

# Analysis of Financial Market using Generative Artificial Intelligence

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**Abstract:** This paper delves into the utilization of Generative Artificial Intelligence (GAI) for virtual financial advising and analysis in capital markets. Initially, it outlines the fundamental principles of GAI and its significance in financial decision-making. Subsequently, it scrutinizes the shortcomings of conventional financial advisory models through a review of literature and empirical data. It then examines the emerging trends and benefits of intelligent financial advising, contrasting them with traditional models. Following this, it elucidates the practical applications of generative AI in finance, encompassing intelligent investment guidance, risk evaluation, and decision-making.

**Keywords:** Generative artificial intelligence; Financial decisions; Artificial intelligence; Financial market.

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## 1. Introduction

Propelled by digital technology, Artificial Intelligence has undergone rapid advancements, with Generating Artificial Intelligence (GAI) garnering attention for its distinct capabilities. By assimilating vast datasets and discerning patterns, generative AI can autonomously create innovative content and emulate human behavior and cognition. Within the realm of financial decision-making, leveraging generative AI holds significant promise for enhancing the precision and efficacy of decision-making processes. This article aims to investigate the application of generative AI in virtual financial advisory services and capital market analysis. Generative AI spans various areas including risk assessment, investment decision-making, and financial analysis, leveraging extensive data processing to uncover latent rules and trends, consequently offering precise predictions and recommendations. Moreover, generative AI aids financial analysis by assisting analysts and investors in comprehensively understanding and interpreting financial data, thereby furnishing more comprehensive insights. Through a synthesis of literature and analysis of real-world data, this paper unveils the latent value of generative AI in virtual financial advisory services and capital market analysis, poised to deliver more intelligent and efficient support for financial decision-making.

Generative AI spans various domains, including risk assessment, investment decision-making, and financial analysis, leveraging extensive data processing to uncover underlying patterns and trends, thereby providing precise predictions and recommendations. Furthermore, generative AI assists financial analysts and investors in thoroughly understanding and interpreting financial data, offering comprehensive insights. Through a combination of literature synthesis and real-world data analysis, this paper reveals the inherent value of generative AI in virtual financial advisory services and capital market analysis, poised to offer more intelligent and efficient support for financial decision-making.

The integration of generative AI into financial decision-making processes signifies a paradigm shift in how data-driven insights are leveraged. By harnessing the capabilities

of generative AI, financial institutions can not only enhance the accuracy of their predictions and recommendations but also streamline their operations through automated analysis and decision-making. Furthermore, the ability of generative AI to understand complex financial markets and adapt in real-time to changing data dynamics provides a competitive edge in an increasingly volatile economic landscape. As generative AI continues to evolve and mature, its potential to revolutionize financial advisory services and capital market analysis remains a focal point for research and innovation in the finance industry.

## 2. Related Work

### 2.1. Financial management

As a crucial intermediary in the financial realm, traditional financial advisors hold significant sway within the financial system. Research indicates that nearly 70 percent of affluent families engage with a financial advisor annually, seeking counsel on investment strategies and financial planning. These advisors aid both individuals and institutions in managing and expanding their financial portfolios by offering advisory services, recommending financial products, providing asset allocation guidance, and more[1-3]. Despite their pivotal role, traditional investment advisory services rely on manual processes, constrained by fixed temporal and spatial limitations. This results in prolonged service durations, non-real-time data provision, and suboptimal customer experiences.

Intelligent advisory services, on the other hand, leverage big data, intelligent algorithms, and electronic information transmission methods to streamline the service process scientifically. Through electronic and intelligent methodologies in marketing, user evaluation, asset allocation suggestions, intelligent rebalancing, information dissemination, and customer reporting, these services facilitate 24/7 investment advisory across multiple platforms, thereby enhancing customer experiences significantly.

However, despite the importance of traditional financial advisors, they are not without their drawbacks and limitations:

1. Limited Reach: Traditional advisors predominantly rely

on face-to-face interactions with clients, limiting the accessibility of their services. This poses challenges, particularly for clients in remote areas or those constrained by time, in accessing timely financial advice and services.

