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Artificial Intelligence Application in Personalized Fintech

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Abstract

Personal finance is an integral part of finance management, and personalized finance has recently gained much importance. Previously, artificial intelligence has been used in mobile banking services. Mobile banking applications use AI to better understand their customers and to provide them with enhanced features (Manser et al., 2021). Services like expense monitoring, credit-debit balance, payments tracking are all crucial parts of a finance management system. While providing users with these services, the concept of cognition is taken into account to better understand the human perspective and thought process behind using the finance management platform. The impact of digital finance is not restricted to customers, whereas it also affects the global economy. Digital finance uses technologies such as AI, blockchain, IoT and cybersecurity, which make it more efficient by the minute. The best way to improve a service's reach is by making it more customer-friendly (Gigante & Zago, 2022). When a system is easy to use and understand, it is more likely to get recommended. Newer technologies and advancements in AI enable new areas of research and development. In the recent years, the area of supply chain has evolved exponentially, and so has AI. AI can be used in supply chain to optimize the management process of any system.

Keywords: Artificial Intelligence, Fintech, Personal finance, Financial planning, Money management

1. Introduction

Artificial Intelligence is the technique of developing a machine such that it can take informed decisions, and act just like a human. Finance is the discipline of managing and handling money and its related tasks, so as to ensure its safety and security. Financial service providers such as banks, investment firms and financial institutions use what is known as “AI-enabled Fintech” for maintaining financial security (How et al., 2020). Integrating conventional finance methods with trending technologies such as AI, blockchain and cybersecurity make them very efficient and reliable. Financial planning is a crucial step of one’s life. Individual or family, everyone requires financial safety. In this diverse world, financial processes must be customized according to every individual’s needs. Using AI for building personal finance management. The term “Fintech” was first coined in 1972, which really was a great step in the evolution of the finance sector. Initially, fintech processes were used to manage back-end tasks of financial institutions. Since then, as technology advanced, so did fintech. A lot of technologies were blended with finance to obtain faster and more efficient methods of processing information. In today’s tech-savvy world, artificial intelligence and its sub-branches are the most used technologies in any given field (Riikkinen et al., 2018). The collaboration of AI with fintech opened up new areas of exploration and development, and AI is actively used by the banking sector to provide better services to its customers. With the help of AI-enabled fintech, personal finance emerged as a growing area of research.

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Personal finance is an integral part of finance management, and personalized finance has recently gained much importance. When around eight billion people leading different lives exist in this world, personalized financial management is the key to financial stability. Personalized finance management platforms use various AI methodologies to provide their customers with new and unique features to track their finances. Machine learning and deep learning are extensively used in fraud detection, stock market prediction and other systems (Kurani et al., 2023). Personalized financial platforms analyze a customer's spending patterns and can suggest suitable techniques to save money and get the best returns. At the same time, these platforms use interpretable models to maintain transparency. With the continuous advancement of technology, fintech is also upgrading continuously. The involvement of AI in fintech services make everyday tasks easier and faster. Personalized finance management services offer features such as expense tracking and transaction management, with automated bill payments and debt management. They also include fraud detection systems that efficiently detect fake schemes and warn customers. Another useful feature is scheme/product recommendation. Based on a customer's income and previous investments, the system recommends personalized schemes that would provide the best returns. Personalized finance management services induce better financial planning and strategic budgeting, leading to more savings. Fig. 1 shows the various features of AI-enabled fintech, when used for personalized finance management. Artificial intelligence is the technique of developing a machine such that it can replicate a human. AI consists of multiple branches such as machine learning, deep learning, explainable AI etc. which are used to improve conventional financial processes. A personalized financial management platform offers expense tracking & transaction management, automated bill payments with deadline alerts, fraud/spam detection, data privacy and customized investment advices.

