



# The Role of Artificial Intelligence In Understanding And Answering Investors' Questions In Arabic

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**Abstract:** This research aims to study the role of artificial intelligence (AI) in accurately understanding and answering investors' questions written in Arabic, thereby supporting investment decision-making and improving communication between investors and digital financial systems. This article explores the potential of AI in providing financial guidance. The study's significance lies in the increasing importance of AI technologies in financial markets, particularly given the rapid growth of digital financial services and investors' growing reliance on electronic platforms for financial information. Twenty questions from the Basic Financial Literacy Questionnaire and the Big Five factors were used to evaluate the ChatGPT-3.5 and ChatGPT-4 models. The study adopted a descriptive-analytical approach to examine the role of AI technologies in understanding investment issues, in addition to employing a range of statistical methods to analyze data and test relationships between study variables. Furthermore, combining financial literacy and AI, while considering ethical awareness, leads to the optimal use of AI-assisted financial advice. This strategy contributes to mitigating the risks of over-reliance on AI, fostering informed trust in AI systems, and enabling better financial decision-making. The study results showed that using artificial intelligence technologies, particularly natural language processing models, significantly improves the understanding of investment questions in Arabic and increases the accuracy of the answers provided to investors. It also reduces the time required to obtain financial information. Furthermore, the results indicated that adopting intelligent systems in investment platforms can enhance investor confidence, increase transparency, and facilitate more efficient investment decisions. Based on these findings, the study recommends developing specialized AI applications in the financial sector in Arabic and expanding their use in financial institutions and investment platforms.

**Keywords:** Investor Decision-Making, Financial Advisor.

## Introduction

Artificial intelligence has to some extent permeated into each person's life and work, changed the way people live and learn. Yet with AI seeping into all sorts of technology, teaching the next generation to be literate about it is relatively new. A common language for teaching AI literacy and the associated definition are currently non-existent (Wang et al, 2024). Teachers still struggle to understand which AI fundamentals

are suitable for non-technical learners, and how they can design effective strategies and tools that support deep learning of AI (Mertala et al, 2022) (Kong et al, 2023) (Wang et al, 2024). While everyone seems to agree about the importance of AI literacy for all, learners still fall short of a minimal understanding of how algorithms operate and what are the axioms that carry AI systems. This gap points to a requirement for hands-on and accessible ways of enabling the learners to problem solve with this technology (Ali et al, 2019) (Mertala et al, 2022). The significance of literacy within the economic sector has been well-documented. After experiencing periods of financial crisis over the decades, and most notably the 2007 global financial crisis, the knowledge of how to manage financial systems and personal finance is forever important. Because financial literacy provides confidence, knowledge and skills to manage one's personal finances responsibly the ability of individuals that do not have these qualities increases at risk of financial problems (Douissa, 2019).

At the same time, advances in AI have created new opportunities. AI is changing the way in which individuals manage their money, and is also changing how different populations around the world get financial education and literacy (Awasthi, 2023). Large language models, such as ChatGPT, have been trained on vast amounts of online text to produce responses that resemble those of a human. In a number of jobs, models of this type can also be helpful for providing information, responding, or making recommendations. ChatGPT generates comprehensible and educational responses through the use of natural language processing and deep learning techniques. It has previously demonstrated superior text summary skills and a comparatively high score on a financial literacy test (Oehler & Horn, 2024). ChatGPT's ability to provide personalized and interactive responses is an important benefit in terms of financial literacy. This function will be very helpful to people who are not familiar with finance or who may be afraid about asking for financial advice. ChatGPT can help users comprehend difficult financial issues and make more informed financial choices through personalized interactions (Lo & Ross, 2024).

