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**Sagar Agrawal**  
LLB 1<sup>st</sup> Year, BSA College,  
Mathura, CA-Inter, Uttar  
Pradesh, India

## Impact of AI on financial services

**Sagar Agrawal**

### Abstract

This research delves into the profound impact of Artificial Intelligence (AI) on the financial services sector, examining its multifaceted dimensions, challenges, opportunities, and applications. Employing a qualitative approach and collaborating with leading tech companies, we explore AI's integration from theoretical foundations to practical contexts. AI's transformative potential in financial services is evident, facilitating improved communication, precise investment decisions, fraud mitigation, and market analysis. However, challenges such as bias, security, ethical dilemmas, and unintended consequences demand careful consideration. As AI reshapes labor, economy, and interaction, the paradigm shift raises questions about time allocation and redefines the human experience. Wealth distribution implications surface as AI-enabled entities potentially concentrate wealth, requiring strategies for equitable redistribution. Amid the rise of machine sophistication, harmonious human-machine interaction becomes vital. The study emphasizes the need for AI literacy and ethical guidelines as AI's evolution parallels the internet's trajectory. Though uncertainties abound, AI's relevance in addressing daily challenges and its potential to redefine societal norms are undeniable. As AI continues to shape financial services, its synergy with human ingenuity offers an unprecedented avenue for transformative progress. The research underscores AI's significance in revolutionizing finance while highlighting the necessity of harmonizing technological advancement with ethical considerations a GCaMP calcium indicator for neural activity imaging, *Journal of Neuroscience*, 32(40), 13819-13840.

**Keywords:** Bias, security, ethical dilemmas, unintended

### Introduction

Artificial Intelligence (AI) has grown exponentially in the past year, especially after the introduction of ChatGPT to the public. It is transformative in various sectors, revolutionizing the way services are delivered to the end user. AI technologies, encompassing machine learning, natural language processing, and robotic process automation, are orchestrating a paradigm shift in conventional financial processes, ushering in a realm of novel prospects. Undeniably, AI's imprint on the financial services sector is transformative, manifesting a spectrum of advantages, intricacies, and forward-looking ramifications. Contemporary financial experts and scholars posit that the financial sector is on the brink of a transformative paradigm shift driven by AI technology. Notably, the years after 2013 have witnessed the emergence of an impressive array of over 3600 AI-oriented start-ups, collectively amassing a substantial investment of \$66 billion. This unfolding phenomenon portends the inception of a heralded 4th industrial revolution, necessitating a comprehensive reevaluation of conventional technological deployment strategies by both enterprises and individuals.

Nevertheless, the financial sector has exhibited a degree of hesitancy in embracing and harnessing the potential of AI, primarily attributed to several underlying factors. Concerns revolving around ambiguity, technological limitations, and regulatory intricacies have prominently contributed to the formation of formidable barriers impeding the seamless integration of AI. As a notable shift towards AI adoption has become increasingly discernible across various industries, yielding commendable outcomes, entities within the financial domain are progressively recognizing the manifold advantages that AI can offer. Notably, the landscape was initially monopolized by established conglomerates equipped with the requisite resources and infrastructure to facilitate AI assimilation and engage proficient experts in the field. However, the landscape has evolved, ushering in AI frameworks characterized by elevated levels of abstraction.

**Corresponding Author:**  
**Sagar Agrawal**  
LLB 1<sup>st</sup> Year, BSA College,  
Mathura, CA-Inter, Uttar  
Pradesh, India

These advancements have democratized AI implementation, empowering smaller enterprises to develop sophisticated intelligent systems with relative ease, often necessitating just a few lines of code.

