INTELLIGENT AUTOMATION IN FINANCIAL SERVICES

EXPLORING APPLICATIONS OF ROBOTIC PROCESS AUTOMATION, MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

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OVERVIEW

When it comes to driving transformative change for any business, it is nearly impossible to avoid discussion of robotic process automation (RPA), machine learning (ML) and artificial intelligence (AI). The financial services industry is certainly not immune to this trend. These technologies, often grouped together and used interchangeably, not only promise cost and process efficiencies but also provide an organization more in-depth business and operational insights from their ability to curate large volumes of data to generate unique perspectives. This paper aims to shed light on what these technologies mean, their applications in the financial services industry, and best practices to implement them successfully.

Before diving into RPA, ML and AI, it is necessary to understand the differences between them. It is also important to note that the goal of these technologies is not to replace humans but merely to recalibrate the focus of their labor to achieve better business outcomes. With adequate resourcing and subject matter expert (SME) support, organizations can consider their benefits and considerations objectively to determine what is best suited for their business need. In this paper, we will look at RPA as a foundational automation technology, then conceptualize how AI and ML can be layered on top to create actual 'intelligent' automation opportunities.

WHAT IS ROBOTIC PROCESS AUTOMATION (RPA)?

RPA is a technology that configures computer software, or a 'robot,' to perform routine tasks such as processing transactions, opening spreadsheets, triggering responses, or copying and pasting data. The technology's strength lies in its ability to continuously read a coded script that leverages a prescribed use of external applications to perform tasks more quickly, accurately, and tirelessly than humans. As a result, it can help achieve material cost savings, greater accuracy, and a reduced error rate while allowing human workers to spend more time on tasks that require reasoning, judgment, emotional intelligence and customer interaction. The fact that RPA can integrate with existing enterprise resource planning (ERP), customer relationship management (CRM) and office applications is an additional advantage, as it means lower upfront investment, and thus a faster ROI.

The diagram below depicts the type of scenarios best suited for RPA[1].

Labor Intensive

Processes that require a high number of FTE or resources are prime candidates for automation

Rules Driven

Clear business rules need to be coded for RPA to work successfully

High Volume

Processes that are performed frequently help build a stronger business case

Structured Data

Standardized and structured data is needed for RPA to initiate and complete processes

RPA USE CASE

To examine the applicability of RPA in the financial services industry, let's take the example of banks' AML programs and refer to the statistics listed below:

- US financial institutions (FIs) today are spending more than $8 billion annually in AML compliance — but seizing less than 0.2 percent of laundered money[2].
- The industry average of false positives (i.e., a test result which incorrectly indicates that a condition or attribute is present in AML alerts) is over 95 percent in the first phase of an AML compliance review[3].
- Depending on the complexity of the AML alert, standards of the bank, availability of information in the core systems, and experience level of the analyst, the entire investigation process - including resolving complex alerts, filing a suspicious activity report (SAR) ,and closing cases where an investigator deems the activity as unrelated to money laundering - can take anywhere from 20 minutes to several hours[4].
- Analysts end up spending the majority of their time (>75 percent) on data collection and efforts to resolve non-critical alerts. Such manual processes make it harder to keep up with ever-increasing regulations while increasing the risk of heavy regulatory penalties due to potential manual error.

The leading cause for false-positives is the failure of banks to monitor and accurately analyze vast amounts of data. Banks usually have transaction monitoring systems in silos, which makes cross-functional data integration and data aggregation activities less effective. This usually leads to lower quality data insights and system inability to find hidden connections through mining or computing big data.