2. **Lack of Personalization:** Manual advisory services often struggle to deliver highly personalized experiences when catering to a large clientele base. Consequently, some clients may not receive tailored advice aligned with their specific needs.

3. **Incomplete Information:** Financial advisors' recommendations are typically informed by their own expertise and knowledge, potentially overlooking certain financial products and market information. This can result in clients lacking access to comprehensive financial insights, leading to suboptimal decision-making.

Hence, while traditional financial advisors are integral to the financial market, it's imperative to acknowledge their limitations. Furthermore, with technological advancements, the demand for more efficient and personalized financial services is burgeoning.

The evolution of intelligent assistants within enterprises has traversed four pivotal stages: Intelligent Intern (SI), Personal Digital Assistant (PDA), Personal Advisor (PC), and Enterprise Optimized Employee (COE). Initially, AI focused on automating processes to enhance workflow efficiency[4-5]. Subsequently, it progressed to catering to complex personalized needs and optimizing services based on user behavior patterns. In the third phase, individual advisors began offering professional advice backed by in-depth data analysis to bolster decision-making processes. Ultimately, AI matures to the point of being optimized for enterprise operations, functioning as a pivotal force capable of independently executing tasks and fostering innovation. These stages delineate the evolutionary trajectory of AI in business operations, from rudimentary automation tools to sophisticated systems providing intricate analyses and decision support, thereby catalyzing business growth and transformation.

## 2.2. Intelligent finance

Intelligent financial advisors leverage cutting-edge technologies such as artificial intelligence, in tandem with foundational elements like big data and cloud computing, to seamlessly integrate with the financial sector. They provide technical support to diverse enterprises and participants in the financial industry, underscoring the pivotal role of artificial intelligence in financial market engagement[6]. According to a report from the International Data Corporation (IDC), the intelligent financial services market is projected to reach \$1.2 trillion by 2025, boasting a robust compound annual growth rate of up to 23%. Its ecosystem comprises entities offering AI technology services to financial institutions, traditional financial establishments, emerging financial formats, and indispensable regulatory bodies.

These intelligent financial advisors operate in two primary modes: completely unattended and partially unattended. In a completely hands-off model, platforms like Betterment and Wealthfront employ sophisticated algorithms to autonomously manage portfolios, executing asset allocation and trading based on analyses of users' investment objectives, risk tolerance, and market conditions to optimize portfolio performance. For instance, if a user aims for long-term growth and exhibits high risk tolerance, the platform may allocate more resources to high-risk, high-return investments

such as equities[7].

In the partially unattended mode, platforms like Vanguard Personal Advisor Services offer a blend of automated and manual services. Investors can interact with a registered investment advisor to receive personalized investment advice. These platforms typically engage with investors via online chat, phone calls, or video conferencing to grasp their specific needs and circumstances, tailoring investment portfolios accordingly in conjunction with intelligent algorithms. For example, if an investor has specific investment objectives or preferences for particular industries, a registered investment advisor can customize their portfolio accordingly.

In essence, whether fully automated or partially assisted, the crux of intelligent financial advisors lies in employing advanced algorithms and technologies to furnish investors with intelligent investment advice and services. This model's strengths lie in its efficiency, convenience, and personalization, facilitating investors in achieving financial goals and managing assets more effectively.

While smart financial advisors offer numerous benefits such as lowered service thresholds, expanded audience reach, and enhanced service quality, they also encounter challenges. Apart from potentially lacking the flexibility and creativity inherent in human subjective judgment, they face issues regarding data security and privacy protection. For instance, some intelligent financial advisors necessitate extensive personal financial data for analysis and recommendations, raising privacy concerns among users. Moreover, information asymmetry in underlying asset selection can impact investors' decisions, while market fluctuations and unforeseen events may lead to algorithmic misjudgments. Thus, while advancing smart financial advisors, it's imperative to bolster oversight of data security and privacy protection and enhance algorithmic stability and accuracy to safeguard investors' interests and foster trust.

## 2.3. Generative artificial intelligence and financial management

Generative AI, a method rooted in deep learning models, has the capacity to generate novel data resembling the training data by grasping the intrinsic distribution of vast datasets. Its operational mechanism revolves around generative adversarial networks (GANs) and variational autoencoders (VAEs)[8].

