



Young Rising Star Award

SET Research Scholarship 2024/2025

“Evaluating AI Agents as Financial Advisors”

By

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11 June 2025



Introduction



Problem Statement and Research Objectives

- Evaluating AI agents as financial investment advisors in terms of financial investment advisory.
- To develop and investigate the performance and capabilities of AI agents as financial investment advisors.



Introduction



Task overview in this research

- This research develops and evaluates AI agents as financial investment advisors, focusing on both quantitative and qualitative aspects of stock selection and customize investment strategies.



Introduction

Significance of Research

- Lower the cost of financial advisory services.
- Reduce financial fraud issues.



Source: [2]



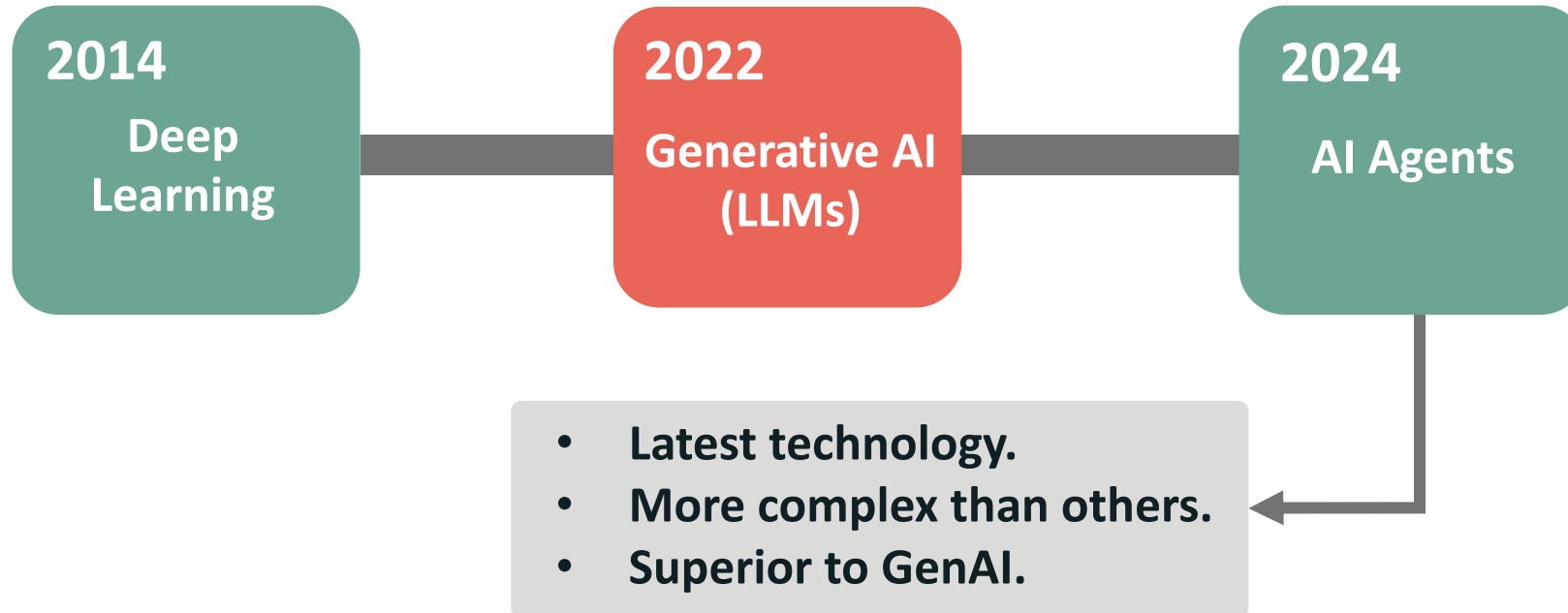
Source: [1]



