

CREATING AN AI CONVERSATIONALIST BY USING ARTIFICIAL INTELLIGENCE TO ENGAGE IN CONVERSATIONS.

Tanu

Assistant Professor, Department of Computer Science, Khalsa College For Women, Civil lines, Ludhiana

Sonia Goyal

Assistant Professor, Department of Computer Science, Khalsa College For Women, Civil lines, Ludhiana

ABSTRACT

A Smart Personal Assistant (SPA) or Intelligent Virtual Assistant (IVA) could be a software representative that answers queries and completes tasks on behalf of a non-public user. Those specifically accessible through online chat, the term “chatbot” are occasionally used, when referring to virtual assistants in general. The first contribution is the assistant paradigm, which is made up of different in-built apps controlled by a command prompt. Applications are thought of as self-evaluating grey boxes that answer to the questions from different users. At a subsequent time, the command prompt forwards the user's request to the most suitable application by considering the user's command, context (like previous interactions), and the answers given by applications. The second contribution involves the use of a user-defined model to automate the online escalation of the behaviour of operating system on the end user's computer in order to convey the modules in the Windows operating system. In order to expedite the mental learning process of the user, multiple user and application simulator parameterizations are activated, covering a range of real-world scenarios. The outcome authenticates that action-based learning is sufficient for learning a pre-defined model through the virtual assistant by using a custom-built data set that is defined by the user in all arrangements of interest that are taken into account.

Keywords SPA, IVA, Virtual Assistant, Simulator Parameterizations

1. INTRODUCTION

Artificial intelligence is the machine's capacity to perform different tasks for which a human being is required to apply his/her own intelligence. Creating ingenious technology in the field of science and logistics with visual perceptions, speech recognition, decision-making, and language translation like humans, is known as artificial intelligence. It is the duplicity of human intelligence processes generated by particular computer systems. It includes learning, to think something, planning of particular system, self-correction system, problem solving, knowledge representation, changes and manipulation and creativity. It is a representation of computing approaches that attract encouragement from different ways in which human beings use their bodies and neural systems to feel, perceive, reason, and act. Artificial intelligence includes machine learning and deep learning, where the deep learning uses different algorithms to identify trends and produce data set based on the data it processes. Deep Learning is a subsystem of machine learning. Some people consider it as a boon while others consider it as a curse to technology that causes danger to the sustainability of humans because it has the power to conquer and dominate the human beings. However, in reality, it has had a direct or indirect impact on the way we live now and future. Every new technology raises different questions which inspire in equal measure. It has different perspectives that offer both pros and cons when it comes to expert system. Ultimately Artificial Intelligence has

changed our lives a way far. AI based Virtual Agents has developed to a great level over past 15 years. It has introduced new application opportunities in the areas of training and healthcare etc. In traditional artificial intelligence theory, the solution to any problem is to create an intelligent system, called an agent, having all the necessary knowledge, abilities and computational resources, which is able to solve some global problems. Multi-agent systems are the type of artificial intelligence that uses various groups consisting of multiple interacting agents to solve a complex problem. Intelligent virtual assistants (VAs) helping us with many daily responsibilities, like scheduling appointments, maintaining track of our fitness, and managing messages. While there is great promise to improve human-agent communication, adding a humanoid body representation to these mostly voice-based VAs also raises expectations for the agent's social, spatial, and intellectual behavior.

2. LITERATURE REVIEW

Islam et al., (2022) emphasizes that artificial intelligence (AI) is being used to create automated or semi-automated systems in nearly every application area. Explainable artificial intelligence (XAI) has grown significantly in the last few years due to the emergence of extremely accurate models that lack interpretability and explainability, which has made these systems more appealing to humans. People from numerous application fields are becoming more interested in utilizing artificial intelligence (AI) technologies due to their recent advancements. Consequently, AI is being applied in a wide range of application sectors nowadays. Various AI algorithms are used to supplement human judgment in a range of tasks.

Gu et al., (2023) discussed that virtual agents are defined and understood differently in various studies within the subject. People with the will to follow through on their intentions and objectives are referred to as virtual agents. Fink further provided a loose definition of virtual agents, defining them as things that reflect a computer user's personality, static or dynamic two-dimensional graphics representing user avatars on Internet forums and other communities, and three-dimensional representations of computer users in video games. The media equation theory, which treats media agents as actual people and applies human social norms to multimedia, is where the concept of virtual agents originally originated.