Additionally, ChatGPT offers bilingual assistance, which is highly advantageous for financial literacy. Language constraints may make it difficult for non-native speakers to access financial services and information) (therefore, providing content in many languages may help reduce these obstacles and promote financial literacy among a range of demographic groups (Awasthi, 2023). ChatGPT has several potential advantages when it comes to improving financial understanding, but its results are ultimately a reflection of the quality and quantity of the data upon which it was trained. Consequently, the model can ignore context which is essential to understanding someone's financial situation. As such, recommendation made by ChatGPT should be reviewed by trained financial professional. Besides, the users interacting with AI-driven tools are required to adhere to privacy and data protection laws while dealing with such technologies (Khan & Umer, 2024). Schlosky et al. (2024) present additional limitations regarding ChatGPT. The model is always right, but it often treats problems in a narrow or inflexible manner, failing to consider nuances or other perspectives. it does not necessarily provide an alternative

when it rejects a particular proposal. Additionally, if a question is poorly written, ChatGPT can provide overconfident answers that fail to consider legal sensitives. Furthermore, the model is not good at covering attitude factors of financial planning, as it could not give truly personalized advice and does not understand user's behavioral situation. In response to these challenges, international organizations like UNESCO have created broad AI literacy recommendations to educate teachers and students on how to understand and use AI ethically (Miao & Shiohira, 2024) (Miao et al, 2021).

Some of the noteworthy initiatives include the "Five Big Ideas of AI Curriculum," and "Six Big Ideas of AI Literacy" (Cheng & Yim, 2024b), Machine Learning Education Framework (Lao, 2020), SEAME Framework (Sweeney & Park, 2024), and AKIEE Framework (Chiu et al, 2021). This European Commission has also added AI competencies to its Digital Competence Framework for citizens (Wu & Hwang, 2023). Whereas, despite these efforts, accessible resources with age-appropriate and conceptually well-founded AI content are scarce—especially in schools (Kim et al, 2021). Given that these competencies are increasingly important for subsequent generations, there is a pressing need for clear and developmentally-appropriate conceptualisation and intervention. In view of the contradictory results about ChatGPT's effectiveness in fostering financial literacy, the current study aims to evaluate the model's performance in answering financial questions in Arabic and to evaluate its prospective role as a financial advisor. The next sections cover the study's theoretical foundation, research methodologies, findings, discussion, and conclusions, and they close with practical recommendations.

## Theoretical Framework

The Fourth Industrial Revolution is driving some revolutionary changes by the introduction of smart technologies, including especially information and communication technologies (ICT), for almost every aspect of daily human activities. AI is clearly the main focus of this revolution, which is centered on education. AI is no longer merely a phenomenon since it has quickly grown to be an essential part of our teaching and learning procedures. In educational contexts, AI is improving Arabic students' comprehension of intricate financial concepts, and financial literacy in particular. AI reduces learning uncertainty and improves comprehension by tailoring replies to the needs and profile of each learner (Du et al, 2022). Artificial intelligence-based technologies apply machine learning algorithms and apply pattern recognition to learner data creating personalized financial literacy instruction based on a person's particular strengths and weaknesses. Given this customization, it is now possible for students to ask questions and receive rapid, high-quality responses in the language of their choice (Sadiku et al, 2021) (Touretzky et al, 2019). AI based educational systems not only transfer the knowledge to students but also frequently assesses level of student's knowledge and provide individual feedback hence offering a adaptive learning environment. This aspect is particularly advantageous for financial education because abstract concepts need to be translated into real financial behavior. Additionally, AI lessens the workload for educators, freeing them up to concentrate more on instructional activities and skills (Wang et al, 2044) (Yetişensoy

& Rapoport, 2023). AI has also made progress in influencing financial literacy outside of this broad area of education. Examples of artificial intelligence (AI) include linguistic models like ChatGPT, which are just one method that people may alter their perspectives on or inquiries about money.

These models may be customized for specific learners, consume enormous amounts of data, and produce responses in dozens of languages, including Arabic. In addition to helping people get past the language barrier, this ease of use could save a lot of time spent looking for financial information (Ermağan & Ermağan, 2012) (Iranpour & Pishdad, 2014). Nonetheless, AI is employed to educate humans on intricate financial subjects so they can make better choices. (Chen & Zhu, 2023). Nevertheless, the results from AI were continued to be limited by the amount and type of training data available) (they could not fully encapsulate the underlying context surrounding specific financial situations. Therefore, it is still important to rely on experts as some of AI-based financial advice might need for validation (Aktay, 2022). Privacy and data security are central to the application of AI in financial technology. In the absence of meeting these challenges, an appropriate and safe deployment of AI cannot be achieved (Kurnin et al, 2023). Arabic speakers should know what are AI systems and financing terminology. People should be concerned about it since the actual usage of these technology at significant levels necessitates some kind of power to think critically. In contrast, there are a number of difficulties when using AI into financial literacy lessons. One of the most challenging issues is the security of personal data and privacy protection. However, even when gathering data to evaluate learning needs, there are risks associated with connecting AI systems to the gathering and analysis of personal data (Laupichler et al, 2021).