Introduction



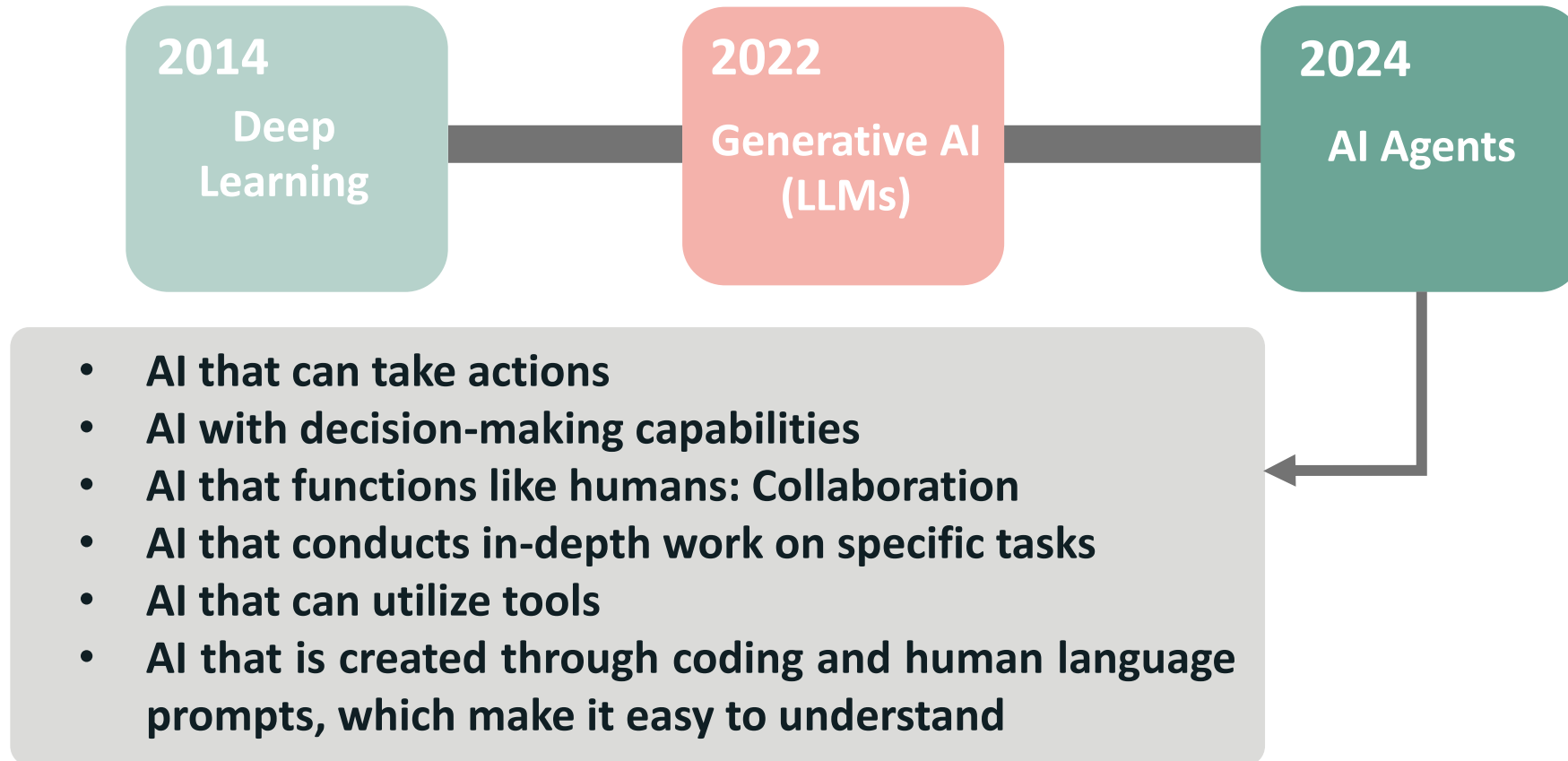
Development of AI Agent Technology





Introduction

Strengths of AI Agents



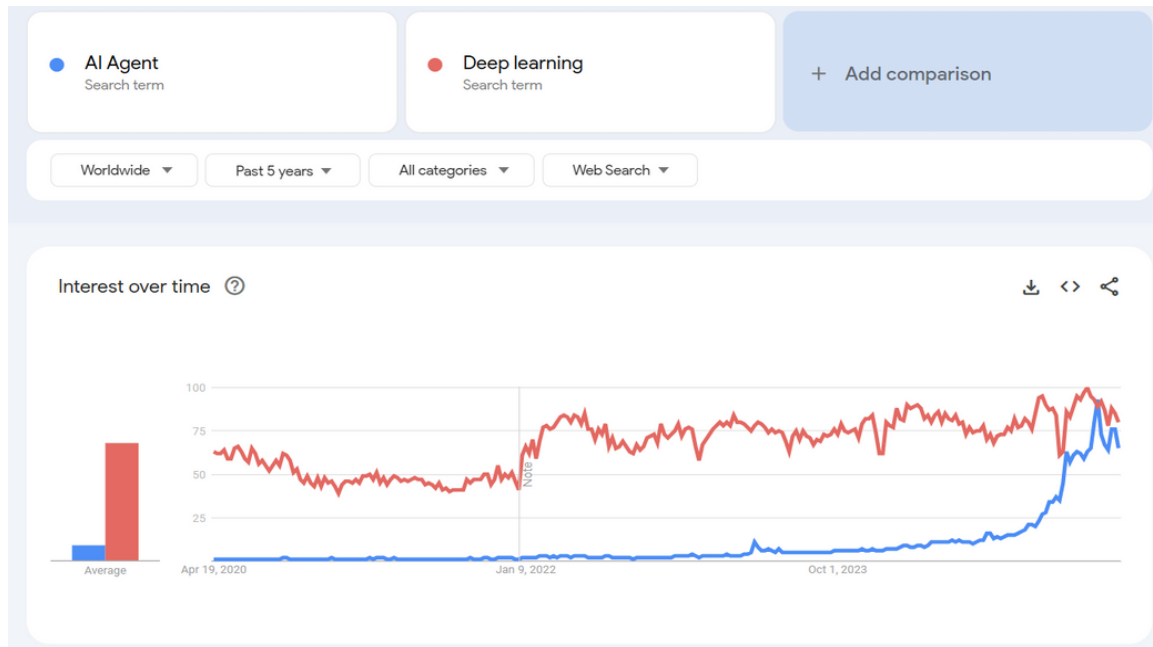


Introduction