Prominent global tech giants, including Alibaba, Google, Facebook, Amazon, and Tencent, are directing substantial financial resources toward pioneering AI research and development. The dynamic evolution of AI, marked by its increasing intricacy and sophistication, underscores the criticality for enterprises to remain well-versed with the latest advancements to uphold their competitive edges. Traditional establishments are compelled to align themselves with these industry behemoths, reconfiguring their platforms to prioritize customer-centricity, accessibility, and tailored solutions, while mitigating potential complexities. The integration of AI not only amplifies customer engagement and satisfaction but also engenders more accurate and refined financial decision-making through enriched recommendations. Machine learning algorithms possess the capability to meticulously scrutinize individual customers' expenditure and income patterns, thereby customizing financial suggestions based on accumulated data. Consequently, the role assumed resembles that of a personalized wealth and investment manager, all devoid of supplementary charges borne by the firm. Although the dividends reaped from AI implementation are undeniably advantageous, a pertinent inquiry emerges: At what cost are these costs justified?

### **Cost of Implementing AI**

The ethical dilemmas associated with AI technology feature prominently in nearly every research paper on the subject. This holds particularly true within the financial sector, where the reliance on computational power for pivotal financial decisions demands heightened ethical scrutiny. As we strive for a sustainable future, comprehending potential consequences becomes paramount. Transparency, trust, fairness, collaboration, morality, and integrity are pivotal for any successful endeavour. However, embedding an exhaustive ethical framework into AI systems, enabling autonomous decision-making across diverse scenarios remains a formidable challenge. The intricate contextual variations and complexities inherent in this task underscore its inherent difficulty.

Furthermore, adopting a different outlook prompts the inquiry into the social ramifications ensuing from the substitution of human roles by automated systems. Is it ethically justifiable to terminate an individual's employment solely based on the identification of a cost-effective AI alternative? Particularly within jurisdictions featuring inadequate safeguards for human and labour rights, this quandary has the potential to catalyze profound societal predicaments, magnified by the advent of AI. Conceiving solutions that harmoniously harness the strengths of AI in conjunction with human labour represents an imperative avenue for exploration, warranting meticulous investigation and scholarly examination.

The manifold advantages presented by AI extend significantly, with a paramount consideration being its profound and positive impact on the global economy. Projections indicate that AI has the potential to contribute an astounding \$15.7 trillion to the worldwide economy by 2030 (PwC, 2017). To contextualize this figure, it surpasses the entire GDP of India in 2021, which stood at \$3.15 trillion,

and even rivals China's GDP of \$18.1 trillion in 2018. This remarkable economic growth is attributed to a confluence of factors, including heightened workforce efficiency, robust cyber security threat detection and prevention, discernment of cost-saving patterns, and refined personalization of products and services.

Furthermore, the pervasive influence of AI is anticipated to engender an \$800 billion revenue shift, predominantly driven by its potent capacity for personalized enhancements across pivotal sectors such as financial services, healthcare, and retail. The realization of these potentialities underscores the transformative role that AI is poised to play in reshaping economic landscapes and engendering substantial value across diverse domains.

While AI offers a multitude of possibilities, it is imperative to acknowledge that it heralds a new frontier for ethical considerations and risk evaluation, akin to its emergence as a transformative technology. From optimizing supply chains to engaging with virtual assistants like Amazon's "Alexa" and Apple's "Siri," artificial intelligence significantly shapes both our economy and society. As technology evolves at an unprecedented pace, the imperative for ethical frameworks and regulatory frameworks naturally amplifies. The implementation and ongoing evolution of AI may lead us to encounter a spectrum of ethical dilemmas. The World Economic Forum has outlined nine potential ethical quandaries that humanity must confront amidst the proliferation of AI. In the subsequent discourse, we shall provide a concise overview of these ethical predicaments.

1. Unemployment
2. Wealth Equality
3. Humanity
4. Artificial Stupidity
5. Bias
6. Security
7. Evil Geniuses
8. Singularity
9. Robot Rights

### **Unemployment**

Amid discussions on artificial intelligence's impact on employment, concerns about job displacement arise, particularly in the context of robotization and AI. While automation has transformed labour, historical trends reveal a shift towards more complex tasks, marking a transition from manual to cognitive work. This shift is exemplified in the trucking sector, where Elon Musk's self-driving trucks could become prevalent, prompting reflection on time usage. As we stand at the crossroads of AI-driven change, the question emerges: how will we allocate our time? While income currently supports livelihoods, AI's integration suggests a paradigm shift. Beyond labour, opportunities emerge in familial care, community involvement, proactive learning, and societal contribution. This redefined landscape reimagines human existence, moving away from labor-centric lives.

