

Artificial Intelligence as Personal Financial Advisor in the Future?

- A Case Study Based on Algorithmic Innovation Strategies

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Abstract: This paper mainly introduces the development prospects and challenges of personal financial advisors driven by artificial intelligence (AI), as well as the advantages of combining artificial intelligence with financial management. With the rapid development of artificial intelligence technology, the personal financial consulting industry is undergoing profound changes. Through deep learning and big data analysis, taking JIMI, JD.COM as an example, it is demonstrated that artificial intelligence financial consultants can grasp the market trend more accurately and provide users with more accurate and personalized financial advice. It shows in detail that in the artificial intelligence environment, it can provide all-weather service for financial users, and users can log in to the client at any time to consult financial related issues, and artificial intelligence will restore to users. The capital market has been in a dynamic change, and there are many uncertainties in the development of the whole financial market, but investors don't know enough about financial treatment. Therefore, the application of artificial intelligence in financial management has won the favor of many financial users, and it also has a certain role in promoting the development of the capital market.

Keywords: Artificial intelligence model, Personalized smart financial advisor, Smart financial management, Robo-advising

1. Introduction

1.1. Service robots in financial advisory services

As stated in the article "Implementing artificial intelligence empowered financial advisory services. Artificial Intelligence (AI)-empowered financial advisory services (i. e.: robo-advisors) have been investigated and discussed by researchers from different aspects and disciplines, constituting a wide range of knowledge regarding their emergence, evolvement, implementation, design, and application. [1] However, existing knowledge regarding robo- advisors is fragmented, calling for a structured and integrative frame- work for researchers and service providers.

Due to the formidable computational capabilities of AI, customer service providers employ AI for the analysis and assimilation of user data, yielding diverse benefits within frontline customer

services. In contrast to other digital technologies, AI possesses the ability to tailor services to individual customers and make predictions through intricate algorithms without human intervention. Furthermore, AI's interface can communicate, interact, and provide customer service, all while operating autonomously. [2] This interactive, adaptive, and autonomous interface, is referred to as a service robot.

1.2. development situation

At present, the pace of the combination of artificial intelligence and finance is getting faster and faster. For example, the first generation of securities investment artificial intelligence system (SIAI) developed by Beijing Zipeiyi Investment Consulting Company, which is the first in China to use artificial intelligence for investment management, can independently analyze investments every day, and produce a number of investment strategies, and then enter the market for trading. [3] During the investment period, SIAI system can adjust positions and buy and sell according to market signals in real time. The "Smart Investment" tool launched by Jingdong Finance intelligently works out a portfolio investment plan for investors by answering a few simple questions on the page; JD.COM's "Fund Optimization" tool ranks the fund products in Jingdong Finance from six dimensions, providing a reference for users to select fund products. [4] Baidu Finance is rapidly promoting the "Baidu Brain" plan and innovating the financial service model with Baidu characteristics. Alibaba's Ant Financial Team uses population intelligence technology to allocate assets in the business scenario of Ant Financial. Taking the innovation in the field of monitoring technology as an example, it shows that the combination of artificial intelligence and finance has bright prospects. For example, on the one hand, artificial intelligence financial consultants can improve the efficiency, accuracy and personalization of services and meet the diversified needs of users; On the other hand, data security, the stability and reliability of algorithm models and the constraints of laws and regulations also need to be paid attention to. In order to meet these challenges, artificial intelligence financial consultants need to constantly improve their professional ability, strengthen technology research and development and data security protection, and ensure business compliance.

1.3. Research gaps and aims

1.3.1. Gaps and limitations

The reliability of this matter is impacted by the decision of the AI system based on its built-in algorithm and model. However, although these models and algorithms will be more accurate and more convenient to operate than manual work in most cases, even AI algorithms may have defects or loopholes, which may lead to the AI system making wrong decisions. In addition, the over-fitting of the model may also lead to its poor performance in the new market environment.

At the same time, financial data often involves personal privacy and asset security. However, the AI system may face the risk of security threats and privacy leakage when processing these data. Hackers or malware may use system vulnerabilities to attack the AI system, resulting in investors' financial losses or personal information disclosure. [5]

In addition, artificial intelligence still has many defects in financial management. In order to give full play to the potential of AI in the financial field, it is necessary to constantly improve relevant technologies, regulations and policies to improve the accuracy, security and adaptability of AI systems. At the same time, it is also necessary to pay attention to user needs and privacy protection to improve the convenience and comfort of human-computer interaction.