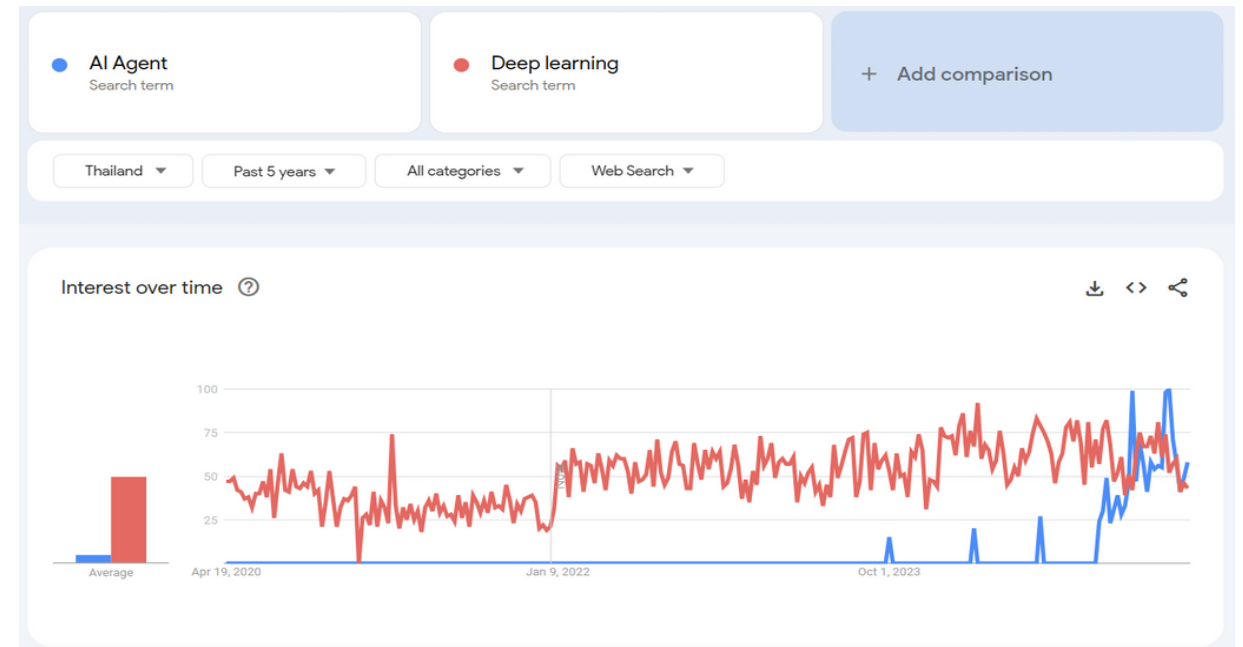
The Future and Real-World Applications of AI Agents

- **Google Trends: AI Agent VS Deep Learning**



Worldwide

Source: [12]



Thailand

Source: [13]