Schmidt et al., (2020) discussed about a model for interacting with intelligent blended agents (IBAs) and humans. These agents can receive multi-modal feedback from one or more users; process the input data using different AI techniques and taking into account previous knowledge; and produce believable multi-sensory outputs, or behavior that users can perceive through their visual, auditory, and haptic channels. Creating haptic output, in particular, is difficult since it calls for IBAs to interact with their actual environment.

Suárez et al., (2022) studied that without underestimating the financial and spatial savings for universities, their results demonstrate the value of using AI to simulate virtual patients by providing students with a variety of clinical cases to practice and an immersive, human experience due to the natural language and interface. Consequently, their research results indicate to the necessity of integrating AI into dental curricula while also making sure that students are knowledgeable about the most recent technology advancements.

According to Bin Sawad et al., (2022) Due to advancements in technologies like voice recognition, natural language processing (NLP), and artificial intelligence (AI), conversational agents are becoming more and more available. Conversational agents (CAs), sometimes referred to as chatbots or dialogue systems, are computer programs that converse with users via text, voice, and image-based natural language user interfaces. Some of the Voice-activated virtual agents include Google Assistance, Apple Siri, Amazon Alexa, and Microsoft Cortana etc. For everyday tasks like calendar management and information

retrieval, users can converse with CAs via their mobile phones. Through smartphone apps or the internet, it is utilized to provide scalable, less expensive medical assistance solutions that are available 24/7. Additionally, they can assist with specialized activities like self-monitoring and overcoming barriers to self-management, which is crucial for managing chronic illnesses and preventing pandemics.

Abdulrahman et al., (2022) explains that the social acceptability of intelligent virtual agents (IVA) will determine how they are used to assist humans in social situations. Acceptance will depend on how the human views the IVAs and how successfully the IVAs respond to the human and modify their dialogue accordingly. Adaptation suggests synthetic speech produced by a machine, like text-to-speech.

Alanazi et al., (2023) explores EE models that are used to better understand how to develop social AI that is more lifelike in task-oriented, time-constrained contexts. Given their interdependence, EE paradigms provide an excellent framework for analyzing how interaction context and agent behavior interact in human-agent or agent-agent interactions, especially when the two must work together to accomplish a task under particular conditions. The aim of their study is to provide an embedded approach to examine empathic behavior in a dynamic social environment. A model is presented that uses multimodal emotional cues to promote emotional intelligence through deep learning, with the output being appropriate and sympathetic reactions.

3. APPLICATIONS OF VIRTUAL ASSISTANTS

3.1 Virtual Assistant for Academic Management: Artificial intelligence education (AIEd) is one of the latest areas of educational technology. There is a confusion among the educators about how to use it more broadly for pedagogical purposes and how it can truly have a significant impact on teaching and learning in higher education, Even if it has been available for about 30 years. Therefore, with the adoption of two to three years, artificial intelligence and its adaptive learning technologies are highlighted as major developments in educational technology in the 2018 Horizon study (Educause, 2018).The growth of AI applications in higher education brings with it new ethical considerations and risks, notwithstanding the immense benefits that AI might give to help teaching and learning. Systems for intelligent tutoring may imitate one-on-one, in-person instruction. They can decide on a student's unique learning route, the content to choose, offer cognitive scaffolding, and assist in getting the student to participate in conversation based on learner models, algorithms, and neural networks.

3.2 Healthcare Artificial Intelligent Conversational Agents for Chronic Conditions: The major issues that are faced by healthcare in this century are chronic diseases and how to get recover from it. With the widespread presence of chronic illnesses and mental health, the disorders are rising day by day. The impacts of chronic illnesses are known to be enduring and persistent. When they do arise, they typically last a person's entire life, therefore long-term care from both individuals and medical professionals is usually required. Virtual Agents can be helpful in the healthcare industry by helping patients and doctors during consultations, aiding users in changing their behavior, and helping the elderly in their homes. The virtual agents can assist with various specialized activities like self-monitoring and overcoming barriers to self-management, which is crucial for managing chronic illnesses and preventing pandemics.