GAN comprises two key components: the generator and the discriminator. The generator generates fresh data samples, while the discriminator discerns between generated and real samples. Through iterative optimization of both networks, the generator progressively learns the data distribution to produce more realistic samples. VAE, on the other hand, learns the latent representation of input data through probabilistic encoding and decoding, which is then mapped to a generated sample by the decoder.

In financial decision-making, generative AI assimilates data distribution via deep learning models, assimilating historical financial data and market trends to produce new data samples for decision support, including financial forecasting, investment guidance, and risk assessment. Compared to conventional rule-based decision systems, generative AI yields more precise and adaptable decision outcomes, comprehending intricate financial markets and economic landscapes, and adapting and optimizing in real-time as data fluctuates[9]. Its foundation lies in GANs and VAEs, generating top-notch samples through adversarial

learning and probabilistic encoding and decoding. Continuous refinement and adjustment enable generative AI to comprehend and acclimatize to complex environments and evolving data, furnishing accurate and adaptable decision support.

Generative AI boasts several advantages in financial decision-making:

1. **Data-Driven Decision Support:** Generative AI adeptly processes vast, intricate datasets to uncover concealed patterns, facilitating more accurate and comprehensive financial forecasting and analysis. This aids businesses and individuals in formulating scientific and effective financial strategies, mitigating risk, and enhancing returns.

2. **Personalized Financial Advice:** Generative AI delivers tailored investment advice and financial planning tailored to individuals based on their financial circumstances, risk tolerance, and goal preferences. This personalized service better caters to diverse demographics, enhancing decision-making efficacy and satisfaction.

3. **Automated and Intelligent Prediction and Decision-Making Processes:** Generative AI automates data processing and analysis, alleviating manual labor and conserving time and human resources. Leveraging historical data and trends

for intelligent forecasting, generative AI furnishes precise financial trends and risk warnings, aiding decision-makers in making informed choices. Simultaneously, it mines vast financial datasets to identify potential patterns and correlations, offering decision-makers a comprehensive perspective. Its ability to construct intricate risk models, pinpoint and quantify potential risk factors, and propose suitable countermeasures is invaluable. Real-time data processing and analysis provide decision-makers with immediate support, enabling swift adjustments to strategies and decisions in response to market dynamics.

### 3. Financial Decision Realization Path of Generative AI

#### 3.1. Architectural model

In order to achieve a more humane, efficient and accurate interactive financial decision-making scenario, this paper constructs a path framework for intelligent financial decision-making based on generative AI, as shown in Figure 1. The framework covers the following key steps.

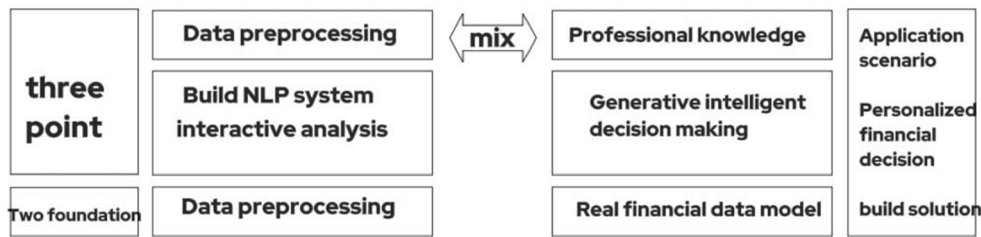


Figure 1. Generative AI financial decision architecture

#### 3.2. Data collection and arrangement

Enhancing enterprise financial decision-making necessitates meticulous data collection and organization. Beyond conventional financial records, a diverse array of structured and unstructured data from various sources, including open API interfaces, can furnish more comprehensive insights. Effective data governance serves as the linchpin for this process. By bolstering data governance infrastructure, enterprises can secure more precise, comprehensive, and dependable financial data, thereby optimizing the data collection and organization workflow. This forms a sturdy foundation for subsequent data analysis and decision-making, furnishing accurate and valuable insights for intelligent decision advisors.