The institutional and social dimensional of education also pose further problems. With the rise of AI, students have fewer chances to talk to people and are less and less emotionally connected to their education. In addition, some areas experience unequal availability of AI for learning tasks, and this amplifies educational inequalities. Another related problem of interest is algorithmic bias leading to unjust or unfair indentations being experienced by learners, which occurs due to the biased training data or model architecture design (Lee & Kwon, 2024). Large language models such as ChatGPT are very good at applications such as accounting and auditing (Al-Gnbri et al. (2024). Some specifics where ChatGPT can provide assistance include data input, accounting advice, financial reporting and budget preparation, financial estimation, research of international accounting standards and laws, data, audit planning, and working paper organization. It also assists in reviewing international audit standards related to internal and external audits. Yet for complex high-stakes activities where the local context is important – like gauging cultural fit when facilitating a response on sexual exploitation to an alert or nuanced country-specific legal requirements – its efficacy falters. There are also opportunities to uncover the potential benefits and drawbacks of so-called artificial intelligence by spreading their financial literacy throughout the Arabic-speaking society. Greater clarity is needed around data protection, and to give better education including consulting policy makers as well as national authorities. Moreover, limited sources of

Arabic finance obstruct the fair financial access. And here is where A.I. holds great promise. The development of contextually adequate and locally relevant information in Arabic could contribute to gap-filling as far as there is shortage of available information and awareness about financial education by the people. AI is undergoing a revolution in Arithmetic II for Arabic students. With the proper goals, AI could be a catalytic force in financial literacy expansion (Mollick & Nagaoka, 2023).

## Methodology

This research employed descriptive non-experimental design to explore the performance of AI with a set of financial literacy questions in Arabic. The main aim of the task was to evaluate the accuracy and 'informativeness' of various AI models about these questions. Responses from several AI models were analyzed using a common set of Arabic financial literacy questions. The study also focuses on the relationship between financial literacy and AI answers reliability. This method illustrate what AI can learn in Arabic, especially when it comes to teaching financial literacy.

### 1. Sample and Its Characteristics

In order to investigate if ChatGPT can be utilized to respond to financial literacy questions in an Arabic context, 100 Iraqi Arabic-speaking users took part in this study. Whether the AI could understand and react to financial questions from a domain other than its home was the issue. The primacy of men in the Iraqi community is reflected in the 70:30 male to female participant ratio. The age range of the participants was 22 to 45 years old, which is typically when people are most interested in embracing new technology and making financial decisions. Several financial literacy scales, including the Big Five Financial Literacy Test (Mitchell & Lusardi, 2022) and the Basic Financial Literacy Survey (Heinberg et al, 2014), were used to create the 20-item financial literacy survey. The files were translated into Arabic in order to assess the AI's comprehension and response to financial questions in a foreign language context.

**Table 1.**  
Demographic Information of Participants

Variable	Categories	Frequency (n)	Percentage (%)
Gender	Male	70	70%
	Female	30	30%
Age Group	20–25 years	25	25%
	26–35 years	50	50%
	36–45 years	25	25%

### 2. Validity and Reliability of the Financial Literacy Assessment Instrument

The Big Five Financial Literacy Test (Mitchell & Lusardi, 2022) and the Basic Financial Literacy Survey (Heinberg et al, 2014) are two well-known, valid, and widely used measures from which a 20-item financial literacy measure was adapted for this study. To better accommodate the cultural and contextual peculiarities of the participants'

