

The case for covenant monitoring in the realm of machine learning

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[Artificial intelligence](#), machine learning and related terms are buzzwords these days, and every fintech and technology developer in the financial world claims to have mastered the technology.

What is artificial intelligence and machine learning in simple terms?

Artificial intelligence is a science that helps machines or computers mimic the logic or intelligence of the human brain in areas such as learning, problem solving and pattern recognition. It has many subfields, one of which is [machine learning](#).

Machine learning is an algorithm, based on statistical models that help computers evolve gradually in a given task. The machine learns gradually over a period as it processes large amounts of data. The learning algorithm for machine learning could be classified as supervised, unsupervised or reinforcement learning. Machine learning has a number of uses in [commercial lending](#) - from complex decision making such as predicting consumer behaviour to evaluating text extraction from PDFs. However, for the purpose of this paper, we cover the use of machine learning and technology at large in covenant monitoring.

Covenant monitoring

Let's first look at some statistics. According to Cerebro Capital, over 38% of middle-market companies have violated a loan agreement and do not know about it. Of these, 23% violated incorrectly calculated financial covenants and 15% missed covenants. This is not all: in its whitepaper, business process management company new gen suggests that 85% of [leveraged loans](#) (USD450bn) were covenant-lite, i.e., the loans were not sufficiently covered or protected by covenants.

These are some of the challenges banks and financial institutions face because they still follow the traditional approach.

The traditional way of covenant monitoring is usually a back-of-the-envelope calculation to certify covenant compliance; a slightly more modern version would be using an Excel sheet, usually maintained by relationship managers or their support team.

This approach has three major shortcomings:

- In the case of reporting covenants, an Outlook reminder may not be sufficient. Outlook is usually cluttered with meetings and reminders, and a covenant due alert could be missed
- A back-of-the-envelope calculation cannot ensure that covenants are calculated correctly, and the figures may not tally with the financials reported by the company
- The Excel or other worksheets are usually decentralised, and banks would fail to identify early indicators relating to these covenants at the portfolio level and is not housed in a data lake

To overcome these challenges, banks are trying to automate the covenant-monitoring process, with analysts focusing on areas requiring judgment, while the technology focuses on capturing the covenant information. The key areas of automation in the covenant-monitoring process are as follows:

- Automated monitoring and validation of covenants
- Automated covenant extraction (the engine)
- Smart contracts
- Smart suggestions while assigning covenants

At [Acuity Knowledge Partners](#) (Acuity), we address this problem by utilizing the first two approaches.

We have created an interactive platform, Covenant Pulse, that helps a bank strengthen its credit risk governance not only by actively monitoring the covenants due for a borrower, but also by validating the financial covenant calculations from financial statements based on the definition of loan agreements. The platform avoids duplication of effort by reusing the spreads completed for risk-rating purposes. It also aggregates or centralises all data and presents it in the form of a dashboard to help bank management teams take informed decisions. It also generates an alert whenever a covenant is about to fall due, avoiding any misses.

The second approach is machine learning-based covenant extraction from loan agreements. After training the platform on the credit agreements of the banks, the tool will automatically extract covenant definitions from the credit agreements in a few clicks. The output could be integrated with [Covenant Pulse](#) to obtain a smart covenant-monitoring solution.

The machine learning algorithm can also be used to further classify the covenants as affirmative, negative or precedent. It can also differentiate between a financial covenant and a non-financial one.

Smart contracts use [block chain](#) to generate self-sustaining contracts. While banks will have better use for smart contracts and block chain in their [KYC](#) and [AML](#) processes, or loans types such as syndicated loans, mortgage loans or inventory finance, this would also have an impact on the overall covenant-monitoring process. In the future, smart contracts would help banks identify failed covenants and apply the charges as mentioned in the contracts.

Technology can also be used to help banks ensure they have optimal covenant levels for each borrower. The smart tool should be able to suggest optimal covenants and thresholds based on industry changes, bank guidelines and risks associated with the borrower.

What are the key challenges of applying machine learning?

The key challenges in applying machine learning in [Covenant Monitoring](#) process and [banking industry](#), at large, lie in [data accuracy and data variability](#). The financial world, especially banks, takes decisions that depend significantly on correct data. If a machine provides 60% accuracy, the relationship manager or analyst would still have to spend a considerable amount of time to make the data accurate. Hence, Acuity's managed services model perfectly blends [technology](#) and subject-matter experts to ensure 100% accuracy.

Another challenge lies in ensuring that the training data perfectly matches the overall portfolio of the bank. We propose a two-step solution to this. Step 1: we propose a white-boarding framework that would help us partner with a bank to understand the core problem area and then address it. Step 2: we propose starting with a two- to three-month proof-of-concept plan, where we evaluate the platform's accuracy in regard to the bank's portfolio.

We will be covering more use cases in our subsequent blogs.

About Acuity Knowledge Partners

Acuity Knowledge Partners is a leading provider of high-value research, analytics and business intelligence to the financial services sector. The company supports over 400+ financial institutions and consulting companies through a team of over 4,000+ subject matter experts who work as an extension of the clients' teams based out of various global delivery centres.

We empower our clients to drive revenues higher. We innovate using our proprietary technology and automation solutions. We enable our clients to transform their operating model and cost base.