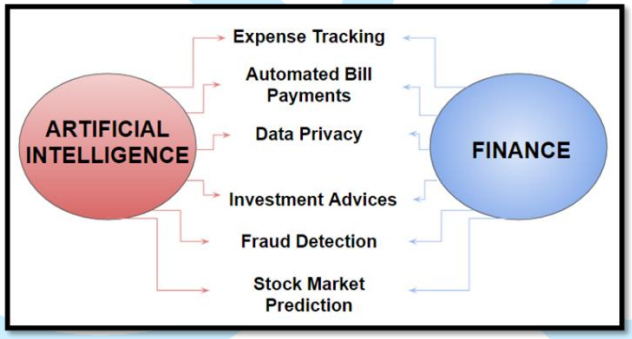

Fig. 1 Artificial Intelligence in Personalized Financial Management

2. Literature Survey

Traditionally, artificial intelligence is used in the banking sector for backend management, with minimal customer interaction. These systems work efficiently, but the need for customized financial management arises, and AI is the best technology yet to develop such systems. Using AI to design personalized finance applications improves budgeting for young individuals, which gives them a sense of independence. These platforms allow for better expense tracking which effectively reduces unnecessary spending. Personalized finance management applications store and process a huge amount of customer data, which is sensitive. Thus, customer data is stored in an encoded format using strong encryption algorithms, ensuring data privacy. Personal finance platforms account for better financial planning and reduced stress. Previously, artificial intelligence has been used in mobile banking services. Mobile banking applications use AI to better understand their customers and to provide them with better features (Königstorfer & Thalmann, 2020). These features revolved around present services provided, enhanced data privacy, and transaction management, which was processed using structural equation modelling. The introduction of chatbots and virtual assistants made it easy to solve typical issues faced by customers. Basically, AI was used in mobile banking to limit human intervention as much as possible, by developing human-like machines to perform simple tasks (Manser Payne et al., 2021).

The concepts of artificial intelligence were also used to analyze firm performance in AI-based transformation project and other industrial projects. Artificial Intelligence has a significant influence on industrial projects, since it has the capability to develop systems that are able to extract useful information from the environment, make a decision based on available knowledge and produce an output as a reaction to the environment. Artificial intelligence provides the user with optimized solutions to a problem, with creative thinking and innovation. AI encompasses a vast range of technologies which have unique applications, and only make the system stronger if used together. This makes AI-dependent projects high in business value and performance. Another use of artificial intelligence concepts in mobile banking is to induce anthromorphism and intelligence in mobile banking applications (Wamba-Taguimdje et al., 2003). This was done using a non-probability approach, and by applied the stimulus-organism-response (SOR) theory. The target was to predict and study customer reaction (response) to non-human entities possessing human-like qualities. Anthromorphism in AI results into minimized human intervention, thus reducing human error. With the help of this technique, it was realized that anthromorphism proved to be an interesting feature in mobile banking platforms (Lee & Chen, 2022).

Financial institutions use artificial intelligence in stock market prediction. Predicting stock values and suggesting the best investment options is an important application of AI. Stock market prediction systems majorly use machine learning (such as SVM) and deep learning (artificial neural networks) algorithms to produce accurate results. Various other technologies like decision trees and sentiment analysis are considered. Stock market prediction is an interesting feature in financial management applications, as correctly predicting shares results into better investments and thus better returns for customers (Kurani, 2023). Fig. 2 shows previously implemented features such as:

1) Credit decisions (data-backed, non-biased)
2) Risk management (early detection of issues)
3) Fraud prevention (prevention of credit card fraud/money laundering)
4) Trading (“Time is Money”)
5) Personalized Banking (chatbots, virtual assistants)
6) Process automation (boost in productivity)

