

Artificial Intelligence in Financial Services – Need to Blend Automation with Human Touch

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Abstract—Artificial Intelligence is the latest in the series of disruptions manifested by computer science. AI has been rapidly transforming the dynamics of banking and financial services industry also. The established and emerging capabilities of AI are being combined, re-constituted and re-formulated in unexpected ways and are throwing up new opportunities and new challenges but at the same time posing new threats also. Apart from the ethico-neutral character of technology and its attendant threats like cyber-crimes and macro-financial risks, a major question to be inquired into is its sustainability as it tends to replace humans and the related personal touch which most often is the essence of financial services industry thriving on the art of customization and customer delight. The instant paper attempts to examine relatively under-explored perspective of AI replacing humans in the space of banking and financial services and unmindfully heralding the flight of personal touch and service customization which are the cornerstone of customer satisfaction and delight in industries like banking and financial services known for their fiduciary and responsible character.

Keywords - Machine Learning, Chabot, NLP, Robo Advisors, FinTech, Eva.

I. INTRODUCTION

Natural intelligence as possessed by humans is the ability to sense, comprehend, analyze, and infer rationally so as to arrive at logical conclusions or solve problems and finally to learn by its own experience, improve and evolve [16]. The similar traits when demonstrated by a machine are called Artificial Intelligence (AI) and Machine Learning. Artificial Intelligence, a term coined by the American Stanford University's computer and cognitive scientist, John McCarthy, refers to the most striking characteristic of a machine to mimic a natural person in thinking the way a natural person does, and making a rational and the best choice from among the available alternatives aimed at achieving a specific goal. Human intelligence has contributed phenomenally to the civilization as it is today. Complementing and thereby augmenting human intelligence with artificial intelligence has unleashed the potential of growth and advancement in an unprecedented manner never experienced before.

Apart from developing and revolutionizing the fields of aviation, healthcare, transportation, education, medical diagnosis, electronic trading, remote sensing, robotics and

many other industries, AI is increasingly used by the financial services industry in data mining, market analysis, personal financing, wealth and asset management, insurance, customer service, credit scoring, retail lending, process automation and many more spheres to enhance customer experience by providing him imaginative services with the assistance of the state of the art technology. The banking industry is fast shedding its stodgy and dogmatic image in a paradigm shift to a whole-hearted embrace of technology and the banks are accelerating their innovation agenda to deliver smartly in future through novel solutions that will help strengthen relationships with customers by offering customized, seamless and imaginative banking in the digital age.

II. LITERATURE REVIEW

Lui, A., & Lamb, G. W. (2018) discuss that use of AI throws up a number of challenges which could undermine customers' trust and confidence. This article points out that the algorithms used in AI application in banking have biases and discriminate against certain races and gender [2].

Sarvady, G. (2017) examines the extent of implementation and cost of AI channel strategy initiatives in the financial service industry [3].

Ludwig, E. (2018) highlights the growing application of artificial intelligence (AI) in banking and financial services industry. He describes how AI assists in analyzing customer data for the purposes of credit scoring and arriving at loanable amounts. He also prescribes for updating regulations to prevent misuse of AI [4].

Nunn, Robin. 2018 addresses the issue of potential bias in AI and advises that financial institutions would better balance AI applications with their algorithmic bias against minority population. He claims that increased diversity at workplaces can reduce the biases inherent in AI applications [5].

Satell, G. (2016) broadly discusses ethical issues in artificial intelligence systems and emphasizes on the need for designing an ethical learning environment, identifying bias in algorithms, investigating ethical dilemmas, and setting higher moral standards [6].

Daks, M. (2018) focuses on the AI benefits for banks using the case study of the acquisition of artificial intelligence company Layer 6 Inc. by TD Bank Group. He cites examples of financial institutions using artificial intelligence model of third-party providers [7].

FRPT Research in its finance industry snapshot examines the impact of introducing artificial intelligence (AI) on jobs in Indian banks and states there will be no loss of jobs. AI tools

such as chatbot simply complement the efforts of human staff as shown in experiments of SBI and Yes Bank [8].

Guy A. Messick. (2017) discusses the integration of artificial intelligence in the digital ecosystems of the financial services industry and examines the role of AI in business development and providing customized advice and services to consumers [9].