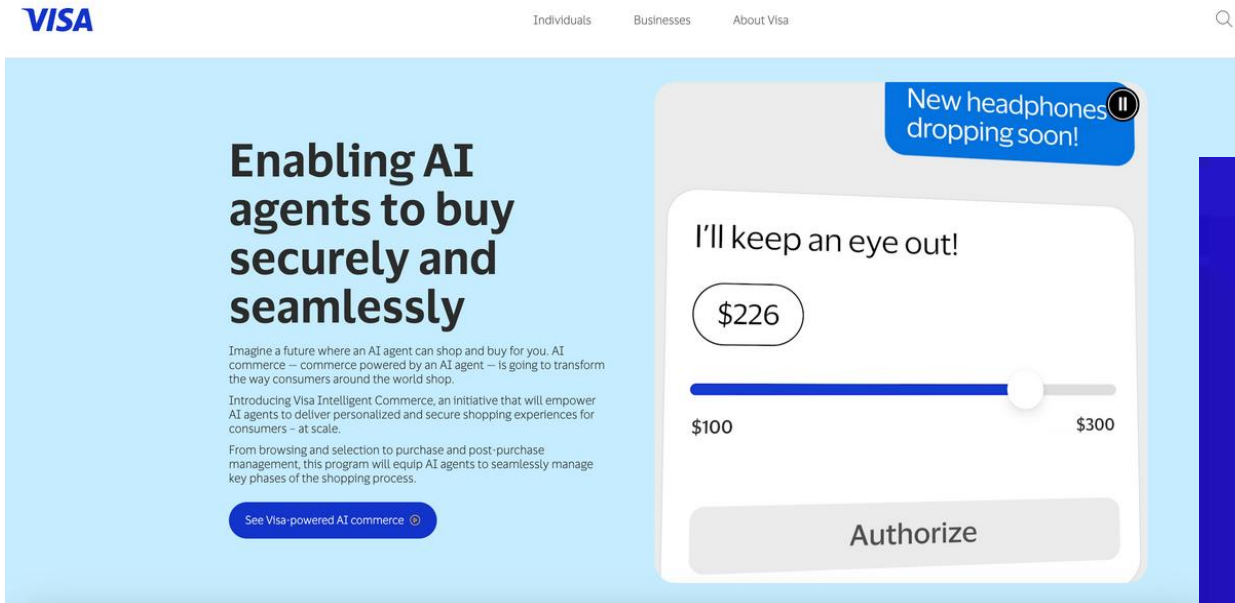


Introduction



The Future and Real-World Applications of AI Agents

- **Visa Intelligent Commerce**



Source: [15]



Source: [9]



Related Works



Related Work: Real-World Applications of AI Agents



FINANCE

This AI-powered financial advisor has quickly gained \$20 billion in assets

PUBLISHED WED, JUL 31 2024 1:30 PM EDT



Hugh Son
@HUGH_SON

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Source: [6]

PortfolioPilot
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1,2: As of July 14, 2024

\$20B

ASSETS ON PLATFORM^{1,2}

22K+

INDIVIDUALS¹

M6 Financial Forecasting Competition Winner⁴

Your AI Financial Advisor

360° portfolio analysis and hyper-personalized recommendations guided by our Economic Insights Engine. Improve your investing strategy with unbiased advice.

Source: [5]

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Source: [10]

What about AI Financial Advisor in Thailand?

Investment Consultant (IC) License

SEC



Related Works



Related Work: AI App in the Thai Financial Market

Powered by Finnomena.



AI Investment Companion



"จัดพอร์ตกองทุนประเภทไหนดี?"
จัดพอร์ตกองทุนให้เหมาะสมกับคุณ



"กองทุน ThaiESG คืออะไร?"
ความรู้เกี่ยวกับการลงทุนที่ใส่ใจ



"ถือกองทุน A มาแล้วแต่ยังไม่รู้ผล?"
บอกคุณผลการลงทุน

เริ่มสนทนากับ Charlie →

การกดเริ่มสนทนา แสดงว่าคุณเข้าใจและยอมรับ ข้อตกลงและเงื่อนไขการใช้งาน แล้ว

ระบบ Charlie ตั้งอยู่ในช่วงทดสอบและจะพยายามทำดีที่สุดในการให้ข้อมูลกับนักลงทุน

- ระบบอาจยังไม่สมบูรณ์แบบในการลงทุนหรือการให้คำแนะนำจากกองทุนหรือข้อมูลอื่น หรือข้อมูลแนะนำนี้ไม่ใช่คำแนะนำจาก Finnomena อีกด้วย
- กองทุนแนะนำและคำแนะนำในการจัดพอร์ตกองทุนทั้งหมดนี้เป็นคำแนะนำจาก Finnomena เท่านั้น

หากมีข้อสงสัย หรือพบปัญหาการใช้งานสามารถติดต่อได้ทางอีเมล support@finnomena.com หรือเบอร์โทรฟรี 02-026-5100

Source: [11]

Finnomena.

เริ่มสนทนาใหม่

ให้ข้อเสนอแนะ



ถามอะไร Charlie ดี?

ขอมุมมองกองทุนญี่ปุ่นหน่อย

มีกองทุนRMFอะไรแนะนำบ้าง

ขอข้อมูลหุ้น AOT หน่อย

จัดพอร์ตการประหยัคภาษียังดี?

บอกค่า 4 ปีย้อนหลังของหุ้น META หน่อย

พิมพ์คำถามของคุณ



Charlie ตั้งอยู่ในช่วงทดสอบระบบ อาจจะไม่สมบูรณ์แบบในการให้ข้อมูลกับนักลงทุน ข้อตกลงการใช้งาน

Source: [14]



Related Works



Related Work: Charlie (Finnomena) VS Our AI Agents

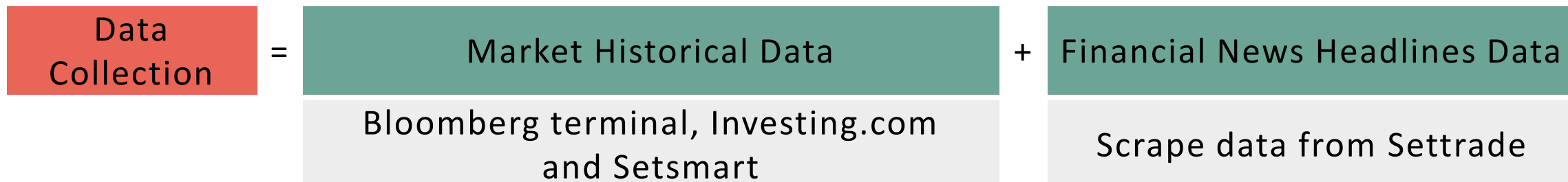
Feature	Charlie (Finnomena)	Our AI Agents
Interaction	Chatbot (Conversational)	None (Task-Oriented Interaction)
Technology	Plain LLM + RAG	Multi-AI Agent System
Objective	Provide financial information	Suggest stock selections and customize investment strategies
Scope	Broad and general	Focused and user-specific
Role	Information Provider	Financial Advisor
Personalization	None	Based on user input and preferences
Evaluation	?	Quantitative and Qualitative



