A Review on AI-Based Personal Assistants and Chatbots

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Abstract

Artificial Intelligence (AI) has significantly contributed to the development of smart assistants and chatbots that enhance user experience, particularly in aiding visually impaired individuals, providing contextual interactions, and enabling voice-controlled functionalities. This paper reviews three research papers on AI-based assistants, summarizing their contributions, methodologies, and technological implementations. Additionally, we incorporate insights from the research paper *AI
Voice Assistant for Academic and Career Guidance*, which focuses on a specialized assistant for AIML students.

1. Introduction

AI-driven personal assistants and chatbots have gained popularity in various domains, including healthcare, education, and customer service. This review explores four notable studies focusing on AI-based assistance, highlighting their applications, methodologies, and outcomes.

2. Summary of Research Papers

2.1 A Smart Personal AI Assistant for Visually Impaired People

Shubham Melvin Felix, Sumer Kumar, and A. Veeramuthu (ICOEI 2018) introduced smartphone-based AI assistant designed for visually impaired individuals. The system utilizes AI, machine learning, and image recognition to interpret the surrounding environment and provide auditory feedback. Key features include:

- Voice-based interaction for ease of use.
- Image recognition technology to analyze surroundings.
- Text-to-speech conversion for reading out textual content.

This research highlights the potential of AI to improve accessibility and independence for visually impaired users.

2.2 **Jollity Chatbot - A Contextual AI Assistant**

Kanakamedala Deepika, Veeranki Tilekya, and Jatroth Mamatha (2020 IEEE) developed Jollity

Chatbot using the Rasa framework, including Rasa NLU and Rasa Core. This chatbot provides:

- Context-aware conversational capabilities.

- Entertainment and motivational interactions.

- Enhanced engagement through NLP-based contextual understanding.

The research emphasizes the importance of natural language processing (NLP) and contextual awareness in improving chatbot efficiency and user experience.

2.3 **Artificial Intelligence-Based AI Assistance**

Subhash S, Prajwal N Srivatsa, and Santhosh B (2020 IEEE) proposed an AI-based voice assistant that integrates:

- Google Text-to-Speech (GTTS) engine.

- Playsound module for interactive audio feedback.

- Python-based development for seamless execution of voice commands.

The study showcases the application of AI in voice-controlled systems, highlighting its usability in everyday interactions.

2.4 **AI Voice Assistant for Department**

Sahil Bodare, Prathamesh Chavan, Raviraj Mohite, and Kiran Kamble designed a voice assistant to support students in the AIML department by offering:

- Academic Assistance: Providing quick access to syllabi, previous exam papers, and studymaterials.
- Career Guidance: Offering structured career pathways, skills recommendations, and industryexpectations.

- Competitive Exam Support: Assisting students with GATE preparation through curated resources.- Self-Directed Learning: Enabling students to retrieve relevant information independently, reducing dependency on faculty.

This research demonstrates how AI voice assistants can enhance self-paced learning and student engagement in academia.

3. **Future Enhancements**

A critical enhancement that can be introduced in future AI assistants is adaptive learning mechanisms. Inspired by past AI chatbot research and voice assistants, this feature would allow the assistant to:

- Track student progress and provide personalized learning paths.

- Recognize complex, domain-specific queries and improve contextual understanding over time.

- Incorporate sentiment analysis to detect user emotions and adjust responses accordingly.

- Expand multilingual support, ensuring accessibility for a diverse student base.

By incorporating these features, AI voice assistants can become more effective and user-centric, catering to evolving educational and accessibility needs.

4. **Conclusion**

The reviewed research papers demonstrate the diverse applications of AI in personal assistance. From aiding visually impaired users to providing contextual interactions and voice-based automation, AI continues to revolutionize human-computer interaction. Additionally, AI-driven assistants in education, such as the *AI Voice Assistant for Academic and Career Guidance*, highlight the growing role of AI in self-directed learning and career development.

Future advancements in NLP, deep learning, and multimodal interaction will further enhance AI-based assistants. By integrating adaptive learning capabilities, multilingual support, and context-aware AI, these systems can evolve into highly personalized academic and career companions, transforming the way students and professionals engage with educational content and career planning.

5. **Reference**

1.Shubham Melvin Felix, Sumer Kumar, and A. Veeramuthu, “A Smart Personal AI Assistant for Visually Impaired People”. Impaired, AI, Machine Learning, Voice Assistant, Chat bot, Image Recognition. Conference on Trends in Electronics and Informatics (ICOEI 2018) IEEE Conference Record.

2. Kanakamedala Deepika, Veeranki Tilekya, Jatroth Mamatha. “Jollity Chatbot- A contextual AI Assistant.»Chatbot, Contextual AI Assistant, Rasa, Rasa NLU, Rasa Core. 2020 IEEE.

3. Subhash S, Prajwal N Srivatsa, Santhosh B. “Artificial Intelligence based AI Assistance” Voice control, AI-based Voice Assistant, GTTS Engine, Playsound, Python. 2020 IEEE .