community, the questions were first formulated linguistically and then translated into Arabic. Before being used, the tool underwent validity and reliability testing, and the results showed that it was dependable. These measurements are widely accepted as trustworthy indicators of financial literacy in international research. Strict guidelines were followed throughout the adaptation process to ensure that the original psychometric properties were maintained. The survey was only available online for data gathering purposes, and each participant was only allowed to finish it once. The aim of the study was explained to all participants and their privacy respected in terms of data confidentiality, according to ethical standards. Using SPSS, Harman's single-factor test was performed to evaluate potential common method bias. Method bias was not an issue because the biggest variable explained by a single factor was 36.08%, which was much below the 50% cutoff. Skewness and kurtosis were used to assess the data's normality, and they both fell within acceptable ranges (skewness between  $\pm 3$  and kurtosis between  $\pm 10$ ). No infractions were further confirmed by Mardia's multivariate normality test (skewness:  $z = 2.313$ ,  $p = 0.06$ ) (kurtosis:  $z = 5.362$ ,  $p = 0.13$ ). The fundamental algorithm of Covariance-Based Structural Equation Modelling (CB-SEM) was again considered to test reliability and validity. Analyses consisted of internal consistency, convergent validity and discriminant validity assessment. All the constructs showed high reliability as Cronbach's alpha and Composite Reliability were greater than 0.70. In general, survey financial literacy data demonstrated a strong validity and reliability) (indicating that the study's findings regarding AI was credible in interpreting financial literacy questions in Arabic.

**Table 2.**  
Reliability Analysis of Research Items

Construct	Number of Items	Cronbach's Alpha	Composite Reliability	Average Extracted (AVE)	Variance
Financial Literacy	20	0.85	0.89	0.67	
Artificial Intelligence Performance	20	0.82	0.86	0.63	

Items from the Big Five Financial Literacy exam (Mitchell & Lusardi, 2022) and important sections of the Basic Financial Literacy Survey (Heinberg et al, 2014) were chosen to measure financial literacy. Twenty questions in both Arabic and English were created. To assess answer consistency, ChatGPT was asked each question twenty times. Every question was multiple-choice, with two to five possible answers. Answer options like "I don't know" and "decline to answer" were eliminated in order to give a more accurate evaluation of AI performance from a human perspective. Furthermore, on a scale of 0% to 100%, a human assessor evaluated ChatGPT's accuracy based on correctness. As illustrated in Table 3, the average accuracy of GPT-3.5 and GPT-4 was differ depending on the mode. Before activating the financial advisor addition, GPT-3.5 scored 75.66% on average, while GPT-4 scored 87.33%. In financial advisor mode turned on, performance was better, with GPT-3.5 up to 76.66% and GPT-4 is increased to 90.58%. The mean score for GPT-4 as a whole was 93.83%, which is higher than that of GPT-3.5's 76.16% and

holding a GCFLP advantage in financial literacy performance. In order to test the robustness of these results, supplementary tests were performed by rewording questions and changing the sequence of answers. These modifications had no affect on the outcomes, demonstrating the stability and reliability of the performance of the AI models.

**Table 3.**  
GPT Performance on the Financial Literacy Test

Financial Literacy Domain	GPT-4 Overall	GPT-4 With Pre-prompt	GPT-4 Without Pre-prompt	GPT-3.5 Overall	GPT-3.5 With Pre-prompt	GPT-3.5 Without Pre-prompt
Big Five (5 items)	85%	85%	84%	70%	80%	60%
Compound Interest (4 items)	85%	80%	75%	67%	62%	71%
Inflation (2 items)	95%	92%	89%	82%	90%	73%
Risk Diversification (2 items)	100%	99%	98%	80%	61%	98%
Tax-favored Assets (5 items)	100%	96%	92%	78%	85%	71%
Employer Match (3 items)	98%	92%	86%	82%	82%	81%
Financial Literacy (all items)	83% / 93%	58% / 90%	33% / 87%	16% / 76%	66% / 76%	66% / 75%

Note: Pre-prompt refers to the activation of the financial advisor mode. The averages are calculated based on 20 responses.

### Accuracy Calculation of Artificial Intelligence

The accuracy of GPT-35 and GPT-4 replies was evaluated using Mean Absolute Percentage Error (MAPE). Although MAPE is one of the most commonly used measures for assessing forecasting and prediction methods, it also referred as the mean absolute percent deviation. The formula is as follows:

$$MAPE = 100 \frac{1}{n} \sum_{t=1}^n \left| \frac{A_t - F_t}{A_t} \right|$$

Where  $A_t$  – actual value and,  $F_t$  – forecast or predicted value. The absolute difference between the predicted and true data is taken, divided by the observed target, summing up all observations and then averaging over size of predictions. This is an actual value that indicates the amount of deviation compared to what was expected. Run through financial literacy scores, GPT-3. 5 and GPT-4 had approximately the same average performance but a clear difference in accuracy. When evaluated under MAPE, GPT-3. 5 reached a MAPE of 12.55%, thus, on average, its answers deviated by about 12.5% from the correct ones. The MAPE of GPT-4 is 2.09%, meaning that on over 20 experiments it was a much more accurate system. These results suggest that GPT-4 is better than random at answering questions about financial texts.