Methodology



Data Collection

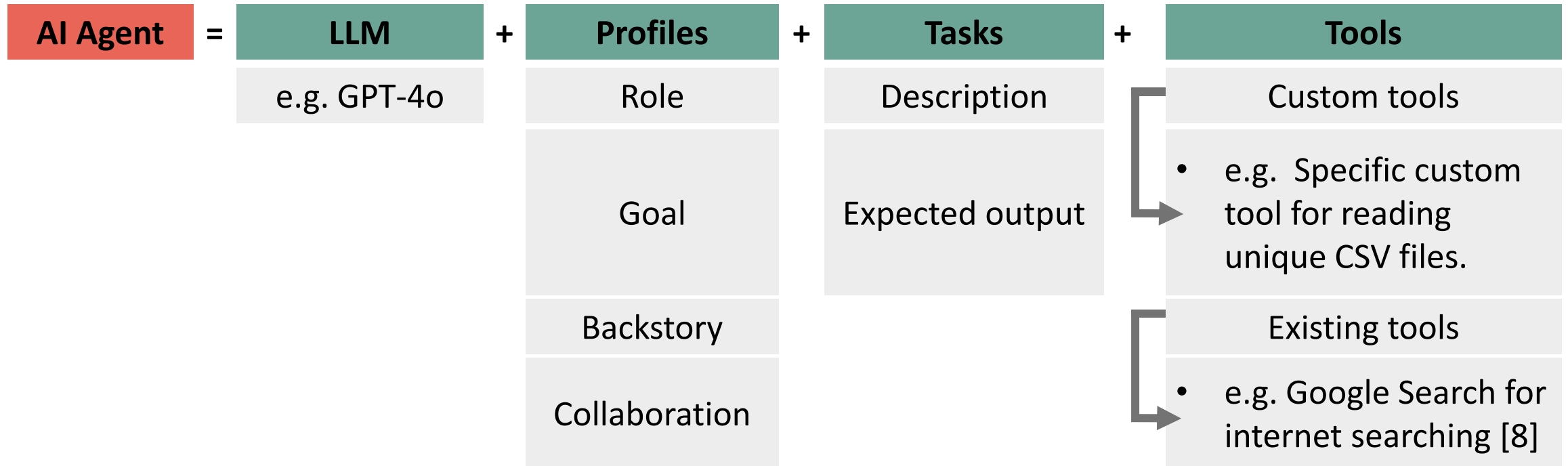


	Market historical data
Sources	Bloomberg terminal, Setsmart and Investing.com
Scope	Historical data on market-adjusted closing prices, P/E ratio, and dividend yield for all stocks in the SET100. Use the list of stocks from the SET100 as reviewed in December 2023. Include benchmarks such as the SET Index, SET100, SET TRI. Collected between March 2023 and October 2024.
	Financial news headlines data
Sources	The news headlines data used in this study is sourced from the Settrade website, which gathers information from various Thai media outlets, including Kaohoon, Thunhoon, Hoonsmart, Money & Banking Magazine, Prachachat, Bangkok Post, TNN ONLINE, Businessstoday, Infoquest, PPTV, efinanceThai, Thai PR, mai, SET, and Share2Trade.
Scope	News headlines for all SET100 stocks, totaling 35,615 headlines, collected between October 2023 and September 2024.



