Robotics vs Machine Learning vs Artificial Intelligence: Identifying the Right Tools for the Right Problems

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Abstract

Understanding the buzz about Artificial Intelligence is critical as it has attracted the attention of the senior finance community. The below body of work defines Machine Learning (ML), Robotic Process Automation (RPA) and Artificial Intelligence (AI), and the necessary knowhow of how it works. The article also addresses the capabilities of AI in helping the financial risk community address processes and tasks that impact their process flow.

Artificial Intelligence (AI) in everyday life

AI generates a wide spectrum of emotions. On one end, some view AI as capable of improving the quality of life, while on the other, it gets viewed as a threat to human livelihood and jobs. This article exemplifies how 'real' AI is built with a focus to automate only manual and clerical tasks, and to assist humans in making complex decisions rather than replacing them altogether.

While AI has recently been hyped, it has been deeply rooted in our daily lives for a long time now. Here are some examples.

Examples of AI in everyday life

Amazon – targeted product suggestions using past search: Has it ever happened that after spending the last 30 minutes unsuccessfully searching for those running shoes on Amazon.com, you end up seeing ads for active wear and fitness bands? If yes, then it's more than just coincidence - it's AI.

The "Your Recommendations" link on Amazon.com directs users to products recommended just for them. Amazon recommends a range of products based on parameters such as categories the user has been browsing, items viewed, demographic data and interests – with the aim of displaying products that users are more likely to buy. 35% of what consumers purchase on Amazon comes from product recommendations. As of 2018, Amazon.com is the world's most valuable brand. *(Source: "Amazon.com Recommendations, Item-to-Item Collaborative Filtering" by Greg Linden, Brent Smith, and Jeremy York, Amazon.com)*

Tesla – self-driving cars: Imagine the year 2020. You enter your car at 7:30 am on a Monday morning. A voice asks you to fasten your seatbelt and sets off for your workplace along the fastest route. Don't worry, you're not being kidnapped. The voice is a digital assistant and the car is an AI-enabled self-driven Tesla.

What used to be science fiction is being brought to life by Elon Musk and his engineers in the form of Tesla's line of self-driving vehicles. The self-driving capacity of Tesla cars has a safety level substantially greater than that of a human driver. And if you are not part of the Elon Musk fan club, then there's Google and Apple who are working on their own autonomous car initiatives as well. And if you are still against this entire concept, then you could just wait until you're not at the driving wheel anymore – or until there is no driving wheel.

The goal of AI - improving the quality of life

All business processes rely on human activity – primarily for abstract and complex decision-making, but also for a lot of repetitive, low-skill, clerical tasks – such as matching transactions or clearing invoices. Nonetheless, with growing business complexity, it is nearly impossible for analysts to account for all the various dimensions and patterns that influence process outcomes, and hence decision-making is often based on individual judgment and experience.

AI is already solving this problem for dozens of industries including healthcare, media and insurance. AI could tap into company data and historical outcomes to either completely automate the decision or to support an analyst with insight for decision-making to drive better outcomes.

The ultimate goal of AI is to improve the quality of human life. Its purpose is not to replace humans, but to focus humans on more critical problems, while it takes care of the low-value transactions. With AI, analysts could focus on high-quality tasks which create bottom-line impact.

Clearing the air around AI

Too many words, too much confusion

With buzzwords such as AI, ML and RPA floating around, it's difficult to grasp their true meaning and how they are distinct from one another. The following definitions aim to clear the air around these technologies and their capabilities.

What is AI – the parent scientific discipline

"Artificial Intelligence is the science of making machines do things that would require intelligence if done by men." Marvin Minsky

AI is the ability of computer systems to learn, reason, think and perform tasks requiring complex decision-making.

AI is capable of:

- performing complex tasks that need judgment by analyzing humans
- evolving with experience and looking for better ways to execute
- handling newer inputs based on experience.

AI is used as a parent term. It is the net application of multiple processes, two of which are RPA and ML.

What is RPA - rules-based automation

Robot Processing Automation, or RPA, is the use of software 'robots' mimicking human actions to perform a well-defined business process.

RPA is best suited for performing tasks which are repetitive in nature and executed by following a fixed set of rules. However, RPA is based on strict compliance of orders and highly structured input – hence, eliminating any scope of learning.

