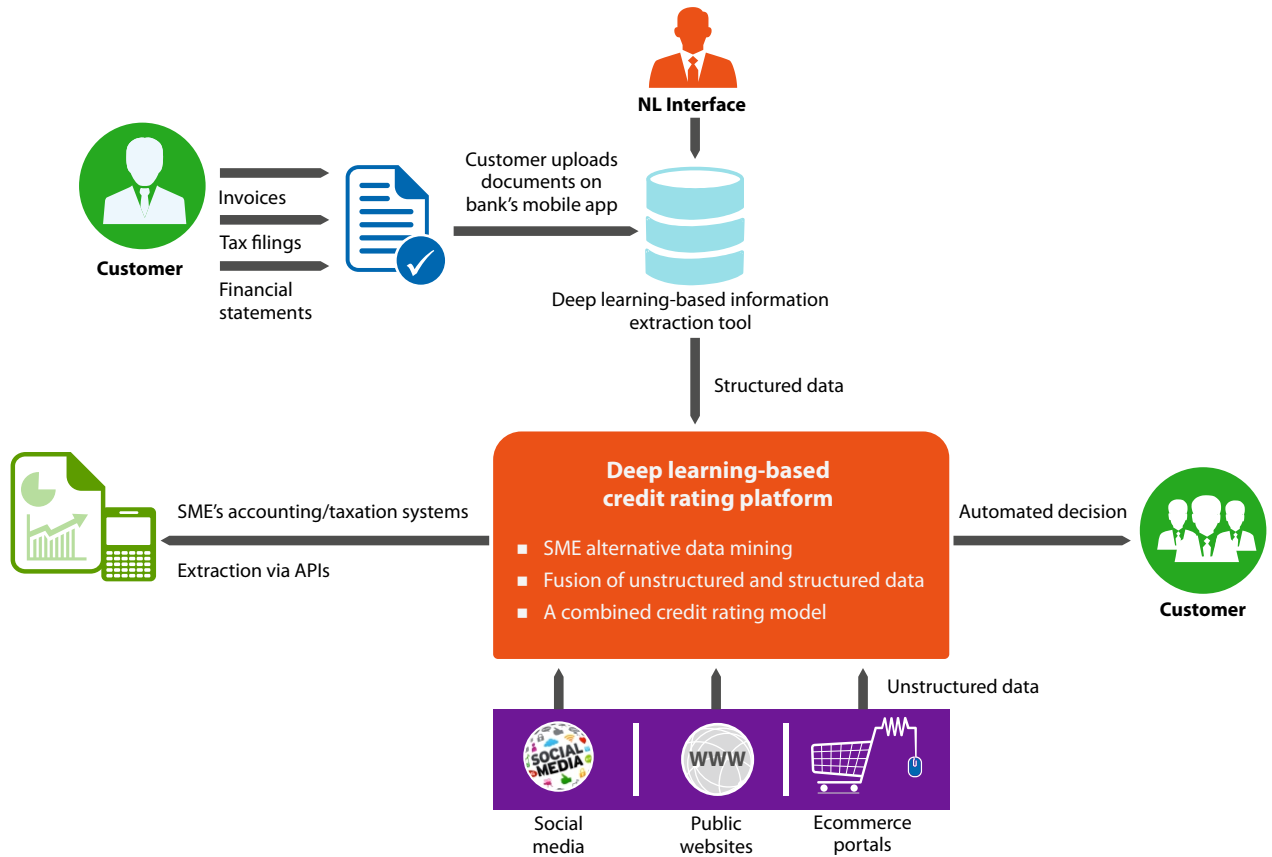
SME Onboarding with the Help of Deep Learning

Figure 1: Automating Client Onboarding

With deep learning, the client onboarding process would be a completely digital one. A credit rating platform based on deep learning could be used to analyze the customer's data and automate the decision-making process (see Figure 1). It would consist of the following steps:

1) A bank's SME client would be able to upload documents consisting of invoices, tax filings, financial statements, etc., on the bank's mobile app. Relevant information would be extracted from these documents using deep learning algorithms.

2) Using APIs wherever possible, the platform will be able to extract relevant information from the SME's external systems (which can be accounting platforms, taxations systems, etc.).