Methodology

Creating AI Agents





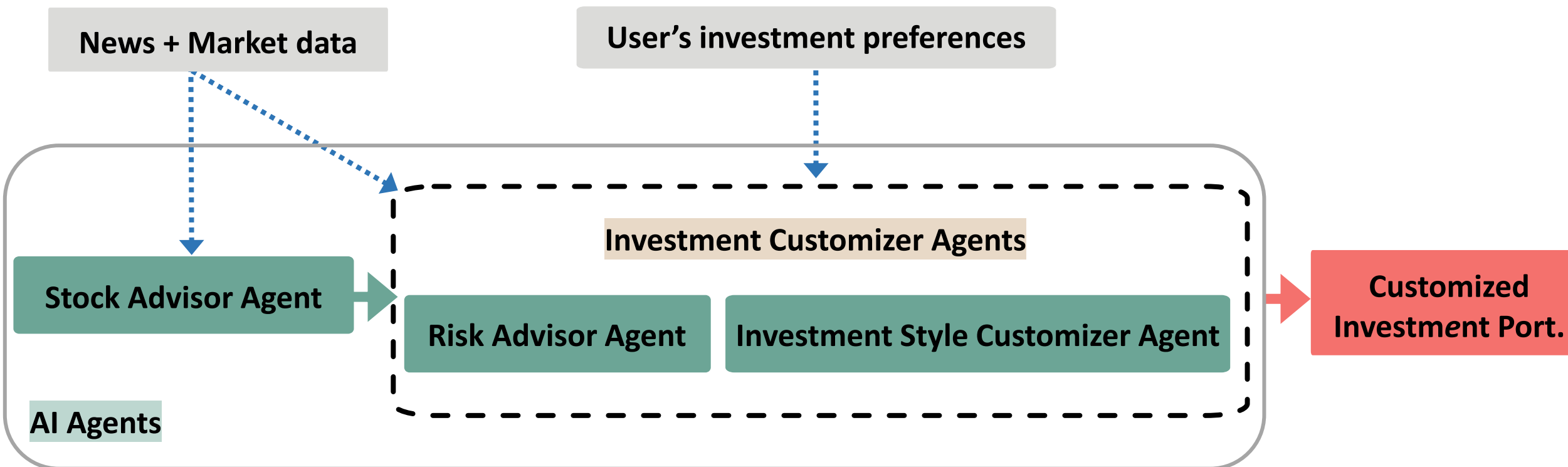
AI Agents' Prompting Instructions

		Stock Advisor Agent	Investment Customizer Agents	
			Risk Advisor Agent	Investment Style Customizer Agent
Prompt	Agent	Goal: Analyze news headlines, gain insights, and determine the top 10 stocks to consider for investment next month (based on positive sentiment). Backstory: Specialist with extensive experience in the Thai financial market, including Thai stocks and Thai economics. Expert with a deep understanding of financial knowledge with a deep understanding of the Thai financial market. Experienced in analyzing stock news headlines to recommend stocks. Tool: Access news headlines file	Goal: Analyze stock with high or low risk and identify them. Backstory: Specialist with extensive experience in the Thai financial market. Expert with a deep understanding of financial knowledge and analytical skills. Tool: Access historical stock details file that contain Annual Return and Annual Standard Deviation.	Goal: Categorize stocks into the specified investment styles. Backstory: Specialist with extensive experience in the Thai financial market. Expert with a deep understanding of financial knowledge and analytical skills. Tool: Access historical stock details file that contain average stock price, average stock P/E ratio, and average stock dividend yield from previous month.
	Task	Task description: Analyze the news headlines. The goal is to gain insights and determine the top 10 stocks to consider for investment next month, based on the positive sentiment of their stock news headlines. Expected output: A report on the top 10 stocks that should be considered for investment next month with explanation.	Task description: Analyze the historical data of the stocks provided. Use this data to assess their risk and identify the top 5 stocks with high or low risk. Expected output: A report on the top stocks categorized by high or low risk.	Task Description: Analyze the historical data of the provided stocks. Use this analysis to categorize the stocks into the specified investment styles. Expected Output: A report detailing the categorization of 5 stocks into the specified investment styles.
Crew		Process collaboration sequentially, starting with the Stock advisor agent, followed by the Risk advisor agent or Investment Style Customizer Agent		



Methodology

Task Workflow



- *Buy stock on the first day of the month*
- *Sell stock on the last day of the month*