What is ML - decision making?

Machine Learning, or ML, is an application of AI, capable of identifying patterns from a large set of data with the help of algorithms. It is self-learning in nature and becomes 'smarter' over time.

It could be deployed to predict future outcomes and identify trends.

How to choose: RPA or ML?

Businesses need the following results from any technology or solution:

1. Automation of repetitive tasks
2. Assistance for decision making
3. Automation of decision making

Examples of the above three are highlighted below:

Repetitive task automation: With the help of algorithms, AI could access different website portals, login to their accounts, download remittance information, irrespective of format and type, and capture it in the system. It could do this accurately without any human intervention.

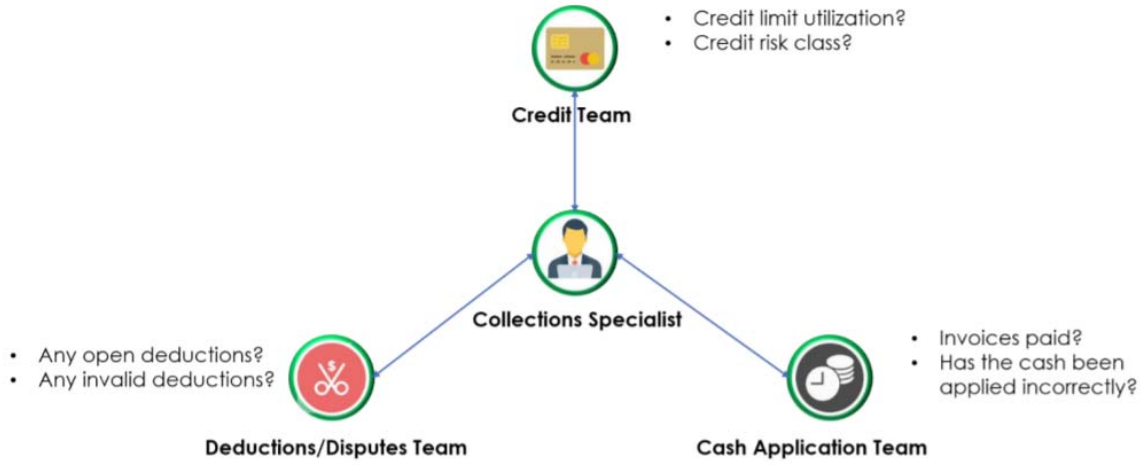

Figure 1: Prioritizing Accounts for Collections

Assisted decision-making: Prioritizing accounts for collections requires input from various A/R departments and data sources such as Credit, Deductions and Cash Application. AI could pull in data seamlessly from various sources at regular intervals and use it to dynamically prioritize accounts. Based on the aging and prioritization details, AI could also automate strategic dunning for accounts such as reminder emails, past-due notices and calls.

Autonomous decision-making: Automating trivial activities provides analysts more time to focus on high-risk tasks. Executing credit reviews for low-risk accounts could be delegated to AI. An AI-based system could consider all the factors usually considered by a human analyst in estimating the credit limit. Such an autonomous system could be used for auto-approving credit limits and coordinating approvals for low-priority accounts while analysts focus on credit decisions for high-value, key accounts.

The final verdict

For most technology service providers, RPA serves as the means of generating revenue by automating very specific business processes for their clients. However, this also means that the clients pay for the technology – essential for each and every robot – and not necessarily for the end results that these robots drive. What's more? Since RPA requires constant training, this equates to regular spends on upgrading the robots to match changing business requirements. On the other hand, solutions which leverage ML are based on 'learning.' This allows the solution to adapt to changing business requirements without the continuous investment or training effort.

If your business is looking to solve a very specific problem, a general RPA solution might offer temporary respite – but it could end up delivering negative ROI in the long run. However, a domain-specific, AI-based solution will ensure that your automated processes stand the test of time.

Credit and A/R jobs: Today and tomorrow with AI

Analysts

A/R analysts are expected to carry out analysis for potentially creating bottom line impact. But in the current scheme of things, analysts spend the majority of their time in low-value work, including:

- collecting remittances and claim documentation from emails, web portals, mail
- scanning and keying data into a master spreadsheet
- pulling customer credit details from public financials
- setting up prioritization worklists for dunning

All these tasks are resource-intensive and do not create significant value.