3.3 Using a Virtual Patient via an Artificial Intelligence: In most of the cases, It is recommended that further studies to be conducted to ascertain the impacts of utilizing digital technology in clinical practice, with an emphasis on possible ethical dilemmas and the

requirement that dental educators integrate them into the curriculum, this is to be done in case of education. This is true despite the fact that clinical dentistry has been advancing to keep up with technology improvements that combine the fields of diagnosis and treatment. Technology in dentistry education makes it easier to put improvements in patient safety into practice by allowing practice in scenarios where the health of a real patient is not at risk. There are research looking into the usage of virtual patients in dentistry, however none that combine virtual patients with artificial intelligence were discovered. In light of everything said above, the suggested goal of the current study is to create and evaluate a virtual patient using an AI chatbot to help dentistry students improve their diagnostic abilities in pulp pathology.

3.4 Virtual-Agent-Based Language Learning: Researchers usually try to find out, if the learner's affective experiences are enhanced by the role of virtual agent. They can act like a peer, instructor, or student and offer emotional support while the learner works through the material. There are various studies that have already demonstrated the benefits of virtual agents on language learning outcomes, including increased student motivation, contentment with the learning process, and positive experiences. The technological uses of virtual agents in language education are still new, and there will likely be a significant increase in the amount of study conducted on their efficacy, use, and application. Therefore, by methodically mapping the important concepts and directions in the study area, it is appropriate to provide a thorough overview of the present state and research trends.

3.5 Consumer Behaviour Research and Virtual Commerce Application Design: With the help of Virtual agents one can switch consumers' impression of 2D product catalogues into 3D immersive virtual places, virtual commerce incorporates immersive technologies like augmented reality and virtual reality into e-commerce. To encourage the purchase of goods and services in virtual commerce, application design paradigms and customer behaviour elements must be in harmony. The term "virtual commerce" refers to business done in a fully immersive virtual setting. It is among the most recent innovations in e-commerce, the amazing business tool of the last 20 years driven by corporate creativity, social acceptance, and technology advancements. From a technological standpoint, virtual commerce uses immersive technology to build new settings for commercial activity and comprises e-commerce infrastructures including electronic product catalogues and electronic payment systems. The findings in user behaviour literatures must be successfully translated into design artifacts—which are generally understood to be constructs, models, methods, or an instantiation of application design research and development—in order for immersive technology to be adopted in virtual commerce applications. Thus, the design science criteria can be applied to research on applications related to virtual commerce that fall within the two categories of consumer behaviour research and application design.

3.6 Virtual Humans in Museums and Cultural Heritage Sites: Nonetheless, the majority of writers in the field make a distinction between computer-generated representations of human actors, known as agents, and digital representations of those actors, referred to as avatars. The term "digital human avatar" refers to all instances of actual users' representations (for example, when the visual representation resembles the actual human actor/narrator, as is the case in the Asinou church AR application). The term "virtual human" is limited to computer-generated representations, or digital agents. On the other hand, the term "digital human avatar" is used more broadly to include instances of digital bots and human users (e.g., Second Life). With the aid of artificial intelligence, digital human agents have developed over time to the point where they can now mimic human behavior and verbal and nonverbal communication patterns in order to interact and engage with actual people as well

as express and elicit emotions. They can even look just like real people. Digital human avatars are commonly employed in social VR applications within multi-user virtual environments. For over twenty years, virtual agents have been employed for a variety of tasks across multiple platforms, in addition to being employed in diverse virtual representations.

4. CHALLENGES IN CREATING VIRTUAL AGENTS WITH THE HELP OF ARTIFICIAL INTELLIGENCE

There are some of the challenges that are faced by the programmers while creating Smart Agents. Here are some of them to be discussed

4.1 Problem Solve: Virtual agents may not be able to solve certain complex issues because they are primarily meant to handle first-level inquiries. To fulfill requests from humans, a virtual agent is programmed to react in a mechanical manner. Put otherwise, the virtual agent's ability to respond is limited by the preset keywords that were programmed into it. When users ask queries, the agent will recognize and match the keyword and reply accordingly.. Virtual agents can help in handling or in providing predefining answer to some questions .Should the questions contain no predefined keywords, there's a chance that your virtual agent won't recognize and handle the issues. Because of this, the chat might continue indefinitely until customer support steps in. Humans, on the other hand, are more adaptable and have the ability to comprehend and deal with a wide range of issues, both simple and complicated. Humans do better than the virtual agent from this perspective.