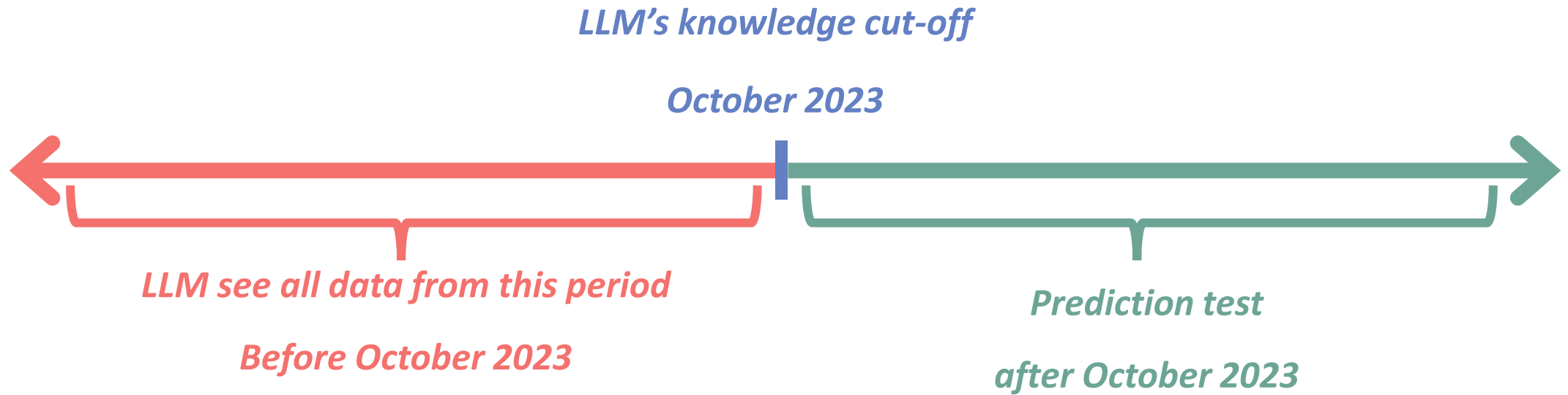
** Assume no trading fees.*



Methodology

LLM's Knowledge Cutoff

- According to the LLM's knowledge cut-off, it has knowledge up to October 2023 [4], which limits our stock selection task to making stock selections only from November 2023 to October 2024 (1 year).





Quantitative Evaluations



Evaluations and Expected Results

Evaluation	Criteria	Evaluated Objects	Expected Results	Benchmark
Quantitative	Portfolio performance on risk and return against benchmark portfolio	High risk portfolio	Achieves <u>higher returns</u> than the benchmark	SET100 equally weighted portfolio
		Low risk portfolio	Achieves <u>lower risk</u> than the benchmark	



Quantitative Evaluations



Benchmark Selection

AI Agents' Portfolios

(Assume no trading fees)

- Equally weighted approach
- Stock universe: Based on SET100 list from December 2023 review



	SET100	<u>SET100 Equally Weighted</u> (Adjusted price)	SET TRI
Annual Return (%)	7.60	-1.68	9.93



Quantitative Evaluations



Portfolio Return and Risk

- **High Risk Portfolio**

	High Risk Portfolio	Benchmark: SET100 Equally Weighted Portfolio
Annual Standard Deviation	17.59	15.41
Annual return (%)	7.36	-1.68
	Expanded Results: Nov 2023 to Feb 2025	
Annual Standard Deviation	18.58	16.09
Annual return (%)	-10.11	-23.30



Achieves higher returns than the benchmark



Level of risk can be either higher or lower than the benchmark



Achieves the expected results



Quantitative Evaluations



Portfolio Return and Risk

- **High Risk Portfolio**

	High Risk Portfolio	Benchmark: SET100 Equally Weighted Portfolio
Annual Standard Deviation	17.59	15.41
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Annual return (%)	-10.11	-23.30



Achieves higher returns than the benchmark



Achieves the expected results



Level of risk can be either higher or lower than the benchmark



Quantitative Evaluations



Portfolio Return and Risk

- **Low Risk Portfolio**

	Low Risk Portfolio	Benchmark: SET100 Equally Weighted Portfolio
Annual Standard Deviation	11.86	15.41
Annual return (%)	0.74	-1.68
	Expanded Results: Nov 2023 to Feb 2025	
Annual Standard Deviation	13.80	16.09
Annual return (%)	-14.55	-23.30



Achieves lower risk than the benchmark



Returns can be either higher or lower than the benchmark



Achieves the expected results



Quantitative Evaluations



Portfolio Return and Risk

- **Low Risk Portfolio**

	Low Risk Portfolio	Benchmark: SET100 Equally Weighted Portfolio
Annual Standard Deviation	11.86	15.41
Annual return (%)	0.74	-1.68
	Expanded Results: Nov 2023 to Feb 2025	
Annual Standard Deviation	13.80	16.09
Annual return (%)	-14.55	-23.30



Achieves lower risk than the benchmark



Achieves the expected results



Returns can be either higher or lower than the benchmark



Qualitative Evaluation: Investment Styles

Evaluations and Expected Results

Evaluation	Criteria	Evaluated Objects	Expected Results	Benchmark
Qualitative	Evaluate whether the selected stock aligns with the investment style.	Growth investing portfolio	Stocks with <u>high growth potential</u>	-
		Income investing portfolio	Stocks that <u>provide dividends</u>	-



Qualitative Evaluation: Investment Styles



Alignment of Investment Styles

Approach	Key Principle	Time Horizon	Risk Profile
Index Investing	Match market performance	Long-term	Varies with market
Growth Investing	Focus on companies with high growth potential	Medium to long-term	Moderate to high
Contrarian Investing	Go against market consensus	Varies	High
Income Investing	Focus on regular cash flow	Long-term	Low to moderate
Momentum Investing	Buy high, sell higher	Short-to-medium term	High
Value Investing	Buy undervalued assets	Long-term	Moderate

Source: [3]

Growth Investing Portfolio		Income Investing Portfolio		
Top 5 Selected Stocks	Annual Return (%)	Top 5 Selected Stocks	Annual Return (%)	Dividend Yield (%)
ADVANC	29.72	ADVANC	29.72	3.75
AOT	-8.24	WHA	18.90	3.51
AAV	61.54	PTTEP	-22.39	6.37
GULF	51.14	SCB	15.82	8.63
MINT	-3.60	BAM	-6.21	5.22
Average Annual Return (%)	26.11	Average Annual Return (%): 7.17		
		Average Dividend Yield (%): 5.50		