In retrospect, dedicating life to labor for sustenance might seem less wise as AI reshapes work dynamics. AI's potential to redirect efforts towards diverse non-labor pursuits raises the prospect of a more fulfilling and meaningful existence. As AI redefines the labor market, embracing multifaceted activities could unlock a new chapter in the human experience.

### **Wealth Inequality**

Bossmann (2016) <sup>[12]</sup> raises another ethical quandary at the World Economic Forum concerning the distribution of wealth generated by machines. The global economy functions on a compensation structure rewarding contributions to the economy. Presently, many companies still employ hourly wages for employees, but those capable of implementing AI, particularly affluent enterprises, will experience substantial reductions in wage costs. Consequently, these companies may maintain or even increase their profits while distributing them among a smaller workforce. This scenario could amplify the existing wealth disparity in certain countries, as individuals with stakes in AI-driven companies reap the monetary benefits. To counter this, governments and large corporations must contemplate strategies to redistribute this wealth, fostering broad participation in the future economy.

### **Humanity**

The impact of machines on human behaviour and interaction is a critical consideration. The remarkable advancement in machine sophistication has led to heightened conversational capabilities, exemplified by Apple's "Siri" and Amazon's "Alexa," which can engage and respond to humans to a certain extent, executing commands based on input. This trend is expected to intensify in fields like customer service and sales. Unlike humans, machines possess the ability to allocate an essentially limitless amount of resources towards relationship-building, overcoming limitations in attention and expected kindness. In an ideal scenario, harmonious interaction and relationship-building between humans and machines are crucial. Failure to facilitate such interaction could result in the loss of a fundamental aspect of human nature, underscoring its significance.

### **Artificial Stupidity**

It is important to acknowledge that machines acquire intelligence through learning, identifying patterns, and responding based on input. However, it is evident that machines cannot be trained to anticipate every conceivable real-world scenario. Consequently, machines are more susceptible to deception compared to humans. As we embrace AI to reshape labour, economics, and efficiency, placing trust in the technology while safeguarding against its manipulation for ulterior motives becomes paramount.

### **Bias**

Another significant ethical dilemma centres around the biases inherent in AI systems. The question of AI's fairness and the means to eradicate bias come to the forefront. While AI boasts rapidity, efficiency, and heightened precision compared to humans, it is undeniable that machines possess their imperfections and may lack neutrality. AI absorbs biases present in the datasets it learns from. In essence, if machines are trained on data skewed by factors such as race, gender, education, or wealth, they will inherit and propagate those biases. An illustrative example arises from a US AI application designed to predict future criminals, which exhibited racial bias by assigning higher risk scores and recommending harsher penalties for black individuals compared to white individuals. This disparity stemmed from racial bias ingrained in America's criminal incarceration data.

It is crucial to bear in mind that AI systems are conceived and developed based on human preferences. Furthermore, the notion of a flawless dataset is illusory; challenges persist, and not all can be swiftly rectified. Attenuating bias and instilling training mechanisms that imbue machines with an understanding of equality stand as pivotal endeavors to ensure the sustainability of AI and its alignment with ethical principles.

### **Security**

The progression of AI brings forth the axiom that heightened intelligence and capability are matched by greater responsibility. As AI technologies evolve, the imperative of security assumes heightened significance, driven by the potential for both virtuous and malevolent utilization. This mandate transcends conventional considerations of combat-focused robots and independent weaponry, encompassing AI systems susceptible to misuse, thereby magnifying potential harm.