AI is already automating a lot of these low-value activities and enabling analysts to focus on high-value tasks such as researching invalid deductions, controlling credit risk, reducing critically delinquent accounts - versus just chasing transactions and spreadsheets.

Process owners

Today, process owners are primarily focused on ensuring that their teams are operating at maximum productivity. They keep close tabs on the performance of individual analysts, monitor target-vs-achieved metrics and constantly reallocate time-sensitive work in the event of resource shortages or absence.

In the future, with 90% of the A/R activities running on auto-pilot, analyst productivity will no longer be a concern for process owners. AI could enable them to closely analyze processes, identify signs of distress and administer course correction and long-term improvement.

Management

For any medium to large sized business, the credit and A/R management, including the VPs, review top-down metrics and numbers from multiple sources. When they identify issues, they chase process owners for root-cause identification. But this exercise is bottle-necked as process owners often do not have the bandwidth to drill down, identify the issue and take instant corrective actions. Management is not able to do this on their own because of their inability to access process level data.

AI provides finance executives with end-to-end process visibility, driven by real-time data across sources. This advanced reporting capability enables a consolidated overview of the statistics and simplifies decision-making by stakeholders. AI positions management to drive next-level process transformation versus policing metrics and process owners.

Applications of AI in A/R

Categorization of tasks

The combined value proposition of AI could be categorized as:

1. The automation of repetitive tasks: Automating manual rules-based tasks with algorithms.
2. Assisted decision-making, autonomous decision-making and continuous improvement: Aiding analysts to make accurate decisions by analyzing and summarizing large volume data points.

Repetitive task automation

Eliminating repetitive exceptions in cash posting: More than 80% of the cash posting exceptions resolved by analysts are repetitive in nature. This is a result of customers repeatedly sending remittance information with the same inconsistencies or errors. An AI-based solution can easily learn patterns in which analysts manually handle these exceptions and auto-resolve such exceptions without requiring analyst input for a similar exception in the future.

Assisted decision-making, autonomous decision-making and continuous improvement

Blocked order prediction: AI can be used to predict the likelihood of orders being blocked by monitoring the credit limit and past purchase patterns of the customer. On detecting the probability of a blocked order, an automated workflow can be triggered to notify customers via

email, provide convenient payment options over a web portal and reconcile the payments with corresponding open invoices, and finally to suggest an immediate update of credit limits orders before the order is blocked, thereby eliminating any impact on sales (see Figures 2 and 3).

This workflow could be explained with the following visualization.