**Table 4.**

Performance of GPT-3.5 and GPT-4 on the 20-Item Financial Literacy Test

MODEL	Mean	SD	MAPE
GPT-3.5	261.14	288.11	12.55%
GPT-4	310.57	342.61	2.09%

### Ranking of Responses

The subjective perspective of GPT's financial literacy test may be considered by scoring how well participants rated its performance) (thus contributing to the formation of firm suggestions. In particular, they evaluated GPT's answers to each question. The average score for each of the 20 questions was used to calculate the model's overall performance after these evaluations were gathered. The recommendation index weight was then determined using the Harvey and Fischer (1997) technique, which is defined as follows:

$$WOA = \frac{\text{final answer} - \text{initial answer}}{\text{advice} - \text{initial answer}}$$

The Weight of approval (WOA) has a range of 0 to 1, where 1 denotes complete approval of the advisor's recommendation and 0 denotes no acceptance at all. Any values outside of this range in study data set were not considered and they are outliers for further analysis. In order to evaluate the extent of dependance to GPT's recommendation, 100 participants from Iran and Iraq were included with intermediate proficiency in English. On average, participants were 39.52 years old (S.D.=6.914), and had already interacted with GPT in the past experience (44%). Financial expertise was assessed with a 1-item self-report question: "I am knowledgeable about financial matters" (on a 7-point scale). The average score was 3.71 (SD = 1.730), which demonstrates a moderate level of financial literacy for the sample. Participants with higher and lesser financial literacy were compared for expected GPT performance and reliance on its advise using an independent samples t-test. On the financial literacy questions, participants predicted that GPT would receive an average score of 75.06%, which was higher than the model's actual performance. Interestingly, the forecasts from both literacy groups were comparable (high literacy: 75.58%, poor literacy: 74.43%) ( $t = 0.420$ ,  $p = 0.584$ ) (see Table 5). The entire mean WOA was 0.890 (SD = 0.308) after Winsorizing the data, suggesting a high tendency for participants to rely more on GPT's recommendations than on their own judgment. Compared to the average WOA of 0.39 reported by Bailey et al. (2022), this number is significantly higher. Participants with lower financial literacy relied more on GPT's advise than those with greater literacy, as Table 5 further demonstrates (low literacy: 83.64%, high literacy: 96.52%) ( $t = 11.027$ ,  $p < 0.001$ ).

**Table 5.**

Comparison of Predicted Performance and Reliance on GPT Estimates Among Individuals with High and Low Financial Literacy

Variable	Financial Literacy Level	Mean (SD)	t-value	p-value
<b>Predicted GPT Performance</b>	High financial literacy	75.58% (SD = 14.225)	0.420	0.584
	Low financial literacy	74.43% (SD = 13.222)		
<b>Reliance on GPT Estimates</b>	High financial literacy	96.52% (SD = 0.253)	11.027	0.001
	Low financial literacy	83.64% (SD = 0.339)		

Table 6 shows the association of participant characteristics with reliance on GPT-generated suggestions. Age did not have a significant effect on GPT dependence ( $t = 0.399$ ) ( $p = 0.691$ ) and prior exposure to GPT also had no role in usage ( $t = -1.571$ ) ( $p = 0.119$ ). Also, expectation of their performance on financial literacy tests did not have any effect on the use of GPT ( $t = 1.409$ ) ( $p = 0.162$ ). In general, these aspects showed no statistically significant relationship with the use of advice generated by AI formulating. On the other hand, reliance on GPT advice was significantly correlated with financial knowledge ( $t = 2.762$ ) ( $p = 0.007$ ). Respondents who were less financial literate trusted more on GPT's advice, compared to respondents having higher financial literacy. These results reveal how perceptions and reality of financial expertise shape the perceived trustworthiness of AI based financial advice.