3) Using alternative, non-traditional data sources such as social media platforms, ecommerce portals, public websites, etc., the platform should be able to capture data, create a more comprehensive view of the SMEs' business and build a more transparent credit sourcing model around that

   a) This alternative data can be mined for credit decision-making purposes by scraping public websites and social media platforms

   b) The SME's website and social media pages can be analyzed and rated based on three parameters: (i) by the extent of engagement, which can be measured by the number of social media visits, likes and retweets; (ii) by analyzing sentiment-related measures such as customer/client feedback and rating, customer communications, company policy-related documents, product or service complaints, etc.; and (iii) by analyzing user characteristics such as demographics of visitors. Applicant demographic data and certain social media metrics can be used to build the scoring model.

   c) Deep learning models such as deep neural networks have successfully been deployed to understand context and to learn from large volumes of unstructured text data. These networks have gained tremendous popularity due to their ability to map complex relationships among large volumes of variables. Both structured and unstructured data can be fused in such cases. Similar deep learning architectures will be able to handle all types of data and derive key actionable insights with the help of the same.

A combined model that takes into account both traditional as well as non-traditional data sources for predicting the probability of default can be trained and developed. Models that are pre-trained on publicly available data, i.e., in this case on publicly available sources on SMEs and their default patterns, can be used as a starting point. The deep learning models can then be transferred to the client environment and contextualized based on the specific problem at hand. This can be done by training a few hidden layers on the client's data. As a result, the time to build the deep learning model would dramatically go down.

Bank Data Marketplace

As for the second part of the approach, banks can challenge lending marketplaces by creating an internal marketplace of their own and offering their existing SME clients a completely new set of customers to sell their products and services to (see Figure 2). This will provide an additional reason for businesses to choose banks over fintech lending marketplaces. This internal marketplace will essentially be a platform that will enable data exchange between two customer segments, thereby leading to product and service recommendations as well as insights.
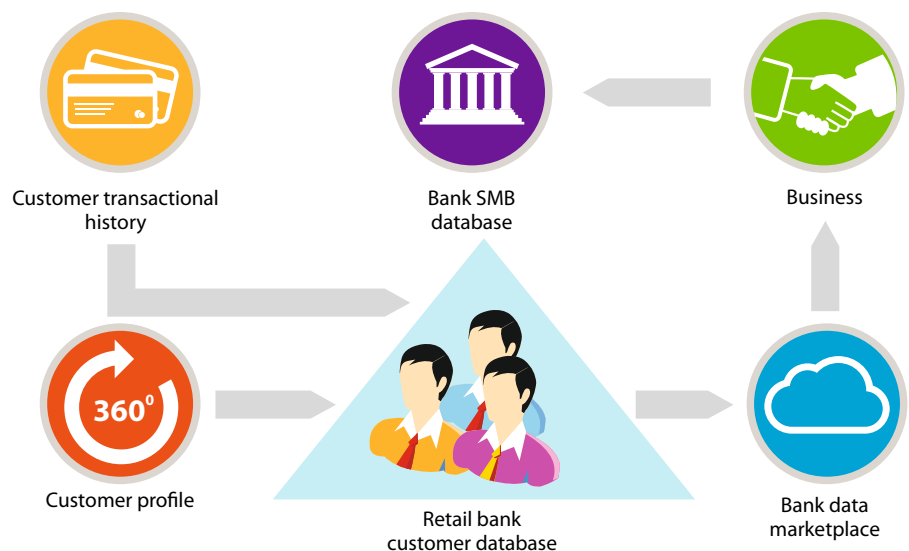

Figure 2: Bank Data Marketplace

The platform will be able to analyze the online and credit card transactions of retail customers and provide recommendations and suggestions by mining the past and current context of their activities. The recommendations based on the mining can be about something that they are currently looking for or the next best suggestion based on their past activities. The platform will use advanced deep learning-based predictive models of customer purchase behavior to generate real-time suggestions.

For example, if a bank's retail customer has used their credit card to buy a product, the platform would detect in real time the context of their current activities, along with details such as

demographics, seasonality, weather, etc. Then, relevant content in the form of the next-best product suggestion from one of its SME customers could be suggested. The bank's app could send a push notification in real time with a link to the SME's ecommerce page.

Conclusion

SMEs are considered as high-risk clients. Information about SMEs is also scarce. This makes it difficult for lenders to measure their creditworthiness. Due to these inherent characteristics, alternative data, along with traditional data sources, will help develop a more comprehensive view of the SME's business. Adopting deep learning will help banks adopt a Machine First™ approach and become agile in processing loan requests. It will also aid them in the decision-making process. A marketplace powered by deep learning will give banks an advantage over the lending start-ups. This is because they will be able to leverage the existing ecosystem to create a win-win situation for all stakeholders.

About The Author

Atul Banga

Atul Banga is an innovation evangelist in the Research and Innovation unit at Tata Consultancy Services (TCS). He supports leading organizations in the Banking and Financial Services and Insurance units in their innovation initiatives. Atul has a deep understanding of various new-age technologies such as analytics, machine learning and deep learning. He has around eight years of experience, and holds an MBA degree from the Delhi School of Economics, India.

Contact

Visit the Research and Innovation page on www.tcs.com

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