4.2 Express Feelings And Have Innovation: An agent that is virtual is emotionless. Robotic answers were given to maintain the expected flow of the conversation which can irritate the clients. In contrast, because they have the ability to see, hear, feel, and think, humans are emotional and sensitive beings. In order to deal with these various situations they have to be sensitive which rarely can happen.

4.3 Maintain Customers: Constant evaluation, upkeep, and optimization is required in Virtual agent to effectively and efficiently interact with consumers and respond to their inquiries. As a result, you must periodically examine frequently asked queries and input fresh keywords or replies into the virtual agent. It is challenging to evaluate each query and exchange of ideas, though. People are able to independently reason, summarize, and work to assist clients with these questions.

4.4 Cost: The initial training that a virtual assistant usually needs to complete makes hiring one of these people very expensive. But hiring a virtual assistant is an investment in the company, and there may be returns that will exceed the initial expenses. We need to decide the budget so that we can hire a virtual assistant which works efficiently and more like humans and this task is quite expensive. We should hire them for a trial and decide if it is really worth investing in them.

4.5 Securing The Real Benefits: If we want to create an AI helper, first of all we need to find out the Reliable cases. These ought to list and defend a VA's advantages and business applications. Consider the situations in which using your AI helper makes sense. Moreover, we need to confirm the real owner of the project and its important stakeholders and also think about where it can have the greatest effect. You may begin by using Virtual Agents in a small area of the company, like customer service, marketing, HR, or training, and then work your way up to the entire enterprise. Understanding the limitations of both your organization and the VA is necessary for part of the analysis. The quality of a VA depends on the context in which they are used. An improper use of a VA will simply make system flaws more evident.

4.6 Training and On boarding Your VA: It is very much necessary for the virtual assistants to get trained and assistance in order to continue the comparison between virtual and real assistants. It goes beyond simply providing them with resources or a ton of knowledge. A virtual agent must understand the audience and the situation in order to be truly effective. It must be completely integrated with the current workflow. This is an ongoing procedure. Like its human counterparts, the virtual assistant will need to be retrained whenever processes, procedures, or corporate goals change.

In the end we can say that there are lots of challenges that human beings are facing while creating virtual agents. Using the VAs is not only the easiest way to do things right but is quite an expensive method to do things the right way. Proper understanding of the code, skilled engineers are required for creating virtual agents.

5. CONCLUSION

The opportunities and challenges which are faced in the field of artificial intelligence are covered in the chapter. Artificial intelligence is becoming more and more important in our society. Even after being studied and learned for many years, it is the most abstract topic in computer science and a popular buzzword. The adaptive neuro-fuzzy inference system has become an outstanding method for handling complex, dynamic, and highly nonlinear research problems that necessitated comprehensible abilities. Today's world is heavily changed by massive amounts of unsupervised data. The ability of machines to demonstrate the application of these advanced cognitive skills in predicting behavior, decision-making, language processing (written or spoken), and learning (supervised or unsupervised) makes this domain extremely important. Artificial intelligence has become much more powerful due to exponential growth in data generation, sophisticated storage capabilities, constant increases in computing power, and advancements in research machine self-learning. Artificial intelligence is not an exception to the rule that every new disruptive technology has advantages and disadvantages. Artificial intelligence (AI) has implications for data protection, privacy, and individual rights. These implications present social and ethical challenges that are exacerbated by the fact that self-learning algorithms are taking control of people and societies. Many are raising their concerns and showing that the devastation that AI may cause will likely manifest as an increasing flood of joblessness and disillusionment. However, the AI revolution will create a lot of new jobs in data science, machine learning, engineering, and IT as they will be running on AI algorithms and they will improve humankind's quality of life.