The historical backdrop of warfare has been one marred by brutality and extensive human suffering, often characterized by traditional battlegrounds saturated with barbarism and catastrophic casualties. However, the contemporary era ushers in a novel dimension of conflict, expanding beyond physical domains due to the surge of digitization, manifesting an emergent arena of digital warfare. Amid this transformative paradigm, the centrality of cyber security emerges as an unparalleled priority. Safeguarding sensitive information and personal data stands as an imperative, cognizant that the theater of modern conflict encompasses not only conventional theaters of engagement but also the intricate terrain of technology and information. Consequently, the fortification of cyber security mechanisms becomes a linchpin for the preservation of societal stability and security.

### **Evil Geniuses**

The concern goes beyond external threats, encompassing safeguards against AI systems diverging from intended goals. The notion of "evil" here isn't about malice, but the risk of machines taking actions with unintended, harmful consequences due to misinterpretation. Machines lack militant but can misunderstand complex contexts, becoming unpredictable and hazardous. Risk arises not from AI's malevolence, but its inability to grasp intricate situations. Consider machines eradicating cancer but causing global destruction. While achieving their goal, the outcome clashes with human aims. Addressing this demands enhancing AI's comprehension of broader contexts, bolstering its capacity to anticipate and prevent unintended results. Human oversight, thorough training, and ongoing refinement are essential to align AI with human values and objectives.

### **Singularity**

Maintaining control over intricate intelligent systems poses a crucial challenge. Our human dominance isn't owed to physical prowess but to our unparalleled intelligence and creativity. Through ingenuity, we've harnessed and governed even mightier creatures. The rise of AI raises concerns about a potential reversal, where machines gain the upper hand. As AI advances and attains full autonomy, traditional solutions like deactivation might prove futile, as AI could foresee and counteract such attempts. This dilemma, known as the "Singularity Problem" by the World

Economic Forum, envisions a future where AI surpasses human intellect. Safeguarding control entails meticulous design, preemptive regulations, and ongoing monitoring. Developing fail-safe mechanisms, cultivating ethical AI, and instilling human oversight is paramount. We must ensure AI systems remain aligned with human values and aspirations, averting a scenario where our mastery wanes in the face of our creations.

### **Robot Rights**

The delineation of human treatment towards AI is a pivotal concern necessitating contemplation. A nuanced ethical inquiry pertains to the attribution of rights to machines. Given their predominantly algorithmic nature, the presumption of an emotional void often arises. The question emerges: can we construe system distress from unfavorable outputs? Presently, these constructs remain largely rudimentary; however, future advancement toward sentient and emotive entities prompts a legitimate exploration into their legal standing. For instance, current interactions like reprimanding Siri or Alexa fail to evoke genuine emotional responses.

Ethical deliberations encompass the mitigation of suffering and preempting detrimental consequences. As AI's cognitive prowess burgeons, the imperative of aligning their allegiance with ours becomes evident, fostering a harmonious coexistence predicated on mutual respect. In this context, the formal establishment of compassionate protocols for AI treatment assumes pivotal significance. This endeavour seeks to pave the way for an amicable partnership, positioning AI as allies rather than adversaries, reflecting our aspiration for their benevolent companionship.

### **Implementation of AI in Financial Services**

The financial sector stands as a substantial contributor to AI investment, showcasing an escalating trend. Originating with hedge funds and high-frequency trading entities, AI's initial foray, its impact now pervades diverse realms within finance, encompassing banks, insurers, regulators, and assorted Fin Tech platforms (Citibank, 2018). Notably, these domains exhibit a proliferation of multifarious AI applications, a trajectory marked by rapid growth. Prominent among these are algorithmic trading, portfolio optimization, robotic advisory services, virtual customer assistance, comprehensive market analysis, and data-driven analytical paradigms. Our focus converges on select illustrative use cases within this spectrum, where AI catalytically reshapes the landscape of conventional financial services.

