AI-Driven Multimodal Holographic Human Computer Interaction System

Project Synopsis

Project Synopsis (Version 1.0)

Course: B.Tech CSE AI ML DL

Degree: Bachelor of Technology (CSE)

PROJECT GUIDE:

MS. VARTIKA GUPTA

SUBMITTED BY:

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1 Project Title

AI-Driven Multimodal Holographic Human–Computer Interaction System

2 Domain

Artificial Intelligence, Computer Vision, Human–Computer Interaction (HCI), Augmented Reality Simulation, Gesture Recognition, Voice Processing (NLP)

3 Problem Statement

Traditional input devices limit natural interaction. This project solves the problem by creating a holographic interface allowing gesture, voice, and 3D simulated hologram-based interaction. The system enhances accessibility, reduces physical contact, and supports futuristic multi modal control.

The problem this project addresses is the **absence of an AI-driven multimodal holographic interface** that:

Enables users to interact using **hand gestures**, **voice commands**, and **3D holographic-like UI**.

Provides **contactless interaction**, reducing physical dependency on devices.

Offers a **futuristic and intuitive user experience** inspired by AR/VR systems without requiring expensive hardware.

Enhances accessibility for users with physical limitations by offering alternative input channels.

Integrates AI models for **real-time recognition, tracking, and response**.

Thus, there is a need to design a system that combines gesture recognition, speech processing, and holographic simulation into a seamless human–computer interaction model capable of supporting next-generation applications.

4 Project Description

The system enables users to interact with 3D holographic-like floating interfaces using hand gestures, voice commands, and AI-driven tracking. It integrates gesture recognition, speech processing, and holographic UI simulation to create a futuristic multi modal user interface.

4.1 Scope of the Work

In Scope: Gesture recognition, voice command processing, holographic UI simulation, hand tracking, floating menu system. Out of Scope: Real hologram hardware, AR headset integration.

4.2 Project Modules

- Module 1: Gesture Detection System

- Module 2: Voice Command System

- Module 3: Holographic UI Simulation

- Module 4: Interaction Engine

- Module 5: System Dashboard

5   Implementation Methodology

The project follows analysis, design, development, integration, and testing phases. AI models handle gesture and voice input. DFDs and diagrams define system flow. Testing includes accuracy tests and usability checks.

6   Technologies to be used
6.1 Software Platform

Front-end: Python UI / Web-based Holographic Simulation
Back-end: Python AI modules

6.2 Hardware Platform

8GB RAM, 256GB Storage, Webcam, Windows OS

Hardware Platform

RAM, Hard Disk, OS, Editor, Browser etc.

4.3 Tools

Python, Open CV, Media Pipe, Speech-recognition API, VS Code, GitHub

7 Advantages of this Project

Hands-free interaction, futuristic holographic interface, enhanced accessibility, applicable in healthcare, defense, smart homes.

8 Future Scope and further enhancement of the Project

Real hologram hardware integration, AR headset support, virtual assistant avatar, IoT expansion.

9 Team Details

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Role: Developer

Project Name & ID	Course Name	Student ID	Student Name	Role	Signature
AI-Driven	B.Tec	**TCA235**	**Y.**	**Develo**	

Multimodal Holographic Human–Computer Interaction System (Holo-UI-01)	h CSE AI ML DL	**9240**	**SIDDHA RTH**	**per / Tester**	

10 Conclusion

The system provides a futuristic multi modal interface combining gesture, voice, and holographic UI. It enhances human–computer interaction and demonstrates practical AI-driven innovation.

11 References

- Open-CV Documentation
- Media-pipe Documentation
- Google Speech API
- Research papers on Holographic UI & AI-based Interaction