

# Python & Machine Learning for the Financial Industry

## Actionable Insights that Fuel Business Growth and Profitability

Growing regulatory requirements, pressure to cut costs, and decreasing margins continue to be key market drivers for banks and other financial institutions. Digital transformation has helped address some of these issues in the past, but traditional solutions are faltering in the face of an ever-growing mountain of customer, market and industry data.

Static, manually managed, and quickly out-of-date Excel spreadsheets can no longer keep up. What's required is a new solution that can reflect emerging trends with interactive, up-to-date solutions that can work with big data.

As a result, banks and other financial institutions are increasingly investing in Machine Learning (ML) in order to deal with ever expanding volumes of data that traditional analytical methods can't deal with effectively. And ML is more and more viewed as the domain of the Python programming language.

### Why Python?

Python has recently overtaken R as the most commonly used solution for ML. Whereas R is still popular among statisticians and general data science applications, Python now incorporates the bulk of all ML libraries, including Google's TensorFlow, Facebook's PyTorch and Microsoft's Cognitive Toolkit. In fact, Python is where the majority of the free/libre and open-source software (FLOSS) community is focusing its efforts around advancing ML.

As a general rule of thumb, open source solutions provide organizations with the greatest agility and control over their ML initiatives, but require strong in-house skills. By comparison, commercial solutions allow less skilled organizations to get started right away, but may prove limiting if you're attempting to create white space from your competitors.

For financial institutions who may be focused on more traditional Java technology stack, Python provides a number of additional advantages, including:

#### • Versatility & Speed

Python is much quicker for building everything from simple scripts to large applications; from low-level systems operations to high-level analytics tasks.

#### • Cross-Platform Support

Python is available for all important operating systems, including the Windows, Linux, and macOS systems your teams prefer.

#### • End-to-End Use

For ML projects, Python is commonly used from prototyping to production, avoiding the traditional handoff between data scientists (using R) and programmers (using Java) that can delay time to market.

# Machine Learning in the Finance Industry

As recent studies show, the financial industry is increasingly investing in ML to solve key issues, including:

- **Profitability:** ML can help optimize the execution of trades via trade simulations and automation of transactions.

ML in insurance markets can better analyse the complex data that determines pricing and market insurance contracts in order to lower costs and improve profitability.

- **Risk:** ML can reduce the number of false positives associated with detecting instances of money laundering, financing of terrorism and fraud by replacing simple, rules-based pattern-matching with more sophisticated algorithmic approaches.

ML-based cybersecurity systems can analyze patterns and learn from them to help prevent similar attacks and respond to changing behavior.

- **Revenue:** Banks often have numerous clients with diverse needs, but fewer advisers to service them, resulting in reduced client coverage. ML-driven "recommendation engines" can provide clients with better, more personalized options faster than traditional methods.

ML-based sentiment analysis can determine consumer preference for specific companies and stocks in order to make better recommendations to clients.

- **Customer Support:** ML can help automate client interactions and customer support with chatbots, which lower costs while helping customers solve problems.

ML-based predictive banking provides customers with reminders to transfer money, automate recurring payments, or set up a travel plan for their account after they've purchased a plane ticket, etc

- **Compliance:** In the wake of the 2008 financial crisis, ML can help address the need for regulatory stress testing by calculating potential losses for a given default, as well as the probability of default models.

ML can interpret financial and legal documents, such as bank statements, tax statements, contracts, etc to help gain insights into a customer's financial health.

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