



Conversational Recommender Systems:

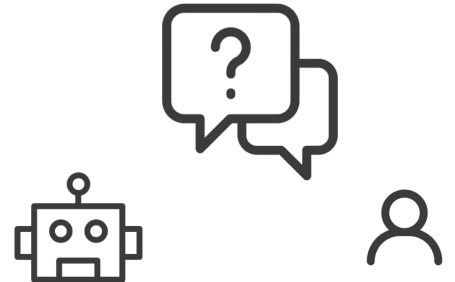
Understanding Humans

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Conversational Recommendation provides personalized recommendation through natural language dialog with users.


Can you find me a **mobile phone** on Amazon?
Sure, what **operating system** do you prefer?

I want an **Android** one.
OK, and any preference on **screen size**?

Better larger than **5 inches**.
Do you have requirements on **storage capacity**?

I want it to be at least **64 Gigabytes**.
And any preference on **phone color**?


Not particularly.
Sure, then what about the following choices?



I don't like them very much...
OK, do you have any preference on the **brand**?

Better be **Samsung or Huawei**.
Any requirement on **price**?

Should be **within 700 dollars**.
OK, then what about these ones?



Great, I want the first one, can you order it for me?
Sure, I have placed the order for you, enjoy!

Figure 1: Example for conversational search in e-commerce product search or recommendation scenario (best in color).

Zhang, Y., Chen, X., Ai, Q., Yang, L., & Croft, W. B. (2018, October). Towards conversational search and recommendation: System ask, user respond. In *Proceedings of the 27th acm international conference on information and knowledge management* (pp. 177-186).

Problem Formalization (Basic)

Input:

Dialogue History

(optional) User preferences

(optional) External knowledge of items

Output:

Next utterance to interact with user

Items to recommend

(optional) Explanations

Traditional Recommendation Systems

- Cold Start Problem
- Lack of feedback

Can Conversational User Interface improve?

Cold Start - Building User Model through Conversations

Learning User Preference Through Conversation

- Kostric, I., Balog, K., & Radlinski, F. (2021, September). Soliciting user preferences in conversational recommender systems via usage-related questions. In *Proceedings of the 15th ACM Conference on Recommender Systems* (pp. 724-729).
- Lei, W., He, X., de Rijke, M., & Chua, T. S. (2020, July). Conversational recommendation: Formulation, methods, and evaluation. In *Proceedings of the 43rd International ACM SIGIR Conference on Research and Development in Information Retrieval* (pp. 2425-2428).
- Xiao, Z., Zhou, M. X., Liao, Q. V., Mark, G., Chi, C., Chen, W., & Yang, H. (2020). Tell me about yourself: Using an AI-powered chatbot to conduct conversational surveys with open-ended questions. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 27(3), 1-37.

Lack of Feedback - Eliciting Explicit feedback

Eliciting User Feedback Through Conversation

- Xu, K., Yang, J., Xu, J., Gao, S., Guo, J., & Wen, J. R. (2021, March). Adapting user preference to online feedback in multi-round conversational recommendation. In *Proceedings of the 14th ACM international conference on web search and data mining* (pp. 364-372).
- Lei, W., Zhang, G., He, X., Miao, Y., Wang, X., Chen, L., & Chua, T. S. (2020, August). Interactive path reasoning on graph for conversational recommendation. In *Proceedings of the 26th ACM SIGKDD international conference on knowledge discovery & data mining* (pp. 2073-2083).
- Xiao, Z., Mennicken, S., Huber, B., Shonkoff, A., & Thom, J. (2021). Let Me Ask You This: How Can a Voice Assistant Elicit Explicit User Feedback?. *Proceedings of the ACM on Human-Computer Interaction*, 5(CSCW2), 1-24.