#### 3.3. Build a large model based on the real data of the enterprise

The crux of refining corporate financial decisions lies in constructing expansive models grounded in authentic data and employing them to train generative AI models to assimilate the principles and insights of the financial domain. This entails a series of steps, including gathering and organizing financial data, devising appropriate architectures for large-scale models, training and refining models, validating and assessing performance, and perpetually updating and enhancing. By following this framework, organizations can furnish more precise financial analyses and forecasts, thereby delivering dependable support for enterprise decision-making.

#### 3.4. Construct interactive data analysis and decision system based on natural language

By harnessing the power of generative AI large models, it is possible to optimize and refine the financial decision-making process of enterprises and develop a data analysis and decision system that supports natural language interaction. The system is able to understand the questions or needs raised by users and extract key information from complex financial data to provide accurate answers and recommendations, the similar recommendation system algorithms have been proven to be applicable in the field of robot control as well[10]. The system can automatically query, analyze and visually display financial data according to the questions raised by users to help users quickly obtain the required information. At the same time, the system can give accurate decision-making suggestions according to data trends and rules, and help enterprises to make wise financial decisions. Through this interactive system, users do not need to have professional financial knowledge, can easily carry out data analysis and decision-making, obtain valuable information in a short time, improve the efficiency of decision-making.

#### 3.5. Integration of general and specialized knowledge

Generative AI grand models can be optimized to blend general financial knowledge with expertise in specific industry areas. In this way, large AI models can gain more comprehensive and in-depth understanding capabilities. Such a large industry model can handle conventional financial

analysis and decision making problems, and can provide customized solutions to the specific needs of different industries. By combining general knowledge and specialized knowledge, the applicability and accuracy of AI large models in the financial field can be improved, providing users with more accurate and valuable advice and decision support[11]. This hybrid fusion of knowledge will drive the development of AI in the field of finance, helping businesses and individuals to better deal with complex financial issues.

### 3.6. Integrating Other Mainstream Technologies

Integrate generative AI with other leading technologies like machine learning, deep learning, RPA (Robotic Process Automation), next-gen ERP (Enterprise Resource Planning), online audit and remote audit capabilities, online office solutions, accounting big data analysis and processing

technologies, as well as business intelligence (BI) tools, to enhance and refine the intelligent financial decision-making system. For instance, leverage machine learning algorithms to analyze and predict vast quantities of financial data, yielding more precise financial metrics and trend forecasts. Employ RPA technology to automate the creation and interpretation of financial statements, thereby enhancing both efficiency and accuracy.

### 3.7. Personalized financial analysis and decision support

Through assimilating users' preferences and behaviors, personalized financial analysis and decision support can be realized. Utilizing a comprehensive generative AI model, financial data and investment records of users can be analyzed to comprehend their risk tolerance, investment objectives, and time horizon.

