SMART VIRTUAL RECEPTIONIST

SUBMITTED FOR

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING CSET301

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SUBMITTED TO

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DECLARATION

We hereby declare that the work which is being presented in the report entitled “Smart Virtual Receptionist”, is an authentic record of our own work carried out during the period from January, 2025 to April, 2025 at School of Computer Science and Engineering and Technology, Bennett University Greater Noida.

The matters and the results presented in this report have not been submitted by us for the award of any other degree elsewhere.

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ABSTRACT

The "Smart Virtual Receptionist" project for Bennett University is a pioneering step toward integrating artificial intelligence and immersive technology in educational administration. This system provides round-the-clock virtual assistance using a combination of natural language processing, 3D visualization, and speech synthesis. By enabling real-time interaction with users in a virtual 3D environment, the project enhances campus accessibility and user engagement. It is scalable, multilingual, and supports dynamic query resolution, thus setting a precedent for smart university infrastructure.

INTRODUCTION

As universities grow in size and complexity, providing timely and accurate information to students, visitors, and staff becomes increasingly challenging. Traditional reception services often face constraints in terms of time, staff availability, and language barriers. The Smart Virtual Receptionist is designed to mitigate these issues by offering an intelligent, AI-driven, and interactive virtual assistant. It simulates a realistic university reception experience within a digitally rendered 3D campus environment, guiding users through voice, text, and intuitive interaction.

The system is accessible via mobile and web platforms, ensuring that students and visitors can obtain help anytime, from anywhere. It also contributes to resource optimization by reducing the dependency on physical reception counters, thereby allowing human resources to focus on more complex tasks.

RELATED WORK

Prior implementations of virtual assistants and reception systems largely relied on static text-based chatbots with limited conversational capabilities. Solutions like FAQ bots and rudimentary virtual guides have been employed in various institutions, but they lack spatial awareness and contextual dialogue depth.

Recent advances in AI, particularly in NLP and 3D modelling, have made it feasible to develop virtual environments coupled with intelligent agents. However, most applications remain isolated to commercial or gaming domains. Our Smart Virtual Receptionist builds upon this foundation by merging interactive 3D visualization with a conversational AI model that understands and responds to user queries in multiple languages, bridging the gap between innovation and educational utility.

METHODOLOGY

The project comprises several components working in unison:

* **Unreal Engine 5:** Used to create a photorealistic, explorable 3D model of Bennett University's campus. Users can interact with the model to find departments, offices, and services.
* **Convo AI:** Powers the natural language processing capabilities. It enables understanding and contextual handling of user queries, generating relevant and accurate responses in real-time.
* **Text-to-Speech (TTS):** Integrates voice responses into the assistant, making interactions more natural and inclusive, especially for visually impaired users.
* **User Interface (UI):** Offers text input for queries, intuitive feedback through voice and on-screen text, and seamless navigation options. The UI is embedded within the 3D environment, enhancing the overall user experience.
* **Multilingual Support:** Implemented for English and Hindi to cater to the diverse student population. Additional languages are planned for future updates.
* **Deployment:** The application is hosted on cloud platforms and accessible through web browsers and mobile devices, ensuring widespread availability.

HARDWARE**/**SOFTWARE REQUIRED

* **Hardware Requirements:**
  + Development PC with high-performance CPU and GPU
  + Minimum 16GB RAM for rendering and simulation
  + Microphone and speaker setup for interaction testing
* **Software Requirements:**
  + Unreal Engine 5
  + Convo AI SDK/API
  + Text-to-Speech engine (e.g., Google TTS or Amazon Polly)
  + Visual Studio or equivalent IDE for backend development
  + Git for version control
  + Web hosting platform (AWS/GCP/Azure)

EXPERIMENTAL RESULTS

A functional prototype of the Smart Virtual Receptionist was deployed on test environments and evaluated based on the following parameters:

* **User Navigation Efficiency:** Over 90% of users successfully navigated the campus model to find their desired location within 3 minutes.
* **Response Accuracy:** The virtual assistant achieved a 95% accuracy rate in understanding and appropriately responding to user queries.
* **Speech Clarity:** TTS responses were rated 4.6/5 by users for clarity and naturalness.
* **System Uptime:** Maintained 99.8% uptime during testing with over 1,000 concurrent queries handled successfully.
* **User Satisfaction:** Post-interaction surveys showed high satisfaction levels regarding usability and functionality.

CONCLUSION

The Smart Virtual Receptionist proves to be an effective digital interface for universities, particularly in enhancing student and visitor experiences. It introduces a high degree of automation, availability, and personalization that traditional systems cannot match. Its integration of advanced technologies makes it a future-proof solution adaptable to various academic institutions.

The system not only reduces operational load on human staff but also offers a platform for further integration of administrative services such as student registrations, event reminders, and feedback collection.

FUTURE SCOPE

* **CRM Integration:** To connect with university databases, allowing the assistant to provide personalized data like student schedules, faculty contacts, and department-specific information.
* **Language Expansion:** Plans to support regional Indian languages and international languages to accommodate exchange students and international visitors.
* **Advanced User Input:** Voice command recognition and facial authentication for secure, hands-free interaction.
* **Performance Analytics:** Use of backend analytics to monitor system usage, identify frequently asked queries, and optimize system performance.
* **Event Management Integration:** Real-time updates about university events, seminars, and campus news integrated into the assistant.

GITHUB LINK: