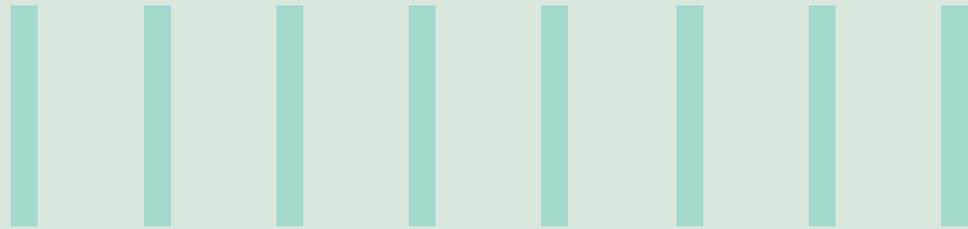




ARTIFICIAL INTELLIGENCE AND ROBOTICS PROCESS AUTOMATION IN CARDS

#IncentiveAutomation; #PrescriptiveAnalytics;
#AutomotiveBlockchain; #Mobility





Introduction

Artificial Intelligence (AI) and RPA (Robotics Process Automation) is the buzz word in all industries today. You cannot get through a day in the today's tech world without hearing these terms. Financial services have also taken towards it in a slow, nevertheless steady fashion.

Father of **Artificial Intelligence**, John McCarthy, defines it as "The science and engineering of making intelligent machines, especially intelligent computer programs". AI is used to define all systems that can handle tasks performed in general by humans which require skills like voice recognition, perception of vision, touch, speech, problem solving, learning etc. This is usually used together with Machine Learning (ML) where the machines are not programmed to perform a specific mundane task, but programmed to learn from experience and build the learning into the system for handling similar tasks in future. AI systems provide best results used on larger samples and they are capable of analyzing huge amounts of data and are usually used along with big data technologies. Though AI concepts have been in existence for quite some time now, they have gathered momentum and practicality only after the advent of big data technologies as AI technologies are considered only as good as the data and the data processing technologies it runs on.

Robotics Process Automation (RPA) aka digital labor is really a step before AI, where the systems or (Ro)bots as they are usually, called perform repetitive rule based tasks without any intelligence (or continuous learning) as in AI. It is usually simpler than AI and can serve most common automation requirements.

For instance, a call center decision automation can be handled by RPA bots, which can use decision trees to answer simpler queries and pass on the complicated queries to operators. AI may be required when the call center wants the system to learn from daily queries and build the handling capacity within the system for future calls.

RPA and AI used appropriately reduces cost, minimizes human error, increases speed and elevates customer experience.

Artificial Intelligence and Robotics Process Information in Finance

AI and RPA are not just sci-fi words, but becoming a reality and an integral way forward in most industries. Financial services industry is usually known to take a cautious approach to any change, as the industry is governed by tight regulations and compliance is a top priority. But as working smarter than working harder is getting more important, firms have to adopt automations into the core of their operations to stay in competition. The very same issue of the industry being regulated, offers scope for RPA since the various compliance that are mandated can be achieved better using RPA. Off late banks that have waded into AI/RPA and are reaping the benefits.