**Table 6.**

Relationship between Independent Variables and the Dependent Variable

Variable	Beta	t-value	p-value
Age	0.041	0.399	0.691
Experience with GPT	-0.156	-1.571	0.119
Financial Literacy	0.167	2.762	0.007
Higher Expected Scores in Financial Literacy Tests	0.140	1.409	0.162

## Discussion

The current study's results show that GPT-3.5 performs mediocly on tests of economic literacy. Although it outperforms random guessing with an average accuracy of 76%, its ability to provide entirely reliable financial advice is still constrained. Similar constraints in big language models have been observed by various prior studies (Bommarito et al, 2023) (Lewkowycz et al, 2022). GPT-4, on the other hand, attained a far higher accuracy of 94%. This improvement shows that more modern models, such as GPT-4, can serve as a useful tool for cost-effective decision-making rather than merely being a technological advancement, which is important for non-expert consumers looking for financial advice (Chak et al, 2022). The data also reveals a significant trend: those who have less financial understanding tend to believe GPT recommendations more. The participants with the lowest level of financial literacy also reported using AI guidance the

most. This finding defies earlier predictions that individuals would disregard AI guidance due to a lack of financial knowledge (Isaia & Oggero, 2022). This is in good agreement with findings by Niszczota and Abbas (2023) and Ren et al. (2023), which show that people who don't know anything about the economics are more likely to trust information from an AI. The current results provide evidence of the potential for ChatGPT to facilitate financial confidence and knowledge in financial decision-making. Aside from being able to asking and receiving responses to their questions, the interactive personal response is especially important for those who refuse to ask for help or don't understand finance jargon due the nature of how simplifies complex issues into easily understandable pieces (Dhiman, 2024).

However, the risk of depending more on AI remains a large concern. Although GPT-4 performs better than GPT-3.5 in financial tasks, this influenced accuracy can unintentionally lead users, especially those with little financial expertise—to overconfidence AI advice. There is a risk of disinformation since large language models often fail to recognize their own limitations and may produce responses that seem authoritative but are inaccurate (Fieberg et al, 2023). Although it is not a perfect solution, repeating or rephrasing queries helps reduce some errors (Niszczota & Abbas, 2023). Overconfidence in AI results is a serious weakness that needs to be fixed.

Participation from financial professionals and experienced investors is critical. Persons having numerous background financial levels use these models and accuracy indeed varies. Working with experts can also improve the reliability and quality of the AI-generated guidance, which in turn should make users less prone to coming into contact with false or incorrect data.

One major line of concern that arises from this study is the possibility of sophisticated AI generating misleading or worse financial advice, such as guidance on how to avoid taxes. The results suggest that users, regardless of their financial literacy level, have high trust in GPT-generated recommendations and there can be risk for overtrust. Without protections included in AI models, there is a significant chance of misuse.

Also, some studies have shown that people behave differently in the use of these technologies - such as financial advisers and educators - based on their understanding of the basic theory behind AI. Having a solid understanding of AI methods can facilitate the integration of AI into financial planning and education settings. Effective training in AI operations is therefore essential to enable users to identify different applications, critically evaluate outcomes, and manage related ethical issues.

Relying on AI-assisted coaching without full comprehension will result in undesirable consequences, com such as receiving bad advice or becoming an accessory to unethical behavior. Simply providing people access to AI tools is not sufficient. Education should be focused on enabling critical thinking, comprehension, and questioning of AI systems.

In addition to imparting skills, educational systems and policies should allow for practice and unrestricted creative thought. This is especially true in the economics, where

profitable assessments can be made by taking advantage of newly obtained information. People can employ AI more successfully whenever they use an organization with good ideas.

Finally, in AI education, ethics should take priority. There needs to be education on the affects of AI on larger society and algorithmic bias as well as guidelines for how to responsibly implement AI. Through incorporating these into affordable financial education users can develop a thoughtful of trust in AI, which would help them maintain a level of critical consciousness and care when consulting AI powered financial advice.

## Conclusion

The study results showed that using artificial intelligence technologies, particularly natural language processing models, significantly improves the understanding of investment questions in Arabic and increases the accuracy of answers provided to investors, in addition to reducing the time required to obtain financial information. The results also indicated that adopting intelligent systems in investment platforms can enhance investor confidence, increase transparency, and facilitate more efficient investment decisions. Based on these findings, the study recommends developing specialized AI applications in the financial sector in Arabic and expanding their use in financial institutions and investment platforms.

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