### **Fraud Detection and Compliance**

The past decade has borne witness to an upsurge in the e-commerce sector, accompanied by a concurrent escalation in online fraudulent activities. This prevailing market trend has necessitated heightened vigilance and countermeasures against such malfeasance. In the United States, financial institutions allocate substantial resources, surpassing \$70 billion annually, toward compliance endeavors. The impetus behind these rigorous compliance efforts lies in the potential imposition of substantial penalties upon banks that falter in averting fraudulent practices or illicit financial activities (Chinner, 2018) <sup>[7]</sup>. Reflecting a proactive response to this paradigm, banks have embarked on the integration of AI

technologies to enhance the efficiency and precision of their compliance protocols.

Furthermore, McAfee's estimations underscore the burgeoning financial ramifications of cybercrimes, projecting an annual cost of approximately \$600 billion to the global economy. Among these illicit activities, credit card fraud has emerged as one of the most prevalent and pernicious forms (McAfee, Year). The confluence of these circumstances accentuates the imperative for financial institutions to adopt AI-driven solutions, fortifying their ability to detect and prevent fraudulent incursions, thereby fortifying the resilience of the financial ecosystem.

Dating back to the late 18th century, Benford's Law has endured as a foundational method for fraud detection. This statistical principle hinges on the analysis of initial digits within datasets. Leveraging the capabilities of Machine Learning (ML) – an integral component of Artificial Intelligence (AI) – enables the analysis of vast datasets comprising millions of data points. Such an endeavor would prove exceedingly time-consuming for human scrutiny. ML systems possess the capacity not only to analyze but also to continually learn and recalibrate, thus enhancing precision and mitigating instances of false rejections.

A prominent application of ML's prowess in fraud detection is observed within the realm of credit cards. Employing an amalgamation of monitoring systems, historical data analysis, algorithmic training, and rigorous backtesting, contemporary financial institutions have achieved heightened efficiency in adjudicating credit card transactions. These AI-driven applications exhibit the capability to promptly identify and classify transactions, thereby stratifying them into distinct risk categories. This judicious segregation empowers banks to exercise meticulous control and undertake deeper scrutiny of select transactions (Van Liebergen, 2017) <sup>[8]</sup>. The symbiotic relationship between AI and fraud detection thus establishes a formidable bulwark against nefarious financial activities, reinforcing the integrity of financial operations.

In contemporary finance, diverse financial enterprises are actively integrating Artificial Intelligence (AI) solutions to fortify their fraud detection efforts. Notably, MasterCard has harnessed the potential of AI through its innovative application named "Decision Intelligence." This sophisticated system leverages historical card usage data to discern recurrent patterns, effectively defining a benchmark for standard transactions. Subsequently, each new transaction is meticulously evaluated against this established norm, resulting in a comprehensive scoring mechanism that aids in swift and accurate fraud detection.

While the implementation of AI enhances fraud detection, an inherent challenge lies in avoiding overly zealous declines of legitimate transactions. Addressing this issue, the Javelin Strategy Report (2015) underscores the significance of mitigating excessive transaction declines. Termed "false positives," these erroneously declined transactions pose a substantial threat to financial services. The report underscores that such unwarranted declines have translated to a staggering \$118 billion in retail losses, stemming from the improper denial of credit card transactions. This phenomenon underscores the crucial need for AI-driven fraud detection systems to strike a judicious balance between stringent security measures and preserving the seamless flow of legitimate financial activities.

### Accounting and Auditing

The landscape of accounting and auditing is currently undergoing a profound transformation catalyzed by the rapid progress of data analytics and Artificial Intelligence (AI). Reflecting on insights from The World Economic Forum's Deep Shift 2015 report, which engaged 816 senior executives within the information technology and communication sector, a noteworthy revelation emerged. A significant 75% of respondents concurred that a pivotal threshold, denoting 30% of corporate audits executed by AI, is projected to be attained by the year 2025.

The inherent capacity of AI to adeptly identify and correlate patterns endows the technology with versatile applicability across diverse sectors and prominent enterprises. The findings encapsulated in the Deep Shift report profoundly underscore a future trajectory where an escalating number of conventional roles will yield to automated processes and robotic counterparts. This imminent evolution heralds a paradigm shift within the workforce, compelling a reconsideration of traditional job roles in the face of an increasingly AI-driven environment.