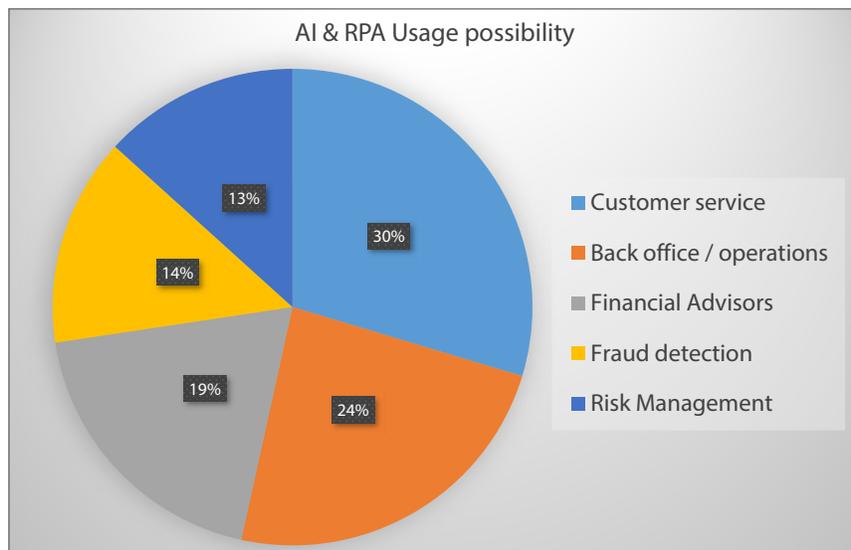
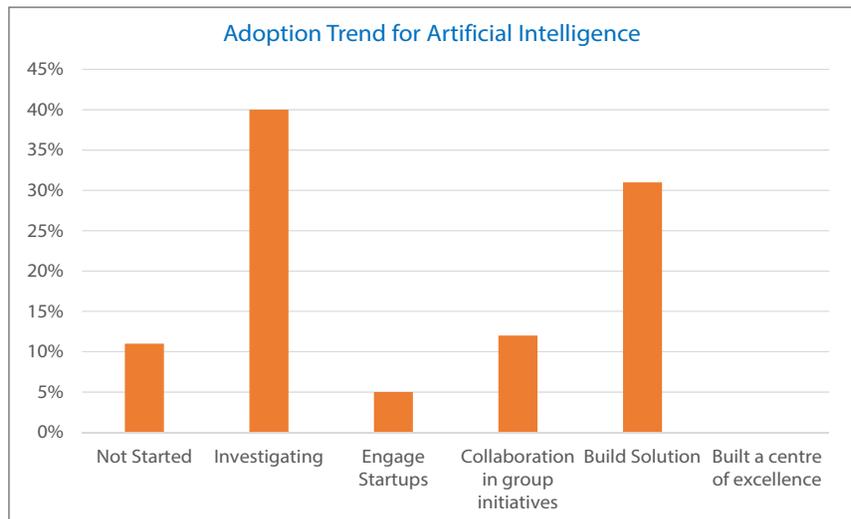
Some typical examples are:

- Humanoids like Nao (Bank of Tokyo), Pepper (Mizuho Bank) which greet customers and assist them on their requests
- Chatbots like Erica (Bank of America), Eno (Capital One), COIN (JP Morgan) that provide instant responses to some frequently asked questions or progress legal queries or contracts quicker
- Robotics Process Automation systems which provide end to end service for Customer Service operations, account opening, fraud detection, finance management etc.
- Most Fin Tech service providers are offering AI and RPA products, for banks

to buy and use off the shelf, with little customization. An example is Infosys Automation for Artificial Intelligence (Nia) and Robotics Process Automations (AssistEdge) which offers various AI/ RPA products

- AMEX offers an application to provide customized restaurant recommendations for customers which uses AI over huge number of transactions to train the model

The following charts depict the adoption trend of AI technologies in Financial services and the areas where banks feel automations can be used. This clearly shows that these technologies are being investigated and embraced slowly in the financial sector.



The data is based on a survey conducted by Delloite and Efm (April 2017)

Artificial Intelligence in Cards

Following are some case studies of AI usage in the financial service industry; cards domain in particular.

I. Credit scoring

Credit scoring is an important exercise for the credit card business, as this determines the risk that the issuer undertakes when issuing a line of credit. The card product and the upper limit of credit that can be offered to a customer is decided based on the credit score. This forms a basis to the profit or loss of a product. Banks usually rely on third party data providers like Experian, Equifax, FICO to get credit scores as it is a specialized function and requires storage and analysis of huge data.

Let's look at some common problems associated with Credit Scoring which can be solved via AI:

- Unavailability of sufficient data for credit scoring; Based on a survey conducted by ID Analytics, nearly 20% of US customers do not have enough data to generate a credit score. This problem is getting bigger with millennials entering the credit card market as buyers and form a major chunk of the customer base. Credit scoring bureaus simply do not return a score for this group. This problem can be handled by AI, where a set of simple rules can be coined based on age, gender, income etc. to decide a risk score. Any number of rules can be created which can be difficult to track via human skills without automation
- The traditional score methods are based on hard and fast rules which lacks in capturing the activities of certain individual entities or provide optimum ways to segment scoring models. Segmentation is required because different type of card products and different customers require different scoring models. FICO is now using AI techniques like collaborative profiles to perform the segmentation based on similarity rather than hard rules. This will capture subtle patterns into the risk score
- Another use of AI is to train bots using machine learning techniques over

existing data. These robots can take over the credit scoring functions. One such product is GiniMachine which offers a bot that can predict credit behavior based on existing customer data.

