

TABLE V  
QUESTIONNAIRE STATEMENT

ID	Factor	Question
USQ1	PE	This system quickly matches cryptocurrencies to my preferences, saving time
USQ2	PE	The system often suggests cryptocurrencies I already know, reducing its efficiency
USQ3	INF	The system explains potential risks for each recommended cryptocurrency in detail
USQ4	INF	It lacks information to help understand the broader cryptocurrency market context
USQ5	ETU	Preferences are easily customizable for tailored recommendations
USQ6	ETU	Some features are hard to locate within the system
USQ7	PRQ	The system's recommender support more strategic cryptocurrency investments
USQ8	PRQ	Some recommendations seem misaligned with my entered preferences
USQ9	EOU	The explanation of how recommendations are made is clear and straightforward
USQ10	EOU	Excessive irrelevant details make it hard to focus on key recommendations

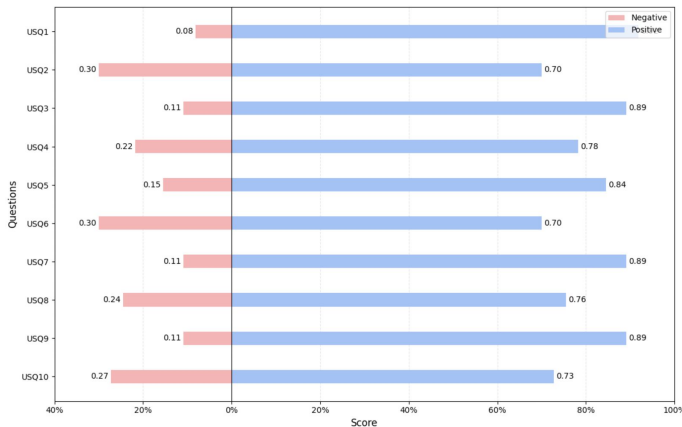


Fig. 7. User satisfaction result

preferences accurately so that users are satisfied with the recommendations.

Although the recommendations fit with the user preferences, in some recommendation cases, 30% of users are still unsatisfied because they get cryptocurrency recommendations that they already know and have invested in. In addition, the system also has limitations in mitigating major forces that can affect cryptocurrency prices, such as world economic conditions, wars, and international outbreaks.

In future research, we will improve CRS's understanding of user preferences and enrich LLM with more relevant data. A comparison using other models, including LLaMA, Falcon, and Mistral, is also necessary to ensure the optimal fit. Furthermore, an additional objective is to implement real-time browsing on LLM, which enables the system to access the latest data on the Internet. This research can be explored to have a more significant impact on recommender systems.

## REFERENCES

- [1] F. Fang, C. Ventre, M. Basios, L. Kanthan, D. Martinez-Rego, F. Wu, and L. Li, "Cryptocurrency trading: A comprehensive survey," *Financial Innovation*, vol. 8, no. 1, p. 13, 2022.
- [2] E. Zaghloul, T. Li, M. W. Mutka, and J. Ren, "Bitcoin and blockchain: Security and privacy," *IEEE Internet of Things Journal*, vol. 7, no. 10, pp. 10 288–10 313, 2020.
- [3] S. V. Ward, "Bitcoin vs. gold and stocks: How to compare bitcoin to traditional assets," <https://www.forbes.com/sites/digital-assets/2023/08/14/bitcoin-vs-gold-and-stocks/>, accessed on November 22, 2024.
- [4] V. Manahov, "The great crypto crash in september 2018: Why did the cryptocurrency market collapse?" *Annals of Operations Research*, pp. 1–38, 2023.
- [5] G. K. Murugan, "Creation of a recommendation system to recommend cryptocurrency portfolio using association rule mining." Ph.D. dissertation, National College of Ireland, Dublin, 2021.
- [6] V. L. Amaral, E. T. F. Affonso, A. M. Silva, G. F. Moita, and P. E. M. Almeida, "New fuzzy approaches to cryptocurrencies investment recommendation systems," in *Fuzzy Techniques: Theory and Applications: Proceedings of the 2019 Joint World Congress of the International Fuzzy Systems Association and the Annual Conference of the North American Fuzzy Information Processing Society IFSA/NAFIPS'2019*. Lafayette, Louisiana, USA: Springer International Publishing, 2019, pp. 135–147.
- [7] Z. Aljinović, B. Marasović, and T. Šestanović, "Cryptocurrency portfolio selection—a multicriteria approach," *Mathematics*, vol. 9, no. 14, p. 1677, 2021.
- [8] Z. Jiang and J. Liang, "Cryptocurrency portfolio management with deep reinforcement learning," in *2017 Intelligent Systems Conference (IntelliSys)*. IEEE, September 2017, pp. 905–913.
- [9] W. Hua, L. Li, S. Xu, L. Chen, and Y. Zhang, "Tutorial on large language models for recommendation," in *Proceedings of the 17th ACM Conference on Recommender Systems*, ser. RecSys '23. New York, NY, USA: Association for Computing Machinery, 2023, p. 1281–1283. [Online]. Available: <https://doi.org/10.1145/3604915.3609494>
- [10] G. Trichopoulos, M. Konstantakis, G. Alexandridis, and G. Caridakis, "Large language models as recommendation systems in museums," *Electronics*, vol. 12, no. 18, p. 3829, 2023.
- [11] Y. Liu, W. N. Zhang, Y. Chen, Y. Zhang, H. Bai, F. Feng, and W. Che, "Conversational recommender system and large language model are made for each other in E-commerce pre-sales dialogue," in *Findings of the Association for Computational Linguistics: EMNLP 2023*. Singapore: Association for Computational Linguistics, Dec. 2023, pp. 9587–9605. [Online]. Available: <https://aclanthology.org/2023.findings-emnlp.643>
- [12] J. Qi, X. Wang, and T. Yang, "Traditional chinese medicine prescription recommendation model based on large language models and graph neural networks," in *2023 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. IEEE, December 2023, pp. 4623–4627.
- [13] Z. A. Baizal, D. H. Widyantoro, and N. U. Maulidevi, "Design of knowledge for conversational recommender system based on product functional requirements," in *2016 international conference on data and software engineering (ICoDSE)*. IEEE, 2016, pp. 1–6.
- [14] Z. A. Baizal, D. Tarwidi, B. Wijaya *et al.*, "Tourism destination recommendation using ontology-based conversational recommender system," *International Journal of Computing and Digital Systems*, vol. 10, 2021.
- [15] D. H. Widyantoro and Z. Baizal, "A framework of conversational recommender system based on user functional requirements," in *2014 2nd international conference on information and communication technology (ICoICT)*. IEEE, 2014, pp. 160–165.
- [16] B. Meskó, "Prompt engineering as an important emerging skill for medical professionals: Tutorial," *Journal of Medical Internet Research*, vol. 25, 2023.
- [17] OpenAI, "Consumer privacy at openai," <https://openai.com/consumer-privacy/>, accessed on December 25, 2024.
- [18] Z. A. Baizal, Y. R. Murti *et al.*, "Evaluating functional requirements-based compound critiquing on conversational recommender system," in *2017 5th International Conference on Information and Communication Technology (ICoICT)*. IEEE, 2017, pp. 1–6.