1. https://irpaai.com/what-is-robotic-process-automation/
2. http://www.legalexecutiveinstitute.com/robots-aml-acams/
3. https://www.reuters.com/article/bc-finreg-laundering-detecting/anti-moneylaundering-controls-failing-to-detect-terrorists-cartels-and-sanctioned-states-idUSKCN1GP2NV
4. https://www.tigergraph.com/2018/06/27/anti-money-laundering-aml-non-compliance-is-injurious-to-your-business-health/

In this case, even if banks adopt a phased approach to RPA implementation, starting with automating only a few steps (robot-driven data collection, consolidation and formatting) rather than the entire process, they can potentially reap material benefits. For example, if banks automate the collection of data from multiple source systems and format it in predefined templates or reports, they can potentially reduce the investigation time by at least 15 to 20 minutes for each alert (approximately a 50 percent reduction in time)[5]. This can lower costs, while increasing the quality of data that could, in turn, reduce the number of false-positives and subsequently help shift employee focus from repetitive tasks to higher-value activities.

However, one must consider that software bots are rule followers and do not learn or improve over time. When rules conflict with reality or complex, real-time events, human intervention may still be required. When data is unstructured (i.e., variable/consequential sets of data exist) or when there is a drastic change in the number of data points, RPA is incapable of making dynamic adjustments[6]. For example, minor changes to any application interface, even as simple as the placement of text fields or hyperlinks within an application, could cause an RPA bot to break. Changes like these can result in significant delays in bot deployment, potentially cannibalizing the business case.

Based on these considerations, RPA serves as a valuable foundational technology. However, when it comes to handling variable data, firms should look to move towards more adaptive cognitive technologies like machine learning and artificial intelligence.

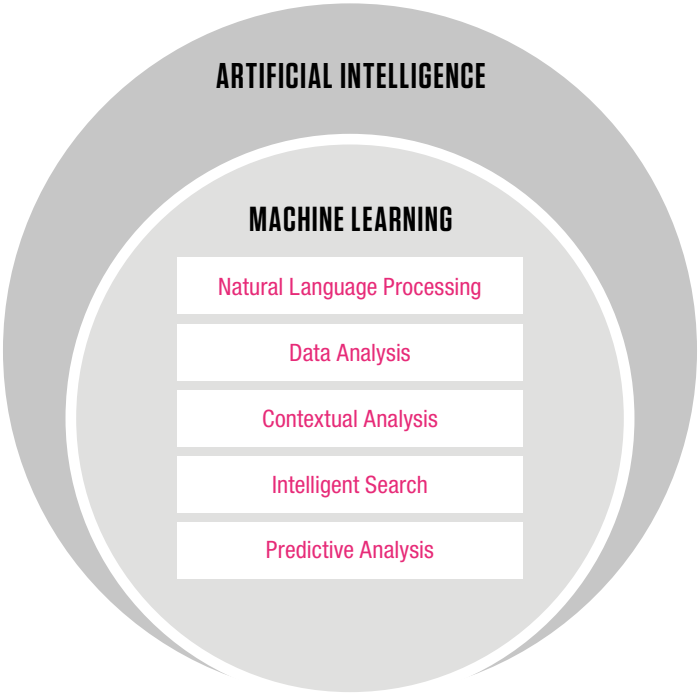
WHAT IS MACHINE LEARNING (ML) AND ARTIFICIAL INTELLIGENCE (AI)?

ML is an application of AI that provides the ability for systems to learn and improve from reliance on patterns and inferences rather than explicit programming. It focuses on the development of computer programs that can access data and use it to learn for themselves. Some examples include[7]:

- **Natural language and speech processing (NLP and SP):** Recognizing and understanding written and spoken language by identifying relationships between words and sentences
- **Contextual analysis:** Providing insights by understanding the context and relative importance of the data
- **Intelligent search:** Extracting data from unstructured or semi-structured documents
- **Predictive Analytics:** Data mining that analyzes current and historical facts to make predictions about future or otherwise unknown events

While machine learning is based on the idea that machines should be able to learn and adapt through experience, AI refers to a broader ambition to replicate the human cognitive abilities and execute tasks 'intelligently' through technology. It is related to the development of computer systems that can conduct complex reasoning and perform tasks that usually require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