II. Customer Acquisition

Sales is one sector which is heavily person dependent and the success of any product depends on the skills of the marketing team. AI has now advanced into this field; systems are built either to assist a sales person make the right sale (as in the case of Rainbird Technology used by MasterCard) or provide an end to end system where the customer can choose and purchase a product without staff assistance (as with the comparison site - Masii)

- Rainbird & MasterCard: MasterCard has entered into an engagement with Rainbird technology to use an Artificial Intelligence System in its sales team. The system will use Machine Learning to capture subject matter expertise available with a few individuals in the sales team of MasterCard. This can later be used by the entire sales team who can look up the system, when they speak to clients to determine the best credit card product that will suit their needs. The technology acts a look up for sales staff and the system will get better as more people use it via self-learning
- Massi: This is a comparison site where customers can choose between various insurance providers or credit cards and make a purchase on the site directly rather than contact agents or sellers. The site designed by a Thai based startup that uses AI as base to provide the right filters and options for customers to narrow down their search and find the right product
- Machine Learning is also used for targeted advertising to identify the right products and campaigns. American Express uses this to its advantage and data says that up to 40% of customer acquisition for AMEX is via online platforms



III. Fraud Management and False denials

According to data collected by Coalition Against Insurance Fraud (CAIF), fraud costs the Card industry dearly. Nearly 2.4 billion dollars is lost every year by US credit and debit Card issuers. The existing fraud protection systems works based on certain typical rules which are usually based on geography, the size of the transactions which will not work in today's world. Various players are coming up with customized data driven solutions for fraud management which are detailed below:

VISA

VISA Advanced Authorization, the analytical system used by VISA to authorize its transactions is built over AI, ML and Data analytics concepts. There are around 150 million transactions processed by per day over VISA and it becomes important to identify fraudulent transaction while approving valid transactions that happen less frequently.

- When a transaction happens on a VISA card, information about the transaction is collected and sent to the Authorization System which uses models created to analyze the information on the transaction in question, over past data
- The system uses up to 500 attributes to find possibilities of fraud. Some of the attributes used are location of the transaction (is it from a store that the customer regularly shops?), the value of the transaction (is this transaction in line with the customer spending pattern), etc.
- Based on this a risk score is assigned to the transaction which is shared with the issuing bank which decided how best to use this score
- It's authorization system is so robust that it can handle 32,500 transactions analysis per second and about 6 billion per day
- VISA has also recently started using mobile location confirmation to decide the authenticity of transactions. This tracks the location of the mobile number and links it to the transaction location. This helps especially in one off valid transactions that happen in a different

location (from the usual location). For instance, if a customer in San Francisco performs a transaction in London and the location of the customers mobile is also London, then the risk score is reduced since the geo location the mobile phones emit is one of the best indicators of the customer's location. The data is not just used to authorize a particular transaction, but is used by the system to make itself smarter using self-improving algorithms

MASTERCARD

Fraud prevention though an important aspect has a downside when it leads to too much of false declines. These are scenarios when a valid customer's transaction under credit limits gets rejected. This is seen as a greater risk than fraud. The amount of false declines are 3 times the actual number of fraudulent transactions. False denials are a loss to both the credit card issuer and the merchant, as customer is not likely to return and is definitely not going to be satisfied with the credit card issuer. MasterCard has developed a comprehensive system for Fraud detection and approvals called Decision Intelligence. One of the major focus of this systems is to reduce the number of false denials.

- As detailed previously, traditional fraud detection systems use hard and fast rules and a limited set of parameters. Decision Intelligence uses machine learning algorithms over huge historic spend data to arrive at a score for each transaction specific to the customer rather than using generic rules.
- The Decision Intelligence system's algorithm are self-evolving.
- MasterCard has gone one step further to combine behavior analysis and biometrics to prevent identity theft and fraudulent transactions. NuDetect is a solution offered by MasterCard that uses a four factor model to identify imposters:
 - Captures Enhanced Device ID for capturing the location
 - Captures various behavioral attributes like typing style, angle at which the device is held, pressure, navigation patterns etc. to identify the customer

- Continually verify and update the behavioral attributes
- Use aggregated behavioral data (from other users and service providers) to be used in tandem with personal behavioral pattern for fraud detection

Since Artificial Intelligence, Big Data and Machine learning go hand in hand, implementing these is no cheap affair which may pose a problem to smaller players. But off late, a lot of products have been launched that leverage this opportunity and offers a solution to small players who cannot afford such a set up on their own.