As a study by the Division of Real Estate Business and Financial Systems, KTH Royal Institute of Technology, Sweden shows: Numerous articles regarding robo-advisory services have been published across various journals and conference proceedings in recent years. Amidst this literature,

three distinct gaps come to light. Firstly, these studies are scattered across research disciplines each with its own focal points. [6]This necessitates an interdisciplinary analysis and the development of an integrative framework to reorganize and synthesize existing evidence into new knowledge.

1.3.2. Overall Aim:

With the continuous development of economy and the continuous growth of residents' wealth, the importance of personal financial advisory services has become increasingly prominent. In the current complex and changeable financial environment, individual investors are faced with many investment options and financial products, which makes them urgently need to seek professional financial consultants to provide tailor-made financial planning solutions for themselves. As the cornerstone of artificial intelligence, machine learning improves the accuracy of prediction and decision-making through continuous learning and improvement. In the field of personal finance, the application of machine learning technology has significantly improved the personalization and refinement of financial planning. By analyzing users' financial situation, investment preferences and risk tolerance, machine learning model can tailor personalized financial advice and product recommendations for users. This personalized service not only meets the diverse needs of users, but also improves the work efficiency and professionalism of financial consultants.

1.3.3. Specific objectives

The importance of this study is that artificial intelligence is used as a personal financial consultant, which improves the safety, efficiency and convenience of investors in the financial management process in terms of algorithms. In detail, this combination not only greatly improves the efficiency and accuracy of financial management, but also enables investors to better grasp the market dynamics and realize the preservation and appreciation of assets. The following is a detailed analysis:

I. Accurate financial analysis Artificial intelligence technology can accurately analyze the financial situation of investors through big data analysis, machine learning and other methods. By collecting data such as investors' income, expenditure and assets, artificial intelligence can provide them with a clear and comprehensive financial portrait, help investors understand their financial situation more accurately and provide strong support for subsequent investment decisions.

II. Personalized investment planning Everyone's financial situation, risk tolerance and investment objectives are different. Artificial intelligence technology can recommend the most suitable investment portfolio for investors through multi-dimensional data analysis of market, industry and products according to their personal situation, so as to achieve the best investment effect.

III. Intelligent Risk Assessment Investment is always accompanied by risks. Artificial intelligence technology can evaluate the risks of various investment projects and help investors understand the potential investment risks more comprehensively. At the same time, artificial intelligence can also adjust the risk assessment results in real time according to market changes, provide real-time risk warnings for investors and ensure their investment safety.

IV. Market Trend Forecast Artificial intelligence technology can predict market trends through deep learning, neural networks and other methods. Through the study and analysis of historical data, artificial intelligence can discover the law of market operation, provide valuable investment advice for investors and help them seize market opportunities.

V. Automated asset allocation In traditional financial management, investors need to allocate assets manually. The application of artificial intelligence technology can realize automatic asset allocation and greatly improve the efficiency of financial management. Through real-time analysis

of market, industry and other information, artificial intelligence can automatically adjust the proportion of investors' asset allocation to achieve the best return and risk control.

2. Theoretical Contribution

2.1. Brief Introduction of Artificial Intelligence Since its appearance

Artificial intelligence has been continuously improved in technology and function, which makes its function stronger and stronger and it can play an important role in various fields and promote the development of the information age. One of the goals of artificial intelligence research is to make robots complete the work that human intelligence can do, but this kind of work has different definitions in different times, but artificial intelligence is never human intelligence and will not exceed human intelligence. As far as the definition of artificial intelligence is concerned, it can be subdivided into two aspects: artificial and intelligent, in which artificial is to replace human work, and the definition of this aspect is relatively unified. [7] However, there are many controversies about the definition of intelligence, which involves the definition of consciousness, self, thinking and many other aspects. It is an accepted view that the intelligence that people know is only their own intelligence, and their understanding of their own intelligence is limited, and there are also limitations in understanding the necessary elements of human intelligence. Based on this, understanding the artificial intelligence will face greater limitations.

2.2. Financial management cylinder

Financial management refers to the management of finance, and its purpose is to preserve or increase the value of finance through the purchase of financial products or other investment activities. Financial management can be subdivided into three categories: corporate financial management, personal financial management and family financial management. At present, financial management activities have been integrated into people's daily lives, and financial products are more popular. Financial management often coexists with investment and financial management. The reason is that financial management includes investment, and investment also includes financial management. From this point of view, financial management behavior is not simply a financial outward investment, and the party receiving the investment can also be a financial management behavior. [8] The connotation of financial management includes three aspects: (1) financial management is to manage the financial resources acquired in a person's life, not simply to solve the problem of short-term capital demand. (2) Financial management belongs to cash flow management. Therefore, financial management is needed regardless of whether there is money or not. (3) All financial projects have hidden risks, so financial management is also an uncertain behavior.

2.3. Analysis of the present situation of financial risk monitoring technology from the perspective of patent

The data in this paper comes from "A Patent Retrieval and Analysis Database". The database contains 170 million pieces of patent information worldwide, and provides a functional interface to automatically generate a retrieval form according to the filling of retrieval fields, including keywords, date/number, related persons, classification number and other patent information, and the retrieval scope includes text files such as patent titles, abstracts and specifications. [9]

This paper searches and analyzes the patent status of financial risk monitoring technology. The retrieval requirement is the patent information with the theme of "Financial risk" or "financial risk" as of December 18th, 2023, and the retrieval formula is $[SS = (\text{financial risk}) \text{ OR } SS = (\text{Financial$

risk)AND publication date = (December 1st, 2023. 8)J. Search results: There are 14,713 patents related to "financial risks" at home and abroad, including invention patents, utility model patents and design patents, among which the most common type is invention patents; There are 10,335 patents in application status, accounting for 70.24%, and 3,858 patents have been authorized, accounting for 26.22%; 110 utility model patents, accounting for 0.75%; 7 design patents, accounting for 0.05%; There are 403 other types of patents, accounting for 2.74%.

According to the published data, all patents are classified and counted, and it is found that the countries or organizations with the largest number of patents (including those in application and those authorized) in the field of financial risk monitoring technology and their patent numbers are: 7194 in the United States, 1610 in the World Intellectual Property Organization (WIPO), 1019 in Japan and South Korea. 975, 774 Canadian, 678 European patents (EPO) and 671 China. [10]

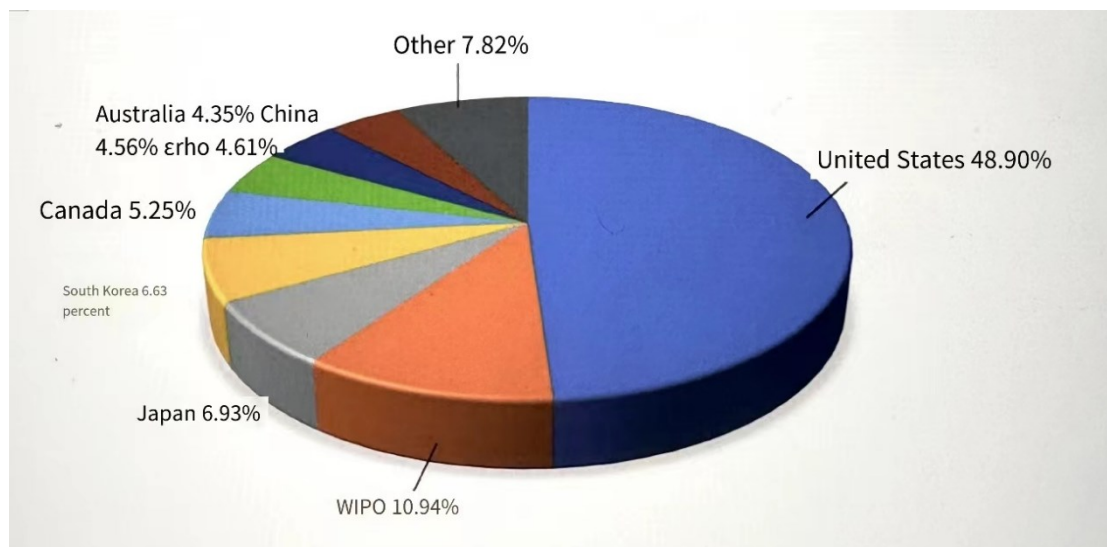


Figure 1: degree of technological innovation in the field of financial risk monitoring technology in various countries

From the statistical data in Figure 1 above, key findings emerge the degree of technological innovation in the field of financial risk monitoring technology in various countries, especially those related to artificial intelligence. The United States has the largest number of patents in this field, so the accumulation of technological innovation is more advanced; WIPO and EPO, as international and regional patent application organizations, their high number of patents reflects the importance attached to financial risk monitoring technology worldwide. On the whole, the number of patents in this field shows a diversified trend, that is, all economies are actively participating in the innovation of financial risk monitoring technology.