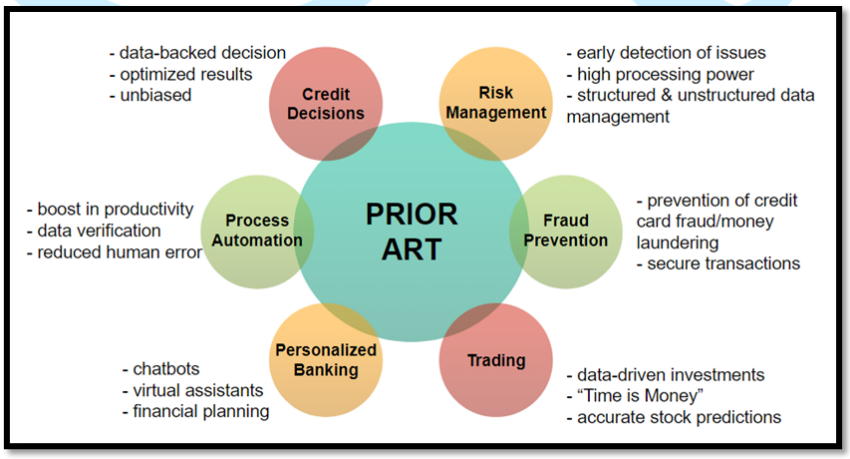

Fig. 2 Prior Art in Financial Management

3. Methodology

Most finance management platforms provide their users with chatbots, which are automated programs that learn based on a knowledge base provided to them, and answer user queries depending on the rule-based expert systems integrated with them. Interacting with chatbots makes it easier as they provide users with definite and precise answers. At the same time, chatbots responses are very human-like, which allows users to feel comfortable while interacting with chatbots. Chatbots increase customer involvement and interest in the

finance management platform, which in-turn boosts its value. Chatbots are designed according to the main feature of any application. For instance, an insurance scheme platform will have a chatbot that can answer all insurance related queries. This ensured accurate and precise results. Artificial intelligence methodologies are avidly used in financial inclusion to provide individuals as well as commercial institutions with useful financial services (Riikkinen et al., 2018). Not only businesses, but young individuals require fintech products to efficiently plan and manage their budget and expenses. Services like expense monitoring, credit-debit balance, payments tracking are all crucial parts of a finance management system. While providing users with these services, the concept of cognition is taken into account to better understand the human perspective and thought process behind using the finance management platform. Cognitive computing enhances the design and development of these platforms as they now become more user-oriented, that is more relatable to customers, which increase the chances of the platform being used regularly (How et al., 2020).

The use of artificial intelligence has had a major impact on the financial sector. Artificial intelligence has had a bittersweet effect on financial service providers, and shall continue to do so. While AI has quickened the traditional financial processing techniques, many human jobs have been rendered obsolete due to very less human intervention. At the same time, human jobs will never become completely obsolete. This is because the current artificial intelligence technology lacks the emotional quotient required while interacting with customers. The client-employee interactions are still an important asset to financial institutions. Thus, AI can completely change the value of a finance platform based on features, but its crucial employees can never be replaced. Artificial intelligence has had a significant influence on customer-facing financial services (8). Customer financial services such as loan/debt management, insurance, investments etc. are improved using AI techniques. Product recommendation models are used to suggest customized schemes to the user. These recommendations depend on previous investments of the user and their income. Financial institutions also use AI concepts for fraud detection to prevent any investments in fake schemes. Thus, AI has effectively improved the customer-facing financial services by making them more personalized.

Any product or service can be considered fully successful only when its users are content with it, and when the product or service has regular or repeated customers (Hentzen et al., 2020). In today's world, artificial intelligence is used in almost all real-world applications. Thus, consumers come across AI almost daily. The use of AI in the finance sector has made it very efficient and has increased its market values. Financial institutions use multiple different tactics for marketing communication. One of these is maintaining a good communication with customers. The use of chatbots and virtual assistants has elevated the importance of finance management platforms, thus making their quality and service better (Chen et al., 2021). Fig. 3 shows the numerous characteristics of a financial management platform, which use various AI methodologies and techniques to work effectively. Some examples include machine learning algorithms for fraud detection, explainable Ai for improving financial literacy.