FICO is an industry leader as an analytics solutions provider which helps various organizations make better decision using predictive analytics and AI. Falcon is a fraud management solution offered by FICO which can be implemented on site or can be an off the shelf product consumed from cloud. Players can choose the appropriate solution based on their size, requirement and budgets. Falcon reduces fraud and thereby protecting the clients from reputational damage and financial loss. It also reduces false positives (denials) to maintain customer experience. Key features of Falcon are:

- Uses self-learning algorithms which not only learn from transactional data, but also include new fraud patterns prevalent in the market
- Provides options for clients to customize the rules engine
- Individualized scores by leveraging Big Data to extract patterns from millions of transactions
- Analyses billions of transactional data from issuers to continually build and update its fraud patterns
- Its Identity Resolution Engine uses social media data for improved risk scores

IBM is also offering a tool that creates models based on historic transaction data for each card via machine learning. This model is then used to perform a predictive analysis for each new transaction and assign a fraud score for it, based on which it can be flagged appropriately. The system

learns with every transaction to better the model, apart from the frequent updates to include new fraud patterns detected in the market.

IBM also offers a tool called [IBM Watson](#) in collaboration with MasterCard to offer data analytics solution, that can be leveraged by small and medium businesses. This will be provided to merchants as a part of their MasterCard acceptance package and will give them access to aggregated data on revenue sections, market share and buyer data. This will also be used by MasterCard to collate customer behavior trend.

[CyberSource](#), an ecommerce payment management company provides payment gateway and fraud management services for merchants. It offers various fraud management products that are built over

a database of 68 billion transactions that CyberSource processes annually, via a tie-up with VISA.

- One of its products, Internet Fraud Screen (IFS) developed in collaboration with VISA to leverage its huge database is used by merchants to prevent online frauds. IFS uses AI and neural networks (on VISA's database) to predict customer behaviors and flag fraudulent transactions while reducing the number of false denial at the same time.
- A common issue with machine learning is that, it is usually a black box and generally one cannot explain the result or output. One way to combat this is to use Machine Learning with traditional rules based approach. CyberSource uses Real Time Fusion approach to combine self-learning

AI techniques and traditional rule base static models in its fraud management solution. It uses several ML techniques instead of just one including regression analysis, Neural networks and decision trees to increase the effectiveness of prediction. This is because no one model will work in all situations and right model should be used on the right set of data (more the data better the results). The fraud management system also offers an UI where the business user can set up rules and also monitor rules that were triggered to arrive at a decision hence offering more transparency. This is a key differentiator CyberSource offers as against its competitors

Robotics Process Automation for Cards

Following are some case studies of RPA usage in the financial service industry; cards domain in particular.

I. Account Opening

Not all account opening processed are completely digitalized. Some accounts are still opened in a manual mode where a customer walks into a branch and fills up paper forms or contacts an agent. The manual process of document verification and application processing is mundane and rule based.

- Axis bank recently embraced RPA in its account opening process where they used RPA to verify the supporting documents. The solution uses optical character recognition (OCR) to read the data from the supporting documents (age proof, address proof etc.) and map it with the entry on the application form to validate it based on predefined rules
- OCR is also used by various RPA products to make the entire account opening process digital. It does so by allowing customers to fill forms online, attach documents. These documents are scanned using OCR to obtain

relevant data which is then used to identify the credit worthiness of the individual before the account is opened. Synchro is one such digital solution provider which offers end to end account opening via RPA

- Synchro also uses OCR to perform KYC which is a part of the on boarding process, by scanning various documented for the relevant fields and updating the bank's other internal systems

II. Back Office

RPA can be used to handle laborious processes in the back office which are usually mundane, and error prone. Some examples are ledger management, order management, collection and invoicing.

- Swiss Post offers a RPA solution to one of its clients to handle the list of accounts whose collection status is past overdue. What used to be manual process following laborious rules to debit the amount past due from the account was automated. The system automatically screens various customer

accounts, collect past dues status and other required details from various systems to processes the collections cases quickly and efficiently based on pre-defined rules. The RPA system also has the capability to block the card or forward the case to an employee for manual action