Meinert, M. C. (2018) discusses the role of (AI) in combating cybercrime in the financial services industry and in enhancing customer experience and also the likelihood of AI's potential involvement in increasing cyber-attacks [10].

Forrester Research Inc (White Paper) (2017), E-Book, Artificial Intelligence with the Human Touch, contends that Artificial Intelligence can handle repetitive mundane but cannot substitute human touch. The study explores how a blending of AI and human touch can enhance customer experience [25].

III. ARTIFICIAL INTELLIGENCE IN FINANCIAL SERVICES

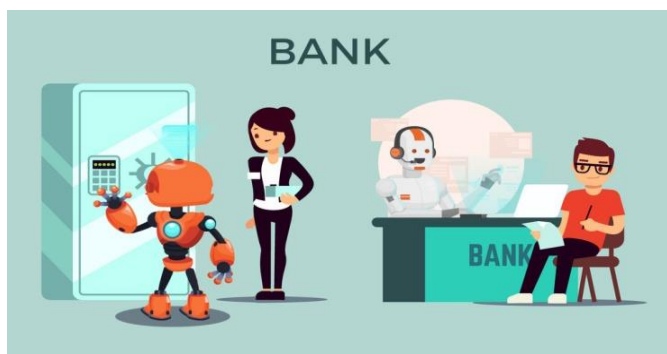


Fig. 1 . Artificial Intelligence in Financial Services. Source: [24]

Artificial Intelligence and its rise to prominence is bringing about a massive disruption in financial services as increasing number of banks are endeavoring to improve existing processes by introducing innovations under the aegis of AI powered technologies. After the stormy realignment of financial services industry equations under FinTech, AI is beginning to have the most transformational impact on banking and is understood to permanently change the dynamics of the sector in the time to come. FinTech industry is working closely with AI constituents to ensure new concepts are captured, developed and commercialized earlier than the competitors [17].

AI is estimated to replicate and often exceed the human caliber in collecting and analyzing data to identify the patterns and making more accurate predictions for the future that will enhance banks' efficiency right from the back office to the front desk. A recent study by PWC pointed out that AI has the potential to claim around \$16 trillion of the global economy by the year 2030. Global investment in AI applications is believed to have crossed \$ 5 billion [11]. The deployment of AI is estimated to save \$ 1 trillion to banking industry by 2030 most of which on account of branch closures [15]. Some of the prominent applications of AI in financial services industry can be counted as under –

(a) *Specialized Services to HNI's (High Net worth Individuals) Wealth and Portfolio Management -*

A major task of wealth and portfolio management services is to understand the risk return trade off and to be able to advise which securities and assets will yield the highest returns. AI has provided a cutting edge to the financial services companies by assisting them in giving customized and accurate advice to their wealthy clients. The world's largest investment group – BlackRock with more than \$6 trillion assets under management (AUM) has a dedicated AI lab to assist its operations. Several other global organizations are in the process of embracing AI to add value to their clients by improving their forecast. Swiss Bank UBS has recently revamped its trading floor by introducing two new AI systems. One identifies trading patterns after analyzing reams of market data and then formulates and advises trading strategies to the bank's clients for higher returns. The second one addresses the post trade allocation preferences of its clients.

(b) *Automated Customer Support and Virtual Financial Assistance through Chatbots and Robo Advisors -*

Banks are using AI assistant and other relevant apps like Revolut's which provide instant services to the customers using Smart chat technologies such as NLP (Natural Language Processing) or they direct the customers' enquiry to the relevant support staff. In 2016, Royal Bank of Scotland installed AI assistant Luvo which responds to customers' queries in general, and hand them over to human staff when necessary. Such Robo advisors are redefining customer experience and delight. Four leading commercial banks in India are using AI in the form of Chatbots in collaboration with FinTech startups to improve the customer experience, improve efficiency and reduce cost. One step further, in some cases, banks are using AI powered smart cameras capable of capturing facial expressions of customers to provide instant feedback on their experience [11].