Qualitative Evaluation: Trust and Explainability



Importance of Evaluating Trust and Explainability

- 2024 survey by McKinsey
 - Conducted in the U.S.
 - Participants from diverse regions and industries
 - 40% of respondents cited **explainability** as a key risk of generative AI
- EU's AI Act
 - AI systems: **interpretable, understandable** by humans, and **safe** for human use.
- **This research will survey human participants** on the trust and explainability of financial advisor AI agents to **assess their trustworthiness among human users.**



Qualitative Evaluation: Trust and Explainability



A Survey on Trust and Explainability

- Conducted a survey via Google Forms.
- Sample size: 20 participants, bachelor's students in finance-related fields, with investment experience in the Thai capital market.
- Participants were paid 50 baht each for completing the survey.
- Expected to achieve positive evaluations from human participants

Trust and Explainability

=

Trust

+

Understandable and
Explainable



Qualitative Evaluation: Trust and Explainability



Instructions for Participants

Example of News Headlines (Snapshot)
CONSENSUS: GULF โคตเด่นสุดกลุ่มโรงไฟฟ้ารอรับกำลังผลิตใหม่ทะลัก LNG-Digital เสริมแกร่ง
Gulf CEO Sarath richest shareholder at B190bn
หุ้นไทยพักเที่ยงวันนี้(19 ธ.ค.66) ลบ 2.45 จุด ขาย GULF-TIDLOR ซื้อ DELTA
GULF ตั้ง 2 บริษัทลูก ดุยธุรกิจบริการบำรุงรักษา-โรงไฟฟ้าชุมชน
GULF คว่ำโซลาร์ฟาร์ม “กฟผ.” 12 โครงการ กำลังผลิต 645 MW ทขย COD ปี 69-72

เหตุผลในการเลือกหุ้น **GULF** เพื่อลงทุนในเดือนถัดมาจาก **AI Agents**

- **GULF** เป็นหุ้นที่น่าลงทุนในเดือนถัดมา เนื่องจากการขยายธุรกิจไปสู่โครงการพลังงานแสงอาทิตย์ของ **GULF** และตำแหน่งทางการตลาดที่แข็งแกร่งในภาคพลังงานทำให้ **GULF** เป็นตัวเลือกอันดับต้นๆ ของนักลงทุน โดยข่าวเน้นย้ำถึงข้อตกลงล่าสุดของ **GULF** ในการขายไฟฟ้าจากโซลาร์ฟาร์มหลายแห่ง ซึ่งจะช่วยให้บริษัทได้อย่างมากและสอดคล้องกับแนวโน้มความยั่งยืนระดับโลก
- **Participants read the news headlines used by the AI and its explanations to assess the reasoning behind stock recommendations.**



Qualitative Evaluation: Trust and Explainability



Overall Participants

Survey Items	Dominant Response
Do you think AI agents' analysis of news is reasonable and consistent with the input data?	Agree
Would you invest based on AI agents' recommendations?	Moderately Agree
Would you choose AI agents as financial advisors?	Moderately Agree
How much of your 10,000 baht investment would you allocate based on the AI agents' stock recommendations?	The median allocation was 16.3% (1,630 baht)
A Perspective on the Benefits of AI Agents as Financial Advisors	Reduce Financial Consultation Costs



Qualitative Evaluation: Trust and Explainability



Across Different Levels of Experience in Investing in Thai Stocks

- Participants with less experience are tend to use AI agents as financial advisors.

Questionnaires	Less Experience • < 1 year	More Experience • 1–3 years, 3–5 years, > 5 years
Would you invest based on AI agents' recommendations?	Moderately Agree	Moderately Agree
Would you choose AI agents as financial advisors?	Agree	Moderately Agree
Do you think AI agents' analysis of news is reasonable and consistent with the input data?	Agree	Agree



Summary of Evaluations



Evaluation	Criteria	Evaluated Objects	Results
Quantitative	Portfolio performance on risk and return against benchmark portfolio	High risk portfolio	- Higher return than benchmark ☒ - Higher risk than benchmark ☒
		Low risk portfolio	- Lower risk than benchmark ☒ - Higher return than benchmark ☒ ★
Qualitative	Evaluate whether each stock aligns with investment style	Growth investing portfolio	Aligns with investment style ☒
		Income investing portfolio	
	Trust and Explainability	Stock selection and reasoning process	Earn trust and understanding from humans ☒



Conclusion



- AI agents have the potential to serve as financial advisors, providing valuable insights for stock selection and investment strategy customization.

Evaluations	Conclusion
• Quantitative Evaluation	Outperform market benchmarks in terms of risk and return
• Qualitative Evaluation (Alignment of Investment Styles)	Align with the characteristics of stocks within investment strategies
• Qualitative Evaluation (Trust and Explainability)	Receive positive overall evaluations from participants



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