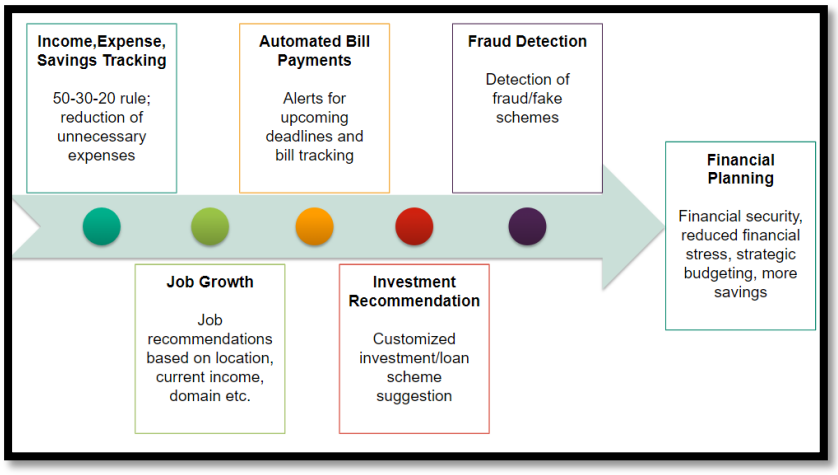

Fig. 3 AI-enabled financial management methodology

4. Applications

The DARQ technologies (Distributed ledger, Artificial intelligence, extended reality, Quantum computing) find multiple applications in the financial sector. These technologies constantly improve the existing state of any services provided. In personalized banking, artificial intelligence is extensively used. The main task in personalized banking is to cater to the customer's current need, and to try and solve any issues immediately. AI comes to be of great help in such a situation. With smart algorithms and evolving concepts, AI provides faster and more optimal solutions as compared to conventional methods. Using AI benefits both supply and demand side, which makes it the best technology to be used. The impact of digital finance is not restricted to customers, whereas it also affects the global economy (Gigante & Zago, 2022). Digital finance uses technologies such as AI, blockchain, IoT and cyber security, which make it more efficient by the minute. For this reason, digital finance methods can be used in the development of a green economy. A green economy's foundations are sustainability, environmental safety and risk management. While developing a green economy, all the factors affecting the environment are taken into consideration. These include digital marketing, smart city, personalized banking etc. With the use of AI concepts, these factors can be designed in such a way that they positively affect the environment (Zhou, 2022).

The best evaluation method for any system in the business sector is customer review. A system can never function without its users. Hence, understanding feedback of customers is of utmost importance for any service or product. Automating the review process makes it faster and thus more advantageous. To make this process more apt, the sentiment analysis technique is used. Sentiment analysis is the method by which a machine is trained to understand the emotion behind a text. This method combines AI (artificial intelligence) and NLP (natural language processing) concepts, to develop a beautiful system that accurately evaluates customer reviews. Through this, the faults in the service or product can be understood and removed. The use of AI in SME's (small to medium range enterprises) is beneficial for smooth execution of their business idea (Ahmed et al., 2022). Latest AI concepts when used in the business model make sure the system completes all tasks successfully and produces accurate results. This boosts the model's productivity, and also improves its processing power. Through such a system, optimal results are produced. The system also has an effective risk management plan that ensures early detection of issues so that any errors can be prevented. Overall, AI efficiently plans out the entire working of an SME (Drydakis, 2022).

The applications of artificial intelligence are increasing day-by-day. More and more fields are using AI to improve their systems. This is true specifically in the business sector. Businesses are eager to integrate AI techniques into their models for better efficiency and to boost productivity. However, a small section of this field still remains unexplored by AI. This happens due to limited technical expertise and general traditional way of thinking. AI has methods that help organizations easily use advanced technical concepts in their business model. This helps in making the business more successful due to customer interaction and feedback (Enholm et al., 2022). Financial management platforms provide a sense of financial security and reduce financial stress. The Fig. 4 shows the applications of financial management platforms such as income/expense/savings tracking, investment scheme recommendation systems, fraud detection systems, stock market prediction systems, to name a few.