(c) *Enhanced Insurance Experience -*

AI has a wide range of applications in the data driven insurance industry. Both in underwriting a policy and at the time of claim settlement, insurance companies need to know as much as possible about the education, health, lifestyle, character, etc. of the customer and the circumstances of the event against which claim is lodged, respectively, which can better be captured using AI algorithms. Using AI apps, as done by some US startups, an insurance claim can be settled in less than 3 seconds by performing multiple back end processes and checks simultaneously while interacting with the client at the front end. AI is all set to play a disruptive role in the insurance industry.

(d) *Robotic Process Automation (RPA) - Repetitive Task Automation -*

Various banking functions like withdrawal and deposit processing, statement generating, cheque clearing, billing, etc. are repetitive and having monotonous front and middle office processing. They can better be executed by AI software like RPA for cost saving, improved efficiency and better time management. From industrial robots to self-driving cars, robotics technology is increasingly replicating human intelligence and skills and may turn out to be a game changer

in the financial services industry. Investment in to robotic sector is rising fast.

According to CB Insights, “the number of funding deals in robotics globally nearly doubled from around \$273 million in 2014 to \$587 million in 2015. The investment growth in 2015 was 115%, as compared to 55% in 2014” [12].



Fig. 2. Robotics (ex-drones): Yearly Global Financing History [12]

Robotic Process Automation enables productivity, cost efficiency, operational improvement and time savings as portrayed in the diagram below -

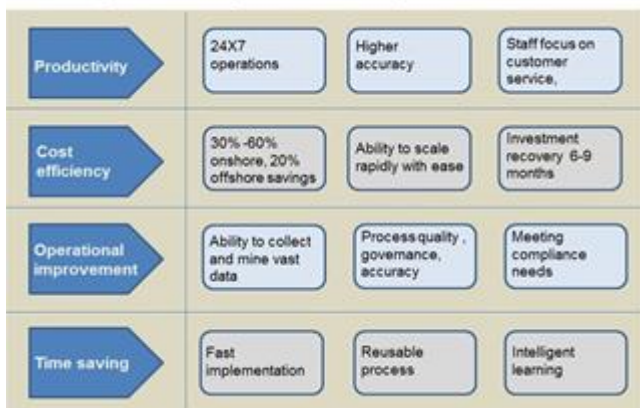


Fig. 3. Benefits gained from Robotics Process Automation [12]

(e) *Credit Scoring and Predictive Analysis through Alternate Data -*

There are millions of financially excluded individuals and SME’s who do not have access to bank credit on account of little or no credit history. Banks find it challenging to lend to such clients for want of adequate credit history. New FinTech startups are using AI to collect and process alternate data like location, employment history, age, spending habits, educational background, police record, social media, and other digital footprint to make lending decisions in such cases. Predictive analysis, a derivative of AI, can help calculate credit score, prevent bad loans and afford an insight in to what the customer’s credit requirement is and what he is willing to buy next [4]. There is a host of FinTech companies using AI powered algorithms disrupting the lending industry with AI solutions targeting such unbanked population in emerging markets.

(f) *Regulatory Compliance, Prevention of Money Laundering and Fraud Prevention & Detection -*

Financial services firms and banks are under immense pressure of regulatory compliance and risk management

requirements particularly after the financial crisis of 2009. Basel Accords I, II and III provide cumbersome capital adequacy compliance and risk management framework including KYC and AML processes which are essential to protect the system against credit, market and operational risks and fraudulent practices. The process is long and arduous involving piles of paperwork and countless man hours. The real appeal of AI is in its ability to sift through reams of data and identify trends and patterns in seconds. JP Morgan’s COIN, which is AI based machine learning system can complete millions of hours of compliance in minutes. The AI based anti-fraud products spot subtle variances from the predicted human behavior and indicates suspicion. Real-time camera images and advanced AI techniques such as deep learning can be used for image and face recognition at ATMs to detect and prevent frauds & crimes [14].

IV. ARTIFICIAL INTELLIGENCE IN TOP INDIAN BANKS

India’s largest public sector bank having 425 million customers on board, SBI, has launched a national hackathon “Code for Bank” inviting students, developers and startups to offer innovative ideas and solutions for the banking sector on technologies such as FinTech, Block chain, IoT, digital payment, AI, BOTS and robotic process automation. Currently SBI is using the AI based solution which scans cameras in the branch and captures the facial expressions of the customers and reports on real time basis if they are happy or otherwise. SBI has also launched AI powered chat assistant, called SIA that instantly addresses customer enquiries and continuously learns with each interaction and is improving upon itself over time. Parallel to SBI’s SIA, HDFC has launched “Eva” which “becomes smarter as it learns through its customer interactions, and, going forward would be able to handle retail banking transactions as well” as stated by the Bank in a news release [11].