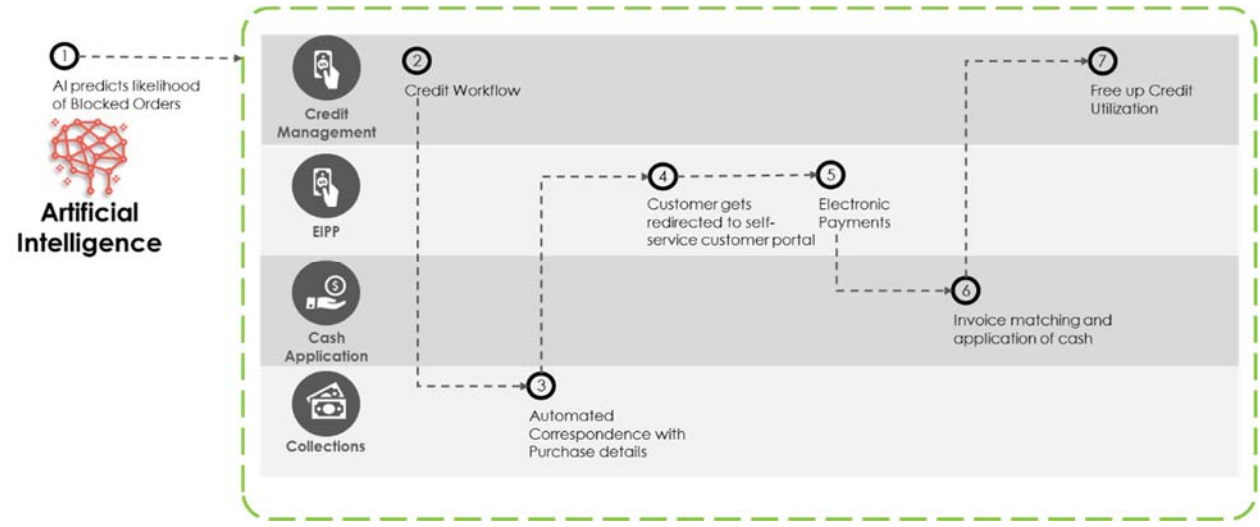

Figure 2: Automated Workflow for Blocked Order Resolution

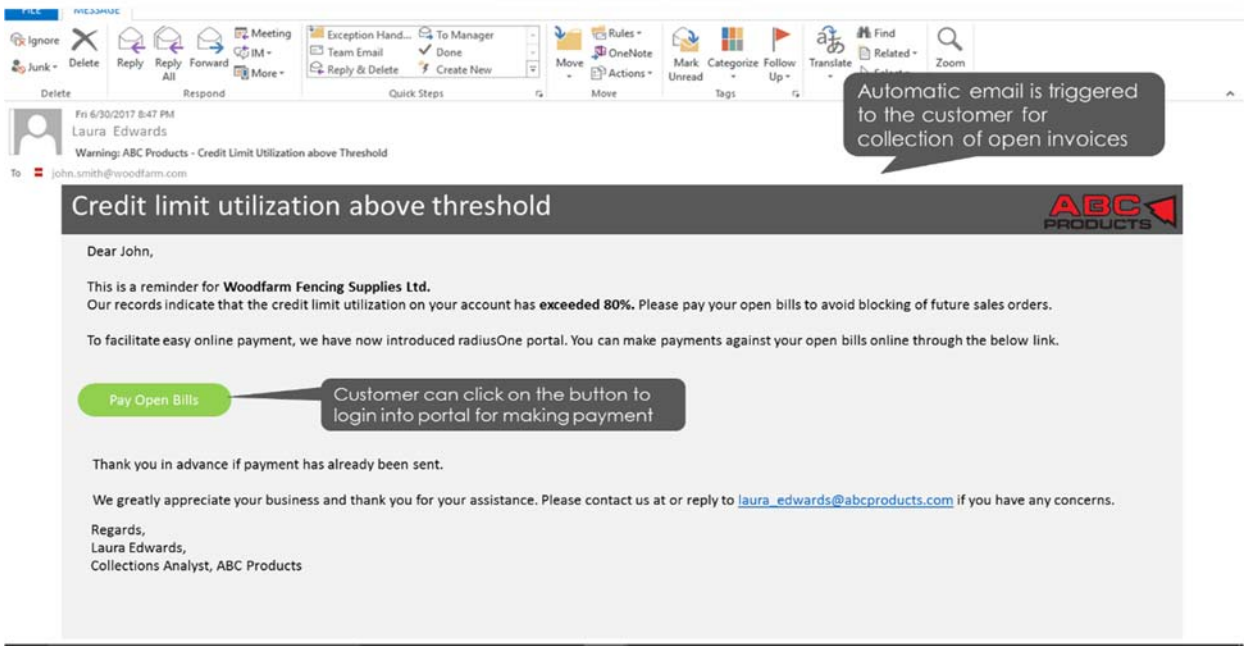

Figure 3: Automated E-mail Campaign for Blocked Order Resolution

Collections payment date prediction

The traditional collections management paradigm relies heavily on the skill, experience and speed of individual collectors, and typically kicks into action only after a customer has gone past-due. The collection rules and prioritization are based on static customer segments which do not change with time.

AI helps Collections Management become proactive by predicting payment dates at a customer or account level. The payment date can be predicted based on past payment behavior of the customer, current open invoices, and using ML algorithms. This could enable collectors to act before invoices and customers go delinquent, thus enabling a minimum impact of 10-15% improvement on DSO and a positive impact on working capital. It also improves collector efficiency by letting them focus on difficult customers rather than low-risk ones.

Dispute validity prediction

60% of deductions go in favor of the customer. This means that analysts research 100% of the deductions to identify 40% invalid deductions. By studying the past resolution patterns, current deduction characteristics and applying ML algorithms, AI is able to predict which deductions are actually invalid.

The prediction of deduction validity can significantly save the time lost in researching valid deductions, while re-focusing it on researching high-probability invalid deductions. This would also result in more time available to recover disputed dollars and add them back to the bottom line.