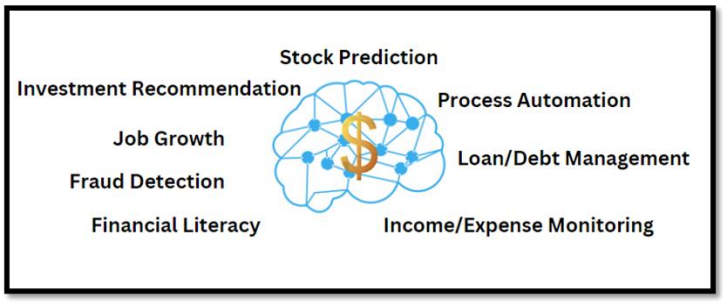

Fig. 4 Applications of personalized financial management platform

5. Discussion

Enterprise management is a crucial part of every business. It is important to monitor and manage the day-to-day activities of the system. This can be done in a more efficient way by using artificial intelligence and deep learning concepts. The best way to improve a service's reach is by making it more customer-friendly. When a system is easy to use and understand, it is more likely to get recommended. A service can be made more customer-oriented by using AI concepts of sentiment analysis, and also by analysing previous errors in the system. With the help of reinforcement learning, a system's error-making tendency can be reduced, thus making it stronger. This ultimately improves the business trust and consumer satisfaction. Artificial intelligence has already been used in almost every sector (Liu & Han, 2022). Consequently, it is also being used in the government sector. AI-enabled healthcare devices, AI-based disease diagnostics, AI-based farming and crop yielding, climate management, weather prediction, smart city, personalized education, are only a few areas of application of AI in the government sector. AI has multiple advantages such as faster execution of tasks, boost in productivity, reduced error rate and minimal human intervention. This makes AI the best technique to be used so far (Sharma et al., 2020).

I-AI or Industrial Artificial Intelligence is the use of AI techniques for industrial applications. AI helps in the planning, designing and overall processing of an industrial project model. While planning the execution of an industrial project, AI looks for effective methods that can be used in the project. In the designing phase, any errors in the planning phase are identified and removed. Once done, a precise design of the model is generated. Finally, the implementation of this model is done. The working and output of the model is then assessed and evaluated to make it as accurate as possible. Energetics systems also make use of AI techniques to perform their tasks (Zhang et al., 2019). With increasing demand of efficient features, new AI concepts such as fuzzy logic, artificial neural networks and genetic algorithms are used to improve a system. By using these, a system will become very advantageous such that - reduction in energy wastage, improved energy management, efficient use of renewable resources and reduced pollution are ensured. It is extremely important for an energetics system to achieve sustainability development goals. These can be achieved through AI methods.

The field of artificial intelligence targets three sectors - country, company and consumer (Ahmad et al., 2022). The consumer is the most integral part of this system. Consumer satisfaction, happiness and trust are important success factors for any service. These can be achieved by providing the consumer with unique features and best returns. The company providing the service should be technically advanced. Finally, the country should be positively affected through this service, contributing to green economy (Kopalle et al., 2022). Fig. 5 shows that the market offers multiple applications/websites for financial management. Existing applications like ‘Wallet’ and ‘Monefy’ offer many features. Some of them, as shown in the Fig. 5 are expense monitoring, easy & safe transfer of funds, bill payments with alert-set option, and account balance viewing. These apps also safely store user’s credit/debit card details.