India’s second largest bank, ICICI Bank’s version of “SIA” or “Eva” is “iPal” which engages in three fold operations involving FAQ, actual financial transactions like remittances, mobile re-charge, utility payments, etc. and continually helping people discover new features. They are also experimenting with in-store robotic applications. ICICI has embarked on “software robotics” The bank claims that “At ICICI Bank, software robots have reduced the response time to customers by up to 60 percent thereby sharply improving the bank’s productivity and efficiency” [11] To help its customers with financial and non- financial transactions, to answer their FAQ’s and to identify and address their loan requirements, Axis Bank launched an AI and Natural Language Processing (NLP) based application called Conversational Banking. The Bank’s ED Mr. Rajiv Anand says, “The intent is to provide 24X7 assistance to our customers in an intuitive and native way” [11].

V. CONTROVERSIES SURROUNDING ARTIFICIAL INTELLIGENCE

AI can be weaponized [20]. In the year 2010, a science fiction movie, Enthiran (lit. Robot) was made in India. It is a movie where a brilliant scientist makes an android to protect mankind, with ability to feel emotions of the humans. The project backfires when the android falls in love with the

scientist's girlfriend and gets distorted by a rival scientist in to a dangerous homicidal. The rest of the plot is about the originator scientist trying to control his own creation which becomes disastrous. The plot of the film resembles and revolves around the real life apprehension of AI leading to making of machines that are more intelligent than humans and continually learning, self-evolving and redesigning at an exponential rate in a way that humans will not be able to keep up with and would not be able to predict how that machine would behave. The combination of algorithms, data and programming going into an application could only determine, that too to a limited extent, whether the end result is promotional or detrimental.

If, by chance, or by design, the evolution gets misdirected and benevolence yields place to malevolence, the outcome may turn out to be a catastrophic bane rather than a boon, and, that too, beyond control. Criminals may use AI technology to automate hacking attempts, phishing scams may become worse and more frequent, ransom attacks may become easier to perpetrate as hackers can target more people using Chatbots, and spread of misleading and fake news and inflammatory propaganda may get worse [20].

There is perceived a high degree of substitutability that AI machines have with employees in any sector. Since AI digitizes and automates repetitive roles both at the back office and front office, there will be loss of jobs on account of the existing skills becoming redundant. [14] Another section of scholars however believe that AI will create more jobs and bring people closer to technology. It will help people focus on more constructive tasks than the repetitive and mechanical ones [8].

VI. ARTIFICIAL INTELLIGENCE REPLACING HUMAN INTERVENTION – THE ISSUES INVOLVED

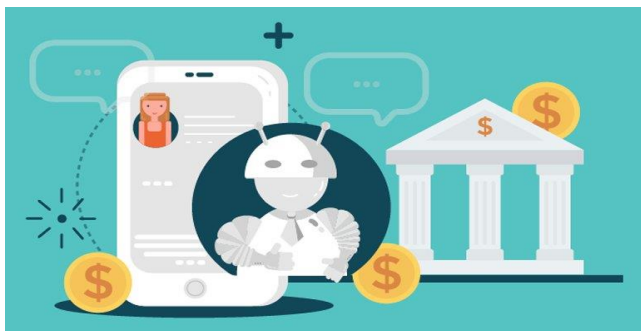


Fig. 3. How Artificial Intelligence can Benefit Financial Industry [22]

AI model has changed the traditional mode of customers' communication between banks and FI's from face to face physical chat to inputting some data from a phone to AI machine which can come up with an approval or rejection outcome. In both cases the customer is not aware how the personal data he has provided will be used onwards or transmitted to whom and for what purpose. It is legally not clear as to who owns that data, the provider or the recipient who received it under specified terms and conditions which normally are unthinkingly accepted by the provider [18].