Choosing the right technology

Technology adoption is based on the value it creates

As highlighted in the above paragraphs, both RPA and ML are necessary to reap the full benefits of AI. In order to have an idea about the value that could be leveraged from technology, it is important to drill down and prioritize processes for automation, which are either labor-intensive or error-prone.

Defining ROI from technology

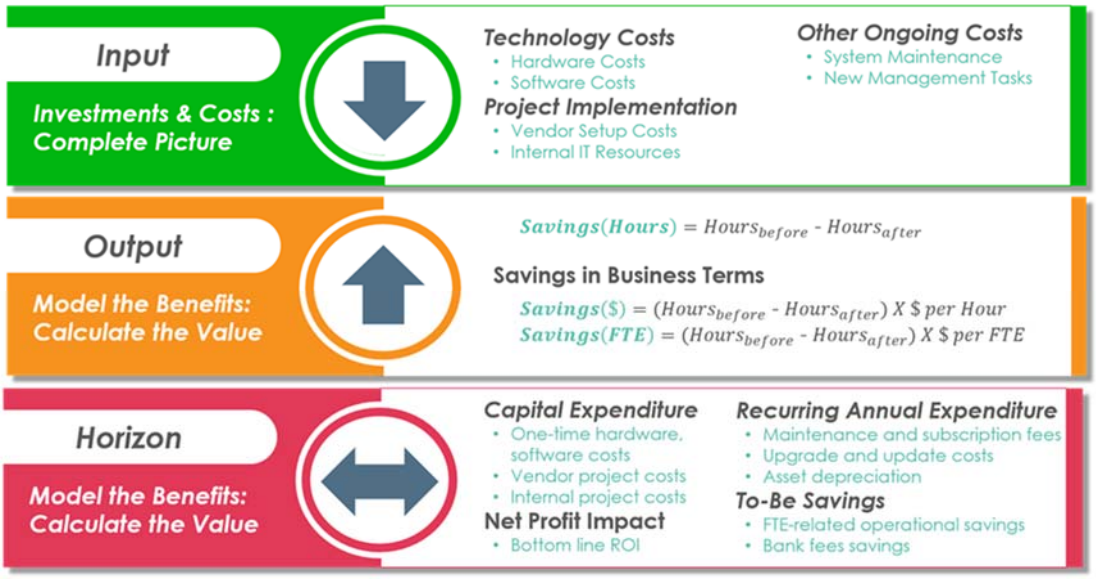

Figure 4: ROI Evaluation

ROI evaluation from technology requires the step-by-step explanation of the costs involved and the value that it will generate within a certain timeframe.

The cost saving opportunities provided by technology make up for initial costs of the technology.

The Hackett Group's researchers concluded that every seven-day reduction in cash conversion yields a 1.2% improvement in gross margin. That is roughly equal to a 20% increase in profit. *(Source: "2017 US Working Capital Survey" by The Hackett Group)*

Soft saving opportunities like DSO, DDO and net cash flow improvements using WACC (weighted average cost of capital) for cash brought in earlier could directly add to the bottom line.

Assuming a reduction of seven days in DSO for a company having $2 Billion revenue and a WACC of 4% could generate savings of a whopping $1.5 Million!

$$Savings\ due\ to\ better\ DSO = \frac{Change\ in\ DSO\ (no.of\ days)}{365} \times Revenue\ \times\ WACC$$

$$= \frac{7}{365} \times \$\ 2{,}000{,}000{,}000\ \times\ 4\%$$

$$= \$\ 1.5\ Million$$

Additionally, FTE savings act as capacity creation for organization's growth.

Summary

The buzz about AI has definitely attracted the attention of finance leaders. But instead of blindly taking a jump on the bandwagon of implementing AI, it is necessary to have a knowhow of how it works. This involves evaluating the AS-IS process of the current system and identifying the areas that can be automated with technology. The capabilities of AI and ML in helping credit practitioners make better decisions also needs to be taken into consideration.

Before implementation, it is imperative to choose the right solution by evaluating different technologies and calculating the ROI. A move in this direction needs to make both process and economic sense.

Once implemented, focus must be given to change management for a seamless transition.

Taking these measures will allow professionals to properly harness the potential benefits of today's technology.

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