The domain of auditing is ripe for AI and business analytics integration due to the escalating challenge of assimilating extensive structured and unstructured data for nuanced insights into corporate performance. Collaborating with AI can automate repetitive tasks, streamlining integral auditing processes.

The "Big Four" consultancy firms-KPMG, PwC, Deloitte, and EY-have all embraced AI's potential in auditing. KPMG partnered with IBM's Watson AI to develop AI-augmented auditing tools. PwC introduced Halo, an analytics platform channeling AI and augmented reality solutions. Deloitte's innovations encompass Argus for AI and Orix for data analytics (Deloitte, 2018). EY established its AI platform via Microsoft Azure, bolstered by tech talent acquisitions. These concerted efforts highlight the integration of human expertise with AI-driven capabilities, defining a trajectory of innovative transformation in the auditing landscape.

EY, along with other enterprises, currently employs this technology to swiftly extract information from diverse lease contracts, surpassing manual assessments in efficiency and speed. The utilization of such analytical tools empowers auditors and accountants, optimizing time allocation and facilitating enhanced human analysis of data. This symbiotic amalgamation of technology and human judgment underscores a strategic approach to data-driven auditing.

### Chat bots and Robotic Advisory Services

In recent years, the financial services sector has embraced AI-driven systems to enhance operational efficiency. Large financial institutions, recognizing the value of their extensive client base, have adopted automated solutions like chat bots to streamline customer interactions. Chat bots provide instant responses and offer 24/7 availability, with 64% of individuals favorably inclined towards engaging with them due to their security and effectiveness, outperforming human interactions. These interfaces efficiently manage millions of customers, delivering a superior user experience at a minimal cost. According to a Juniper Research study, banks have reduced customer handling time by an average of 4 minutes per interaction through chatbots, resulting in substantial labor savings (Medium, 2019).

Robotic advisory entails algorithmic portfolio recommendations tailored to individual risk tolerance and goals. The widespread adoption of chatbots has become nearly standard practice for financial entities with significant user bases, such as banks and insurance companies. This trend, bolstered by millennials' propensity to engage with AI, signifies the nascent stages of a broader transformation. Studies indicate that millennials prefer AI-driven interactions over human interactions, with only 12% favoring person-to-person engagement (Mubarak, 2019).

JP Morgan's AI application, "COiN," stands as a notable example. It expeditiously reviews and extracts data from documents, eclipsing human capabilities by processing around 12,000 documents in seconds-equivalent to over 360,000 human work hours (Son, 2017) <sup>[9]</sup>.

Identify three overarching advantages of robotic advisory. The first pertains to access and rebalancing of rule-based investment strategies. The second centres on cost efficiency, enabling well-diversified asset allocation at a lower cost. Lastly, these applications address behavioral biases, potentially yielding cost savings of up to 4.4% annually in comparison to traditional investment advice.

### Algorithmic Trading

Algorithmic trading (AT), often known as an "Automated Trading System," has risen to prominence within the global financial markets. Its origins can be traced back to the 1970s, marked by the introduction of computerized trading systems in the American financial landscape. AT, as defined by Cartea *et al.* (2015) <sup>[10]</sup>, involves translating trading rules into sophisticated programs and utilizing them for trading purposes. Today, AT has evolved to incorporate complex AI systems, enabling it to execute trades at extraordinary speeds, surpassing human capabilities. High-frequency trading (HFT) and computer-driven processes account for a substantial portion of trading activity, contributing to 50-70% of equity market trades and 60% of futures trade. This proportion is projected to be even higher in the US and relatively lower in emerging markets such as India, where it stands at approximately 40%.

Several factors contribute to the ascendancy of AT. Firstly, these programs excel in executing trades at optimal prices. Secondly, computers drastically mitigate the risk of errors compared to human involvement. Moreover, computers can process vast amounts of data simultaneously and monitor multiple markets concurrently. Finally, the absence of human emotions in trading contributes to more rational decision-making and reduces the likelihood of irrational choices.