European commission has enforced GDPR (General Data Protection Regulation) standards to protect the privacy and personal data of people as everyone has a right to privacy and

protection of personal data. On various digital platforms people hardly care to read the lengthy privacy policies and accord their consent for access to, and use of, their personal data without understanding implications and later feel offended when the consequences of such data sharing surface up.

AI has immensely contributed to cyber security by facilitating user authentication, robust password protection, intercepting phishing and spam attacks, spotting fake news and intensifying war against cybercrime in general. What is concerning is that the weapon in the war against cybercrime may itself be used to commit the same crime which will then be all the more challenging to discover and check. This is the flip side of AI capabilities. AI can be instrumental in engineering large scale, precisely targeted and sophisticated hacking and cyber-attacks on databases [10].

Further, although AI is believed to enhance efficiency by enabling processing of a large volume of data otherwise unmanageable, it is not so dependable as a cyber-security solution which stands better managed in the hands of humans – the cyber security and IT professionals - who are sensitive to legal compliance issues and can deliver effective real-world solutions. They are the most suited for risk analysis, policy formulation and cyber-attack response. AI enabled cyber-security systems are actually inadequate and cannot replace the essential role played by human experts in protecting data, networks and cyber-attacks. Symantec Corp. Chief Technology Officer, Hugh Thompson emphasized the role of human intervention in cyber-security despite a massive drive towards automation and AI across all industries [26].

Businesses using AI are not subjected to the obligation of explaining how their algorithm arrived at a particular decision / conclusion and they tend to be indifferent on this count. In a normal physical interaction, the cause of rejection may be identified, communicated and even rectified. The assumptions made, data used, patterns detected and the scoring matrix used in AI algorithm are never disclosed to the customer, nor are they often known to the employers of AI. So they cannot explain their customer why he is put in a certain category causing acceptance or rejection of his account opening, mortgage or credit card application. AI systems should be fair, rational, and free from socio-economic and political biases and should enable reliable outcomes driven purely by statistics. [6] They need to be transparent about how their AI algorithm works and which data are used to drive them. Ethical consciousness of the financial professionals is already low. In cases of minimal human intervention, they are likely to feel all the less responsible for the decisions made in AI environment where outcomes are dictated by third party designed AI algorithm [18].

Another important issue relates to accountability. The results produced by AI system should be accurate, precise and reliable. However, they may be doubtful or incorrect also, at times, depending on the quality of algorithm they are using or based on. In an AI driven business model, devoid of human intervention, no one takes responsibility of the outcome of the decision making process. No one is answerable for the incorrect outcome of an Algorithm [18].

Organizations who have designed the AI algorithm should own the outcomes of the AI model. A pre-mature retirement plan, income tax planning or a diversified portfolio for investment advised by a trading platform to an investor with a specific profile of risk bearing capacity and investment objectives is taken by the client for granted with a blind faith, without a doubt on the capability of the AI algorithm churning out such portfolios. There is a moral responsibility on the part of organizations to own the financial prescriptions given by AI systems. Interacting and advising experience under AI mechanism may seem to be friction less but may damage the financial profile of the customer if the expertise and experience of the traditional human financial planners are not adequately replicated by AI.

VII. CAN MACHINES REPLACE HUMANS – A CASE OF SUPPLEMENTING VERSUS SUPPLANTING HUMANS

The financial industry today focuses its attention on massive AI implementation and tends to neglect or minimize the significance of human work force and its contribution to customer satisfaction which is the targeted objective of any marketing theme. Over-prioritization of technological improvement as against investment in human work force and its up-gradation is mainly on account of the lack of ability and sufficient data to quantify and support the value of human contribution in customer satisfaction.



Fig. 4. Increasing the adoption of Ethics in Artificial Intelligence, Information Age [23]

The banking and financial services industry is based on trust and confidence. Banks have a fiduciary character which is best supported by moral values imbibed and pursued by human beings rather than pinned on machines. The customer wants to transact his business looking in to the eyes of his service provider which affords him the confidence and the feel of being in safe hands. He wants endless customization of the service package to suit to his specific needs bundled with a human smile and the assurance of continued support, which can flow from human beings and not machines. In the early part of the 21st century, it was believed that the click and portal banking would gradually replace brick and mortar banking. Within next five to seven years that followed, the writing on the wall was clear that the majority of population in semi-urban and rural centres would look upon a physical human presence as the guarantee for the safety of their savings and genuineness of the financial solutions provided. Younger generation is comfortable with fully automated responses and

interactions but it is essential to make available to the customer the option of escalating complex or highly personalized issues to the level of human interactions. The Royal Bank of Canada has used its digital platform to enable its customers' video conferencing with the financial advisors. The bank accepts that human interaction is one of the most essential ingredients in customer satisfaction over and above an automated platform[21]. Endless computerized instructions on an IVR call tend to irritate the client who always seeks to get connected to a human "customer representative" to sort out his issues and be guided suitably. The clients may be offered the option to choose human interactions like video calls or fixing appointments with human operators / professionals which would enhance the brand loyalty and the requisite element of physical presence in services [21]. Customers develop loyalty towards companies that know them personally as a unique entity. The loyalty is strengthened to the next level if they happen to be known and recognized to humans rather than machines. Brand that grow popular fast are the ones that prudentially combine AI, data Analytics and automation to cross over to achieving customer delight from mere satisfaction. Customers always appreciate the option to interact with humans as and when they want to. Machines may follow logic, not human values and moral discretion. They may sympathize, not empathize. The serious money business the financial services industry deals in calls for the warmth of human intervention than the curt and mechanically formulated interactions.

VIII. CONCLUSIONS AND FUTURE TASK – BLENDING MECHANICAL EFFICIENCY WITH HUMAN TOUCH

In an increasingly dematerialized world where product wise differentiation is fading out, the customer choice will be driven more by human and personal touch as the ultimate differentiator than by the variety or price of products on the shelf. AI is a disruptive technology with tremendous potential to transform the way banking and financial services are conceived, formulated and delivered. It has already changed the way business is done in the spheres of portfolio management, algorithm trading, fraud detection, loan & insurance underwriting, customer service, cyber security and sentiment analysis. AI has the potential to reduce operating cost of the front, middle and back office of the industry by a whopping 20% to 25% and is poised to redefine how banks and financial companies operate, how they create innovative products and services and how they take customer experience to the next level [11]. AI has come to stay and there is no looking back. Having said that, there are certain things that remain fundamental and the inter personal communication between humans is one of them. Availability of technology does not mean it is the best option too in all situations [27]. The spirit of AI adoption and implementation may not be extended to take over all responsibilities handled by the humans who, any day, are the best suited for establishing emotional connect and trust [25].

Another major challenge that stares in the face of AI application in Indian banking industry, and any other industry for that matter, relates to humans only. It is the scarcity of professionals with needed skills in science of Machine Learning. For rapid and widespread application of AI

technology in Indian banking and financial services industry, there is an urgent need to develop in-house training programmes for imparting AI skills to the existing employees and to enter in to tie-ups with universities and colleges to churn out skilled data scientists qualified to work on live AI projects.

Also, any massive adoption of AI technology in banking sector to the neglect of the human element is fraught with the risk of perceived redundancy of human skills of the bank employees leading to large scale layoffs and resultant unemployment in the industry[11]. Equally important, there is an urgent need for globally accepted legislative and regulatory framework for application of this technology in an ethical manner not detrimental to the interest of targeted users in general and to prevent its misuse in the hands of unscrupulous users [4].

Another argument in support of blending human touch with artificial intelligence is that the regulatory framework must create room for appeal to human authorities against AI algorithm driven decisions in cases where the customer feels discriminated against or aggrieved so as not to empower an impersonal and artificial system to have the last word in financial transactions. Parallel to the policy of “Suitability and Appropriateness” in derivative transactions world over, regulatory measures may be prescribed in AI framework, in the interest of consumer protection, to personally / humanly ensure “suitability and appropriateness” of advices or financial solutions tendered to the clients. If AI is good at handling simple, repetitive tasks and automated conversations, there is no match to human intervention when it comes to handling complex personalized requests, understanding sentiments, building trust and establishing an emotional connect with the customer to capture his attention and to secure his brand loyalty. Wisdom would demand judicious blending of the functionality of AI with human intervention wherever necessary to enhance customer experience.

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