5. https://www.kofax.com/-/media/Files/Infographics/EN/ig_top-5-reasons-you-need-RPA-for-KYC_en.pdf
6. https://www.juniperresearch.com/press/press-releases/robotic-process-automation-revenues-in-banking
7. https://www.forbes.com/sites/bernardmarr/2018/04/30/27-incredible-examples-of-ai-and-machine-learning-in-practice/#76cd29c75022



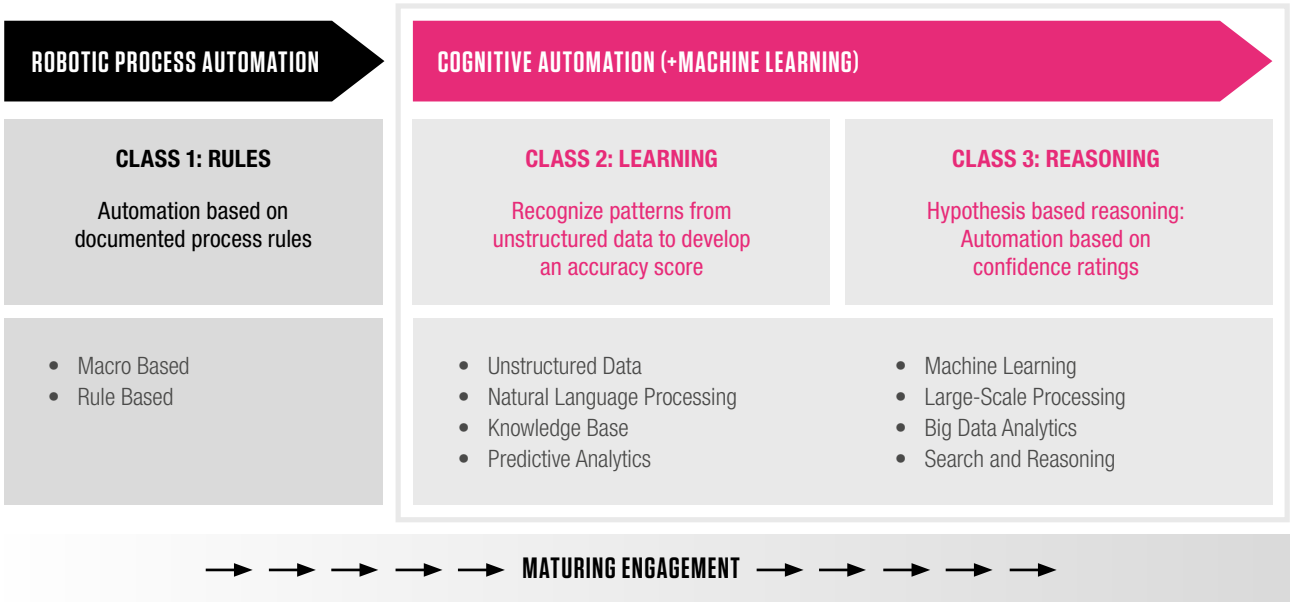
AI AND ML USE CASES

As noted in the RPA use case above, since 2008, FIs have been trying to address the increasingly challenging task of implementing controls to comply with regulatory requirements. They have invested heavily in compliance personnel to monitor activities and conduct qualitative assessments. Today, FIs spend nearly 4 percent of revenue on human and technology resources, and that figure is expected to reach over 10 percent by 2022[8]. While RPA is already being used to flag suspicious transactions and communications, compliance officers continue to spend a large amount of their time sifting through false-positive flags. However, even with automated processes, infractions continue to go unnoticed, resulting in billions of dollars in fines. Turning to AI in this scenario can help eliminate some of these gaps.

An example that demonstrates AIs potential involves a Tier-1 investment bank that used an ML tool to analyze commercial credit agreements and contracts. The bank was interested in reducing the amount of time (six to eight hours per loan) that it took for loan officers to assign a credit rating to a loan while manually reviewing hundred pages of documentation and credit contracts. Credit risk SMEs were interviewed, and they laid down the top 50 attributes that were taken into consideration while determining a commercial loan's credit rating. The attributes were then weighted based on perceived importance in determining a loan rating and fed into the ML tool. ML specialists worked on training the algorithm for three months by ingesting millions of pages of credit documentation, unstructured text and images using an optical character recognition (OCR) reader. Using the power of supervised reinforcement and machine learning, they helped raise confidence intervals for the tool from 50 to 95 percent. Within four months, the tool reached a stage where a preliminary rating for a loan could be generated with 90 percent accuracy in just a couple of minutes. Considering that the bank could only previously handle a volume of 500 loans per day, this investment helped increase that number to approximately 5,000 loans per day, while realizing a savings of $16 million in the first year of implementation.

8. https://blog.storagecraft.com/top-5-regulatory-compliance-challenges-financial-sector/

The ability of AI and ML to continuously learn and analyze information patterns helps manage variability in data. When combined with RPA, people refer to the resulting innovation as intelligent process automation (IPA). These two technologies can help basic and repetitive RPA processes scale in a way not previously possible, especially when dynamic adjustments to changing data are required. Many FIs have already started layering these technologies on top of existing RPA to support various functions, including fraud detection, customer service and business development.



ARE ENTERPRISES READY FOR THIS CHANGE?

The intelligent process automation market is projected to grow to $19.79 billion by 2026, increasing at a CAGR of 13.2 percent from $7.34B in 2018[9]. The potential growth of the IPA market is mainly due to the impending necessity of its services. With intelligent automation predicted to offer companies potential cost savings of approximately $5-7 trillion by 2025, FIs are being forced to take notice.

However, it is still debatable if the average enterprise is ready for the demands of IPA. In the highly regulated financial services sector, where large banks traditionally have aged legacy systems with unorganized data sources, the automation and implementation of end-to-end process improvement solutions can be a complicated task. When automation systems are implemented without proper governance or support teams to ensure quality, security and operating efficiency, or if systems

9. https://www.databridgemarketresearch.com/reports/global-intelligent-process-automation-market/

do not integrate well with the existing technology landscape, the technology can lose much of its value, as breakpoints and errors can be challenging to locate, analyze, and explain. Organizational culture can also be negatively affected if employees don't understand, accept or appreciate this technological transition.

To maximize the potential benefits of intelligent automation, FIs should first consider the quality and accuracy of data they hold within their organization. As any AI or ML application is only as good as the data used to train it, formal data governance processes are necessary to maximize the value of the initial automation tools deployed, while also enabling them to scale across the enterprise. Additionally, in order to increase capabilities for data sourcing, validation and quality management, organizations should consider investing in new data management software and storage systems to upgrade or replace existing ones. Finally, addressing these legacy data issues to unlock the full potential of intelligent automation also involves hiring the right people, such as those with data science backgrounds, while also upskilling existing employees with skills like the ones mentioned in the table below. Lastly, it is essential that FIs plan for and set up an automation center of excellence (CoE) to govern demand management, business case development, benefits tracking, bot performance monitoring and triage, and decommission management.

Through new and innovative approaches to learning and collaboration and by reinforcing a data-driven culture and mindset, FIs can lay the groundwork for successful intelligent process automation as a foundational element to the company's transformation and growth journey.

Tech Specialization	Potential Roles	Skills Required
Robotic Process Automation (RPA)	• Data Scientist/Technician • RPA Developer/Architect • System Engineer	• Specialized Education • Data Modeling & Reporting • System Engineer • Relational Database Development
Artificial Intelligence (AI)	• Software Analyst/Developer • Mechanical Engineer/Specialist • Computer Engineer/Scientist	• Specialized Education • Fluent in at least one programming language • System/Web Development Experience • Capable of solving problems with software & hardware
Machine Learning (ML)	• Data Analyst/Scientist • Core ML Engineer/Developer • Technical Algorithm Specialist	• Specialized Education • Fluent in at least one programming language • Probability & Statistical Expertise • Data Modeling & Evaluation • Software Engineering & System Design

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