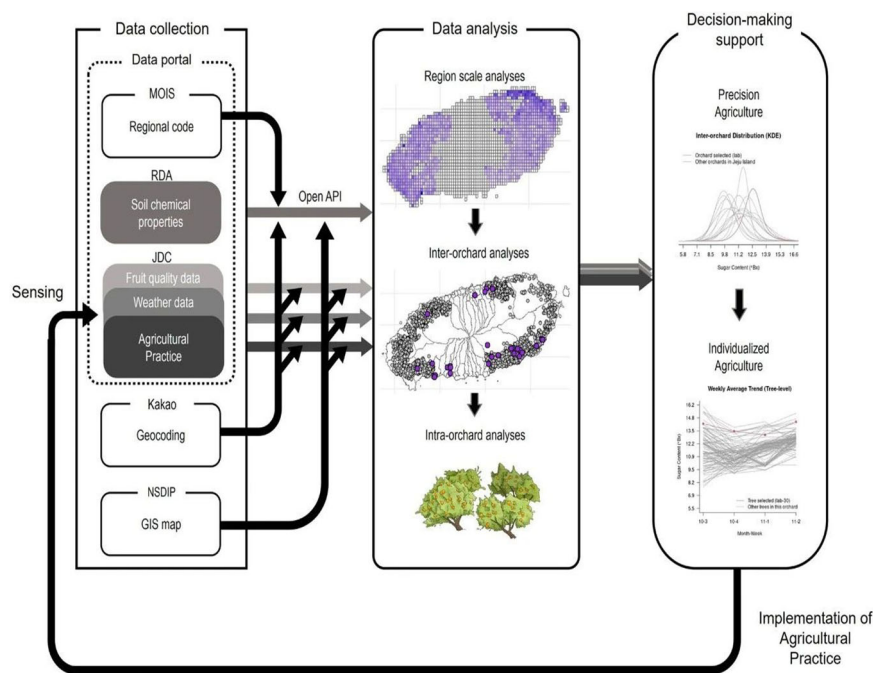


Figure 2. Individualized financial decision analysis model

Based on this information (Figure 2), the model can generate personalized financial analysis reports, offering users tailored investment recommendations and decision support. Furthermore, it can regularly monitor the user's investment portfolio, intelligently adapting to market fluctuations and user requirements, ensuring continual optimization and flexibility of investment strategies. Through personalized financial analysis and decision support, users gain a deeper understanding of their financial standing, refine investment choices, mitigate risk, and attain their financial objectives more effectively.

### 3.8. Providing Customized Solutions

Tailored financial analysis and decision support solutions can be offered to cater to the specific requirements of diverse industries. By grasping industry-specific financial metrics, critical business data, and market trends, generative AI models can furnish expert advice and insights tailored to each industry. Leveraging this domain-specific knowledge, the model can deliver customized financial analysis reports, offering pertinent decision support aligned with industry characteristics and challenges. Whether in retail,

manufacturing, finance, or technology sectors, generative AI large models can conduct industry-specific data analysis, competitor assessments, and market projections tailored to users' needs and objectives. With bespoke solutions, both businesses and individuals can gain deeper insights into industry financial landscapes, monitor trends, devise strategies, and make more informed financial decisions.

The potential benefits and future prospects of generative AI in financial decision-making remain promising. Moving forward, a thorough and comprehensive exploration of the feasibility and value of generative AI application in financial decision-making is warranted. Interdisciplinary research stands as a pivotal avenue for fostering innovation in financial decision-making[13]. By melding expertise from the finance domain with generative AI technology, challenges encountered in financial decision-making can be more effectively addressed. Concurrently, attention must be paid to the challenges and constraints that generative AI may encounter in financial decision-making. These encompass diverse facets such as data privacy concerns, model interpretation, and algorithmic fairness, aiming to ensure the robust and sustainable development of generative AI in

financial decision-making arenas.

## 4. Conclusion

The integration of generative AI into financial decision-making introduces a more intuitive, efficient, and precise interactive approach to business decision-making and data analysis. When coupled with intelligent technologies like speech recognition and face recognition, generative AI enhances the sophistication and user experience of automated processes. Moreover, it can amalgamate diverse data sources such as social network data and Internet of Things data to facilitate more accurate business decisions and data analysis. Additionally, generative AI streamlines financial decision-making by offering more efficient and intelligent business process solutions through the incorporation of robotic process automation (RPA) technology[14]. This fusion of automated processes and tasks, such as automated report analysis and financial decision-making, significantly boosts work efficiency and minimizes error rates.

Generative AI is poised to embark on a new phase of rapid global development. Despite spawning myriad application scenarios across various domains, substantial challenges remain in achieving widespread implementation. Governments and enterprises advocate for strengthened control and governance of generative AI to ensure adherence to pertinent laws and regulations, particularly concerning data security. Against this backdrop, an innovative artificial intelligence platform has recently emerged, leveraging expertise from diverse domains such as strategy, enterprise transformation, and risk management. By integrating technical proficiency and cutting-edge capabilities, this platform endeavors to assist customers in achieving compliance with policies and regulations while harnessing the potential of AI to optimize workflows. Its technical applications encompass professional services for assessing AI application scenarios, identifying industry best practices, and devising effective implementation strategies to enable enterprises to leverage AI's potential more effectively. Moreover, it emphasizes quantifying the business value of AI applications and prioritizing projects with the highest revenue potential.

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