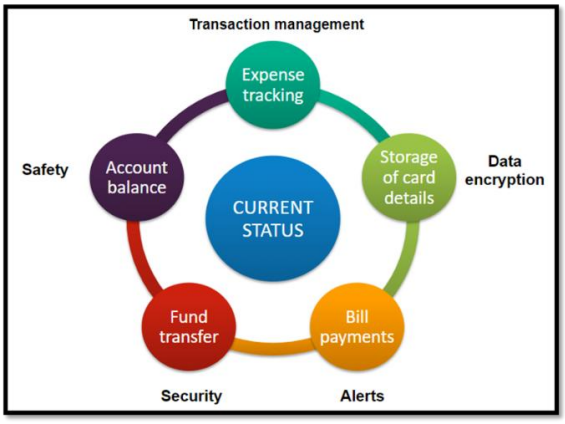

Fig. 5 Current status and recent trends in finance management technologies

6. Conclusion

Financial management is the art of developing an efficient system to control all aspects of financial planning - income, expense, savings, insurance and investment. Artificial Intelligence has a significant influence on industrial projects, since it has the capability to develop systems that are able to extract useful information from the environment, make a decision based on available knowledge and produce an output as a reaction to the environment. Cognitive computing enhances the design and development of financial management platforms as they now become more user-oriented, that is more relatable to customers, which increase the chances of the platform being used regularly. Businesses are eager to integrate AI techniques into their models for better efficiency and to boost productivity. With increasing demand of efficient features, new AI concepts such as fuzzy logic, artificial neural networks and genetic algorithms are used to improve a system. Artificial intelligence is often integrated with Big Data, another important field. Big data has the ability to process both structured and unstructured data, which enables financial service providers to make more detailed and personalized portfolios for their customers.

7. Future Scope

Recent advancements in technologies such as AI (artificial intelligence), IoT (Internet of Things), blockchain and cybersecurity have opened up many new areas of research. Many sectors use AI to develop more efficient methods of data management and processing. The branches of AI like machine learning provide users with optimal algorithms that help in effective predictions. By altering these algorithms, new algorithms can be developed which might find newer applications. Other than these, explainable AI is used to better understand various AI algorithms. AI also helps in designing chatbots and voice-enabled virtual assistants for better communication. Thus, AI and Big data go hand-in-hand while developing a large-scale service. Entrepreneurship has evolved tremendously in the past years. Newer technologies and advancements in AI enable new areas of research and development. By combining AI and entrepreneurship, new challenges can be explored and overcome. AI can be used in supply chain to optimize the management process of any system. By using concepts of machine learning and natural language processing, the supply chain methods can be strengthened to develop a much more efficient system. Fintech uses numerous technologies like AI, blockchain, cyber security, etc. to design systems that are optimal and user-friendly. Banks, investment firms and financial institutions use AI methods to improve the processing power of existing processes. Fig. 6 shows that customer sentiment analysis can be developed to better understand customer reviews and thus improve on the system. Data privacy can be done by using various encryption algorithms, to enhance security. The financial management system can also be refined to analyse unstructured data such as images etc.

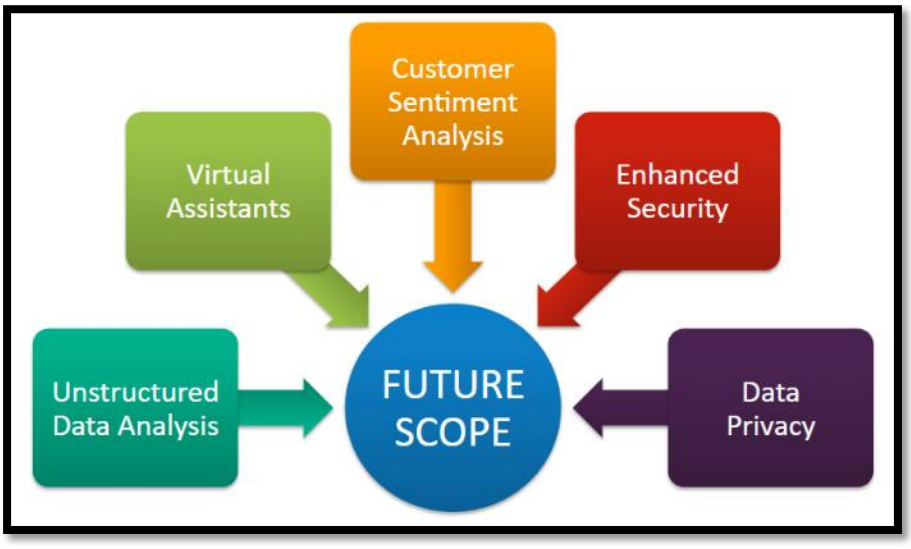

Fig. 6 Future scope of financial management platforms

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Declaration of Conflict

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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