REFERENCES

- Abdulrahman, A., & Richards, D. (2022). Is natural necessary? Human voice versus synthetic voice for intelligent virtual agents. *Multimodal Technologies and Interaction*, 6(7), 51.
- Alanazi, S. A., Shabbir, M., Alshammari, N., Alruwaili, M., Hussain, I., & Ahmad, F. (2023). Prediction of emotional empathy in intelligent agents to facilitate precise social interaction. *Applied Sciences*, 13(2), 1163.
- Baskaran, G., Raj, A. H., Kumar, S. A., Anand, R.(2021), To Build a Virtual Assistant By Using Artificial Intelligence.
- Bin Sawad, A., Narayan, B., Alnefaie, A., Maqbool, A., Mckie, I., Smith, J., & Kocaballi, A. B. (2022). A systematic review on healthcare artificial intelligent conversational agents for chronic conditions. *Sensors*, 22(7), 2625. <https://doi.org/10.3390/s22072625>
- Bryndin, E. (2020). Development of artificial intelligence by ensembles of virtual agents with mobile interaction. *Automation, Control and Intelligent Systems*, 2020, 1-8.

Chen, Y., Jensen, S., Albert, L. J., Gupta, S., Lee, T. (14 June 2022) Artificial Intelligence (AI) Student Assistants in the Classroom: Designing Chatbots to Support Student Success. <https://doi.org/10.17705/1jais.00491>

Gu, X., Yu, T., Huang, J., Wang, F., Zheng, X., Sun, M., ... & Li, Q. (2023). Virtual-Agent-Based Language Learning: A Scoping Review of Journal Publications from 2012 to 2022. *Sustainability*, 15(18), 13479. <https://doi.org/10.3390/su151813479>

Healy, P. (2021, May 12). 9 Challenges In Implementing An AI Virtual Assistant Into Your Organization. eLearning Industry. <https://elearningindustry.com/ai-virtual-assistant-organization-9-challenges-implementing>

Islam, M. R., Ahmed, M. U., Barua, S., & Begum, S. (2022). A systematic review of explainable artificial intelligence in terms of different application domains and tasks. *Applied Sciences*, 12(3), 1353. <https://doi.org/10.3390/app12031353>

Luc Lamontagne, L., François Laviolette, F., Khoury R., Bergeron-Guyard, A. (March 2014) A framework for building adaptive intelligent virtual assistants

Ming, W. (2021, April 23). The Advantages And Disadvantages Of Using A Virtual Agent. Forbes. <https://www.forbes.com/sites/forbesbusinesscouncil/2021/04/23/the-advantages-and-disadvantages-of-using-a-virtual-agent/?sh=31a0b75b29e6>

Rahman, Md. W., Tashfia, S. S., Islam, R., Hasan Md. M., Sultan Sadee I., Mia, S., Rahman Md. M. (March 2021) The architectural design of smart blind assistant using IoT with deep learning paradigm. <https://doi.org/10.1016/j.iot.2020.100344>

Rawassizadeh, R., Sen, T., Kim, Sunny J., Meurisch, C., Hamidreza Keshavarz, H., Mühlhäuser, M., Pazzani, M. (2019) Manifestation of virtual assistants and robots into daily life: vision and challenges

Reddy M., S., Vyshnavi, Kumar, R., Saumya. VIRTUAL ASSISTANT USING ARTIFICIAL INTELLIGENCE AND. (March, 2020)

S Jagadesh, M Arul Pugazhendhi, G Rohith Raj (2021) Automatic Face Recognition and Virtual Assistant using IOT and AI

Schmidt, S., Ariza, O., & Steinicke, F. (2020). Intelligent blended agents: Reality–virtuality interaction with artificially intelligent embodied virtual humans. *Multimodal Technologies and Interaction*, 4(4), 85.

Shen, B., Tan, W., Guo, J., Zhao, L., & Qin, P. (2021). How to promote user purchase in metaverse? A systematic literature review on consumer behavior research and virtual commerce application design. *Applied Sciences*, 11(23), 11087. <https://doi.org/10.3390/app112311087>

Suárez, A., Adanero, A., Díaz-Flores García, V., Freire, Y., & Algar, J. (2022). Using a virtual patient via an artificial intelligence chatbot to develop dental students' diagnostic skills. *International Journal of Environmental Research and Public Health*, 19(14), 8735.

Sylaiou, S., & Fidas, C. (2022). Virtual humans in museums and cultural heritage sites. *Applied Sciences*, 12(19), 9913. <https://doi.org/10.3390/app12199913>

Top 5 Virtual Assistant Challenges and Solutions. (2024, March 14). Analytix Solutions. Retrieved from <https://www.analytix.com/virtual-assistant-challenges-and-solutions/>

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 1-27.