3. Method

3.1. case analysis

Let's look at actual cases to understand how artificial intelligence becomes a personal financial advisor.

Firstly, according to the recent Citibank research report, from 2012 to the end of 2015, the assets managed by smart investment consultants will increase from 0 to 29 billion US dollars, and the assets managed by smart investment consultants will increase geometrically in the next decade. It is estimated that the total scale will reach 5 trillion US dollars. [11]At present, there are a large

number of Internet companies that can provide asset management services in developed countries, among which Wealth Front and Better are the two largest companies in the industry, with assets of more than \$2.6 billion each.

Secondly, taking JIMI in JD.COM as an example, this paper explores the progress in the application of artificial intelligence in financial management:

in the early stage of financial investment guidance application From the perspective of financial management, people are concerned about choosing the right financial management method. With the rapid development of artificial intelligence, the application scope of intelligent customer service has been continuously expanded, and people can obtain the financial information they need in time through intelligent customer service. In financial activities, the pre-financing service is similar to the website recommendation service, specifically, it is to analyze users' needs and recommend related products for users on this basis. Compared with traditional manual recommendation, this intelligent service is more accurate. Taking JD.COM JIMI as an example, this case shows that AI can provide investment guidance services for users in the early stage of financial management. Through the extraction and analysis of chat records, AI financial advisors can understand the degree of financial knowledge of users, and classify investment types suitable for users and present them to users. By understanding users' needs and investment ability at this time, intelligence system can recommend financial products for them or answer their questions. Financial management is a complicated activity, especially in the market where the variety of financial products is increasing. It is difficult for users to make the right choice. Some users have more funds themselves, and they will put all their eggs in one basket when buying stocks. [12]However, this behavior often leads to all their assets being directly locked up. Under the guidance of JIMI, users can adjust this thinking mode and invest more rationally.

Application in Financial Advisor The foundation of financial management is optimization, and all users who participate in financial management want to get the highest profit with the lowest capital. In the artificial intelligence environment, there is actually a huge knowledge base. [13] Artificial intelligence financial advisors give correct guidance to investment and financial management users by mobilizing the knowledge base. During the campaign, they mostly comprehensively analyze and evaluate the assets and investment direction of financial management personnel, and take the final analysis results as the basis to provide users with suitable investment plans. In the rapid development environment of big data and cloud computing, artificial intelligence services are also developing in the direction of accuracy and convenience. [14]JD.COM JMI can make a comprehensive evaluation based on users' assets, investment intentions and risk preferences, and at the same time optimize the best financial portfolio according to the existing types of financial products with the help of cloud computing and big data analysis.

Application in financial management business After making clear the direction of financial management, financial users will have a deeper understanding of financial management methods and related information. In some large-scale banking services, artificial intelligence has replaced manual services, and users who participate in financial management can get a deeper understanding of the business process and required procedures through contact with intelligent customer service. [15]The application of artificial intelligence service in financial management, on the one hand, improves the efficiency of financial management business, on the other hand, it also helps to improve users' satisfaction with financial management services, thus improving their enthusiasm for participating in financial management.[16]

Application in information security of wealth management users. After the financial management related business is completed, it is necessary to improve the user's personal information, with the aim of ensuring the security of user information. The application of computer's own visual recognition technology and personal physical feature recognition technology

in financial institutions has prompted the intelligent service robot to identify the identity of financial users. In addition, in order to further improve the investment environment security of financial institutions, financial enterprises apply artificial intelligence detection systems and install them in more important areas to identify users. [17] In the process of information consultation from users to JIMI, JIMI can obtain user information through relevant channels. If users have problems in JD.COM, JIMI robot will automatically record them.

4. Conclusion

This paper conclude that based on its powerful functions, artificial intelligence can be applied in many fields, including smart homes and intelligent robots, and the application of artificial intelligence in financial management is also one of the main directions. Artificial intelligence is widely used in financial management, from pre-financial consultation, financial management business selection and development, user information analysis and security maintenance. From the analysis results of the application of JIMI in all aspects of financial management, artificial intelligence can greatly improve the efficiency of financial management business, and at the same time, it can automatically identify users, which is helpful to improve the information security of users and control various risks faced by financial management institutions. In addition, with the help of the application of artificial intelligence, users can consult financial management-related questions at any time, and artificial intelligence robots will answer them in a short time, which greatly improves users' satisfaction with financial management services, thus indicating that artificial intelligence can become personalized financial consultants.

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