III. Call Centre

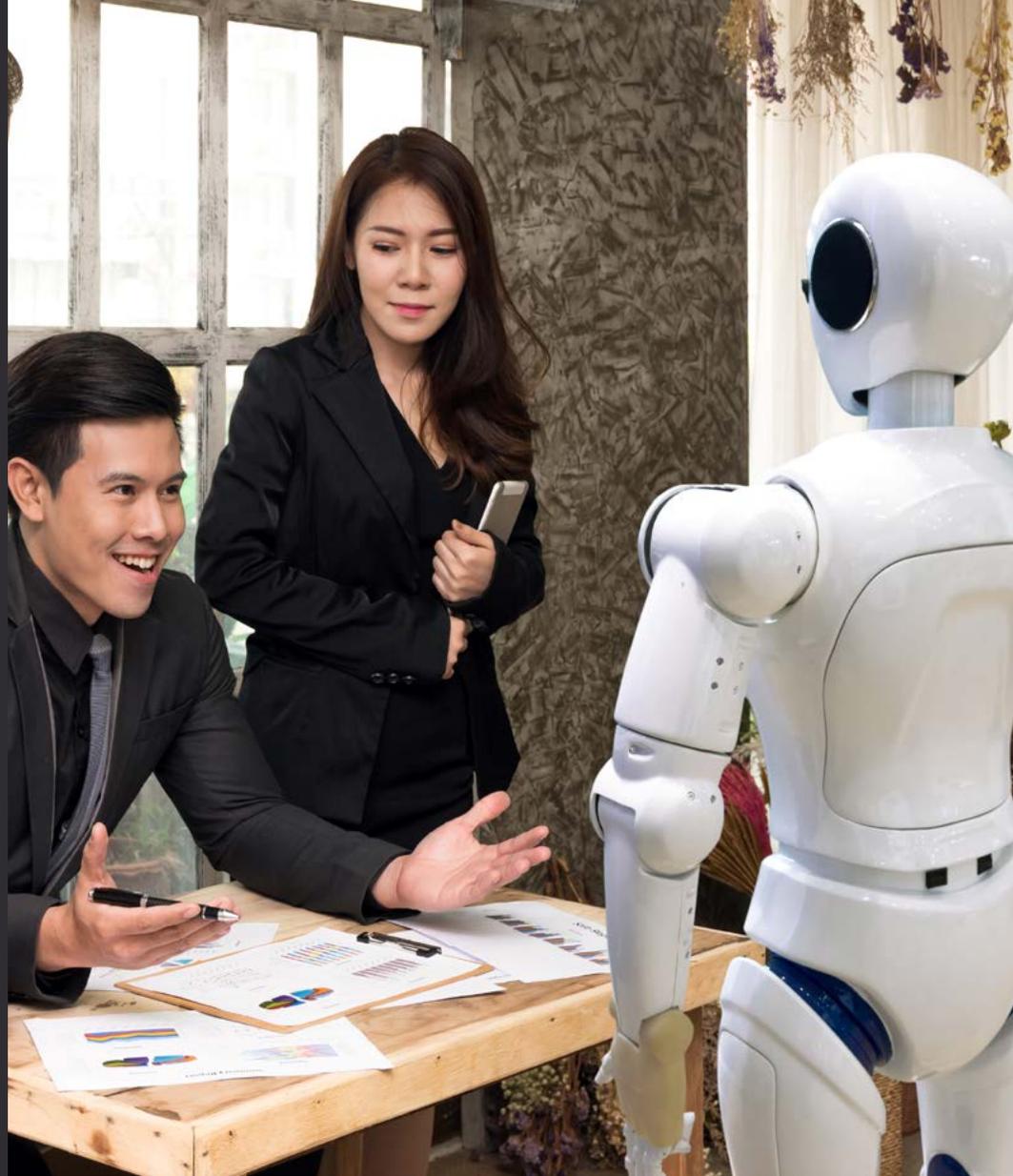
Software bots are now used in answering call center queries which were manually handled previously. Some examples are incident management, billing queries, product enquiry.

- ICI bank has liaised with OpenSpan to implement its Robotics Automation Platform. Bots have reduced the customer response time by 60% with a 100% increase in accuracy. For instance, ATM query resolution was a cost heavy operation for the bank with 200 million transactions per year, leading to 0.1 million queries. The query resolution time was brought down from 12 hours to 4 hours per query following the usage of bots in the area

Conclusion

Automation technologies detailed above have surely moved away from academia to being implemented in business real-time and benefits being realized. Clearly any financial institution not using these will lose out in the race in the near future. These technologies are not to replace staff, but to augment their functions, relieve them of mundane tasks and enable them to concentrate on other innovative aspects. Of course there will be disbursements of units, re-skilling of staff doing the manual work. The organizations will have to adopt strategies not just to embrace automations, but to ensure that transition is smooth for the staff. Automations are enablers and are not to replace people.

Data privacy and security is another big concern especially in the financial service industry. Unprecedented huge amounts of customer data are being collected and stored to be used by AI, RPA and ML using various Big data technologies. It is important that the data access and privacy are controlled by rules and regulations as applicable in the geography. Implementing these regulations with the right technical security controls should be part and parcel of these automations.



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