Designing Educational Personas using Generative AI

Ivan TERZIC[a], Antun DROBNJAK[a] & Ivica BOTICKI[a*]
[a]*Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia*
*ivica.boticki@fer.hr

Abstract: In this paper, the use of generative AI for creating educational personas is presented. Prior to the appearance of generative AI, conversational AI was used to enhance educational environments with the use of technologies such as chatbots. Generative AI brings a new dimension as it allows for the creation and use of personas mimicking real people, historical figures, and even fictional characters. Such designs potentially bring a new immersive and interactive dimension to learning, but further research is required to understand the full potential of these technologies. In this paper, the experiences and challenges in appropriating language learning models to act as potential educational personas are described.

Keywords: Generative AI, learning, education, personas, conversational AI

1. Introduction

The emergence of generative AI has highlighted the potential of AI in education, leading to the efforts to its widespread adoption worldwide (Baidoo-Anu & Owusu Ansah, 2023). Generative AI has played a pivotal role in driving the creation of interactive tools and systems that are enabling learners to access personalized and dynamic learning experiences. Ultimately, these interactive systems possess the capability to revolutionize the way learners engage with educational content and access learning resources. However, akin to other novel tools, there are persisting challenges concerning their use in achieving enhanced learning outcomes and improved educational process. Although generative AI holds the potential to contribute to the improved interaction in the educational processes that could potentially lead to educational benefits (Xu et al., 2022), it is important to acknowledge that pedagogical approaches to achieve so are still work in progress.

2. From Conversational AI to Personas in Education

Terzidou et al. (2016) found that the implementation of effective pedagogical approaches can yield positive impact on students' learning outcomes. Xu et al. (2022) suggest that facilitating contingent interaction between child viewers and media characters has the potential to bring about supplementary educational advantages that are not readily available through conventional video programming. Pataranutaporn et al. (2021), Fu et al. (2022), Almahri et al. (2021), Park et al. (2022) and Chien & Yao (2020) found that personalization can improve students' motivation, engagement, and outcomes. Haller & Rebedea (2013) presented a method for building a conversational agent that has personality and knowledge about historical figures and can be used in educational contexts. Likewise, Fu et al. (2022) highlighted that agents' personal memory in conversation can significantly improve agents' responses. Xu et al. (2022) proposed an enhanced framework for designing pedagogical agents, which can pose questions, provide feedback, are based on scaffolding, and dynamically adjust to students. Implementing such an innovative framework could significantly enhance the efficacy of pedagogical agents in supporting student learning.

3. Creating Personas and Conversing with Personas

To explore the potential for the use personas in generative AI, Open AI and GPT-3 model were leveraged to create a prototype where personas could be defined and used. The prototype had the advantage of own database for storing user information and logs. Figure 1 shows a feature where predefined personas can by modified by specifying name, desired voice, avatar, and the initial prompt thereby determining persona characteristics. Such a design allows for adjusting the persona vocabulary level towards the educational level of students taking part in the learning activity.

Persona variation creation

Persona picker:

| Albert Einstein | ∨ |

Name:

| Albert Einstein |

Voice:

| Hans, German, Sample | ∨ |

Image:

| 71 | ∨ |

Initial prompt:

Provide scientifically accurate answers to questions from the perspective of Albert Einstein. Use scientific language and expressions. The questions will be provided by the user in the following messages. You must answer exclusively from Einstein's imaginary

Prompt length: 326, max length is 1000

Submit Reset

Figure 1. Modifying a predefined persona to match the desired educational level

Conversations with the persona are conducted via the interactive feature where a specific persona can be chosen for textual and voice communication (speech-to-text and text-to-speech) when interacting with the persona. The avatar of the persona is customized and animated to reflect real time talk (Figure 2).

Select a chat option:

| Text | Interactive | Conversation |

Select a persona: | Albert Einstein ∨ | **Submit** **Reset conversation**

| Ask Albert Einstein something... | **Send message** |

Or...

✎ **Send message**

Listening

Figure 2. Interactive mode for conversing with the persona via text or voice

4. Conclusions

To achieve sensible and smooth conversation with the persona, prompts, or queries to OpenAI are used to set up the persona. Such a query needs to include the detailed specification of the expected persona characteristics. Due to the design of Open AI, the following needs to be eliminated from the conversation: the answers where the model itself generates questions for the person it is imitating, answers where the model mentions that it is not a persona but that it is a language model, and responses where the entire conversation is generated as a conversation between two people. The randomization of answers and the reduction of the occurrence of repeating expressions had to be performed as well. In terms of the overall interaction, the roles of the participants in the conversation sent to OpenAI needed to be precisely defined. To simulate the synchronous nature of the conversation, speech and animation needed to be synchronized, pronunciation of numbers had to be defined, and the flow of conversation had to be slowed down for easier readability.

The development of generative AI has open the path for significant advancements in pedagogy, interaction, and personalization in education. By incorporating pedagogical principles into AI systems, educators can leverage generative AI as effective teaching tools. Interaction with AI systems, such as chatbots, humanoid robots, and LLMs, should enable engaging and immersive learning experiences. The adaptability of generative AI models supports personalized learning by potentially tailoring instruction to individual student needs.

Acknowledgements

References

Almahri, F. A. A. J., Bell, D., & Arzoky, M. (2021). Applications of machine learning in education: Personas design for chatbots. In *Machine Learning Approaches for Improvising Modern Learning Systems*. https://doi.org/10.4018/978-1-7998-5009-0.ch004

Baidoo-Anu, D., & Owusu Ansah, L. (2023). Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4337484

Chien, Y. H., & Yao, C. K. (2020). Development of an ai userbot for engineering design education using an intent and flow combined framework. *Applied Sciences (Switzerland)*, *10*(22). https://doi.org/10.3390/app10227970

Fu, T., Zhao, X., Tao, C., Wen, J. R., & Yan, R. (2022). There Are a Thousand Hamlets in a Thousand People's Eyes: Enhancing Knowledge-grounded Dialogue with Personal Memory. *Proceedings of the Annual Meeting of the Association for Computational Linguistics*, *1*. https://doi.org/10.18653/v1/2022.acl-long.270

Haller, E., & Rebedea, T. (2013). Designing a chat-bot that simulates an historical figure. *Proceedings - 19th International Conference on Control Systems and Computer Science, CSCS 2013*. https://doi.org/10.1109/CSCS.2013.85

Park, C., Jang, Y., Lee, S., Park, S., & Lim, H. (2022). FREETALKY: Don't Be Afraid! Conversations Made Easier by a Humanoid Robot using Persona-based Dialogue. *2022 Language Resources and Evaluation Conference, LREC 2022*.

Pataranutaporn, P., Danry, V., Leong, J., Punpongsanon, P., Novy, D., Maes, P., & Sra, M. (2021). AI-generated characters for supporting personalized learning and well-being. In *Nature Machine Intelligence* (Vol. 3, Issue 12). https://doi.org/10.1038/s42256-021-00417-9

Terzidou, T., Tsiatsos, T., Miliou, C., & Sourvinou, A. (2016). Agent Supported Serious Game Environment. *IEEE Transactions on Learning Technologies*, *9*(3). https://doi.org/10.1109/TLT.2016.2521649

Xu, Y., Vigil, V., Bustamante, A. S., & Warschauer, M. (2022). "Elinor's Talking to Me!":Integrating Conversational AI into Children's Narrative Science Programming. *Conference on Human Factors in Computing Systems - Proceedings*. https://doi.org/10.1145/3491102.3502050