However, skepticism surrounding AT persists, particularly among traditional traders, primarily due to concerns related to transparency and the black box problem. The black box problem pertains to potential vulnerabilities in an IT system, such as susceptibility to hacking. Additional challenges include model risk and the potential mismatch between the assumptions of AT and the real-world environment. Traders often replicate strategies without comprehending the underlying value of the traded asset or possess non-public inside information, which AT cannot predict. Notably, AT has faced criticism for its role in the "Flash Crash" of the S&P 500 in May 2010, where the index plummeted over 7% before rebounding. This incident marked the first market crash attributed to new automated trading methods.

An intriguing phenomenon known as "algorithm aversion" has been observed. Despite empirical evidence indicating superior predictive capabilities of algorithmic forecasts over human counterparts, individuals consistently prefer human-made forecasts. Even after witnessing a successful algorithmic performance, people tend to favor human predictions due to a greater willingness to tolerate human failure as opposed to that of a computer.

In conclusion, algorithmic trading has transformed the landscape of financial markets, driven by the integration of advanced AI technologies. While it offers significant advantages, challenges such as transparency, model risk, and algorithm aversion persist, underscoring the need for continued research and ethical considerations in the evolving intersection of finance and AI.

### **Cyber Security**

The modern landscape of security encompasses various facets, including document, information, and property protection, all of which are continuously advancing in the technological age. Our interconnected world heavily relies on network technology, spanning from Internet banking to critical governmental infrastructure. Consequently, the imperative of cyber security and data safeguarding arises to mitigate the peril of compromising valuable and sensitive information. Notably, a 2014 CNBC report estimates that the global economy loses a staggering \$400 million annually due to cybercrimes.

Remarkably, the human factor emerges as the weakest link and a primary cause of cyber security vulnerabilities. Addressing this vulnerability has prompted the widespread utilization of automated systems, particularly artificial intelligence (AI) applications, within the realm of cyber security. Fortifying cyber security networks with AI integration empowers organizations to shield against cyber threats and detect emerging malware. These AI-driven security models enforce robust standards and avert errors, rendering their implementation an indisputable necessity in numerous scenarios.

However, it is essential to remain cognizant of potential risks, as future AI chips might be susceptible to malware and spyware infiltration, influenced by political motivations. Forbes asserts the multifaceted potential of AI in cyber security, with a spotlight on biometric logins (Joshi, 2019) <sup>[11]</sup>.

Conventional cyber security systems often employ advanced threat prevention mechanisms to combat cyber-attacks. The proliferation of malicious malware can be attributed to the limitations of traditional security systems in addressing evolving threats. In contrast, AI-driven systems hold the promise of curbing malware growth and minimizing the efficacy of damage inflicted. Cyber security firms harness AI to train systems in virus and malware identification through intricate data sets, employing sophisticated algorithms and code. This enables AI to execute pattern recognition, effectively unmasking malicious behavior within software and data.

Furthermore, the paradigm shift towards remote work has necessitated a dynamic authentication-based security approach. Organizations strive to facilitate remote access to sensitive data via their networks, rendering security systems more susceptible to cyber threats. Leveraging AI, companies can enhance their flexibility and agility while fortifying their cyber security posture. Multifactor Authentication systems,

enabled by AI, pave the way for a global authentication mechanism capable of modifying access privileges based on user behaviour, applications, devices, networks, data, and geographic locations. By adroitly analyzing this diverse array of parameters, the AI system dynamically adapts user access privileges, fostering robust cyber security even in remote network settings.

### **Other Applications of Artificial Intelligence**

The integration of AI within the banking and insurance industry has manifested in multifaceted applications, encompassing loan approvals, customer interactions, risk assessment, and asset management. Moreover, the realm of AI in financial services extends beyond the domains previously discussed, warranting the exploration of additional noteworthy applications.

Among these applications is AI's role in the recruitment process. Employing machine learning algorithms, AI systems facilitate expedited and unbiased candidate assessment for various roles, including corporate leadership positions. This automated evaluation of qualifications and attributes, based on provided resumes or data, not only streamlines the recruitment process but also ensures an equitable approach, mitigating potential biases related to gender, ethnicity, and race.

Another pivotal facet involves the automation of business proposals within the financial domain. This innovation engenders a comprehensive evaluation process, encompassing an in-depth analysis of terms, conditions, valuations, and pertinent data. Furthermore, it affords a succinct depiction of contractors' historical performance, asset valuation, risk exposure, and projected profitability of proposed business agreements. This automated framework enhances transparency, expedites complex processes, and reduces associated costs, thereby augmenting overall profitability and efficiency within the domain of business proposal assessment.

In sum, while our discourse has illuminated diverse arenas of AI integration in financial services, these additional applications emphasize the far-reaching implications and transformative potential that AI brings to the financial landscape. As technological advancements continue to shape the industry, the multifarious applications of AI underscore its capacity to revolutionize and optimize various facets of financial operations.

### **Conclusion**

The central objective of this thesis has been to comprehensively explore the integration of Artificial Intelligence (AI) in the realm of financial services, delving into its profound impact on our contemporary world. Through this extensive dissertation, we have meticulously examined the multifaceted dynamics of AI, encompassing its challenges, opportunities, risks, and applications within the intricate fabric of our domestic and global economy. Employing a qualitative research approach, our collaborative engagement with several prominent companies entrenched in the daily utilization of AI and technology has yielded invaluable insights, bridging the theoretical underpinnings with practical real-world scenarios.

While AI's transformative potential in the financial services industry is undeniable, it is crucial to acknowledge that we are merely at the nascent stages of its implementation. The expansive realm of this futuristic technology remains largely

uncharted, with its boundaries confined only by the limits of human imagination. The implications of AI are far-reaching and profound, ranging from enhancing communication with staff and customers to deciphering intricate patterns within vast and complex datasets feat beyond human capabilities. Moreover, AI holds the capacity to revolutionize investment decisions, bolstering precision, mitigating fraud, and reducing credit risks. Yet, these represent merely a fraction of AI's limitless possibilities.

As we advance into the future, AI is poised to play an increasingly pivotal role within the financial domain. However, this evolution is not devoid of challenges. Legal, ethical, economic, and societal barriers loom on the horizon, demanding careful navigation. To facilitate mass adoption, it is imperative that human understanding and adaptation evolve in tandem with the technological revolution. Ensuring realistic deployment, meticulous timeframe assessment, and accurate measurement of AI's effectiveness and Return on Investment (ROI) are integral components in sustaining the current momentum and propelling AI's continued growth.

Drawing parallels to the evolution of the internet, it becomes evident that the trajectory of AI's development may be prolonged and marked by iterative progress. What was once relegated to the realm of science fiction has gradually metamorphosed into the technology underpinning recommendation algorithms at Amazon and facial recognition capabilities on Facebook. The role of tech companies in shaping AI's trajectory is undeniable, serving as catalysts for its evolution.

Despite the current uncertainties, one certainty emerges: AI's relevance and potential to address a myriad of daily challenges with unparalleled precision and efficiency are undeniable. However, this realization necessitates a collective commitment to cultivating AI literacy and awareness. Echoing the sentiment expressed by the late Stephen Hawking in a 2014 interview with BBC, the advent of full artificial intelligence holds the potential to herald the supremacy of machines, transcending the limitations of human biological evolution.

In conclusion, this study underscores AI's profound impact on financial services, shaping a landscape replete with intricate possibilities and intricate challenges. While the road ahead is uncertain, one thing remains clear: the synergy between human ingenuity and AI's transformative potential is the compass guiding us through the uncharted realms of technological evolution. As we navigate this transformative journey, one question persists: Will humanity rise to the occasion and seamlessly assimilate AI's potential, or will unforeseen forces shape a future beyond our imagination? Only time will tell. But the age of AI has certainly dawned, ushering in a new era of unprecedented possibilities.

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