WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

AI-Voice Assistant And Invisible Mouse

***Dnyanesh Mahajan*[*1], *Aniket Menge*[*2], *Samarth Godse*[*3]**

[*1,2,3,]Department Of Computer Engineering, Brahma Valley College Of Engineering And Research Institute, Nashik, Maharashtra, India.

ABSTRACT :

This paper presents an Ai-voice Assistant and Invisible Mouse project represents a pioneering endeavor in human-computer interaction, aimed at reshaping how we engage with technology in our digitally driven world. This project harnesses computer vision, artificial intelligence, and natural language processing to create a seamless, touchless computing experience. It eliminates the need for physical mice by enabling users to control computer functions through hand gestures and a personalized AI assistant that responds to voice commands. This integration enhances accessibility for individuals with physical disabilities, streamlines tasks to boost productivity, and pushes the boundaries of human-computer interface design. By focusing on security, accessibility, sustainability, and personalization, the project paves the way for a future where technology serves and empowers individuals globally.

INTRODUCTION :

In the ever-evolving landscape of technology, human-computer interaction is undergoing a transformative shift, becoming an integral part of our daily lives. The " Ai-voice Assistant and Invisible Mouse " project represents a pioneering endeavor at the forefront of this evolution, aiming to redefine the way we interact with computers and digital devices. This innovative project leverages cutting-edge capabilities in computer vision, artificial intelligence (AI), and natural language processing (NLP) to create an immersive and intuitive touchless computing experience.

As we navigate a digital world that permeates every aspect of modern life, the project seeks to transcend the limitations of traditional input methods. It enables users to interact with computers in a more natural and user-centric manner by eliminating the need for physical mice. Instead, it introduces hand gesture-based controls and a voice-controlled AI assistant, making interactions seamless and efficient. This project not only enhances accessibility and productivity but also redefines innovation in human-computer interface design, offering a glimpse into the future of technology.

Touchscreen technology has transformed mobile devices but remains constrained in desktops and laptops due to cost and hardware limitations. The objective of this project is to develop a virtual mouse system using a webcam, providing a user-friendly alternative to touchscreens and conserving workspace by utilizing vision-based technology to control the mouse through natural hand gestures.

LITERATURE SURVEY :

1. Existing Systems & Limitations

Several research studies explored gesture-based virtual mouse systems (e.g., Mouseless, AI Virtual Mouse, Head-Controlled Interfaces).
Challenges include poor accuracy in varying lighting conditions, high computational requirements, and limited accessibility for users with disabilities.

2. Research Gaps Identified

Lack of integration between gesture control and AI voice assistants for a seamless user experience.
Security and privacy concerns in existing voice-controlled systems due to cloud-based data processing.

3. Problem Statement & Objective

The project NI-SPARSH aims to create an Invisible Mouse using hand gestures and voice commands, improving accessibility, efficiency, and security in human-computer interaction

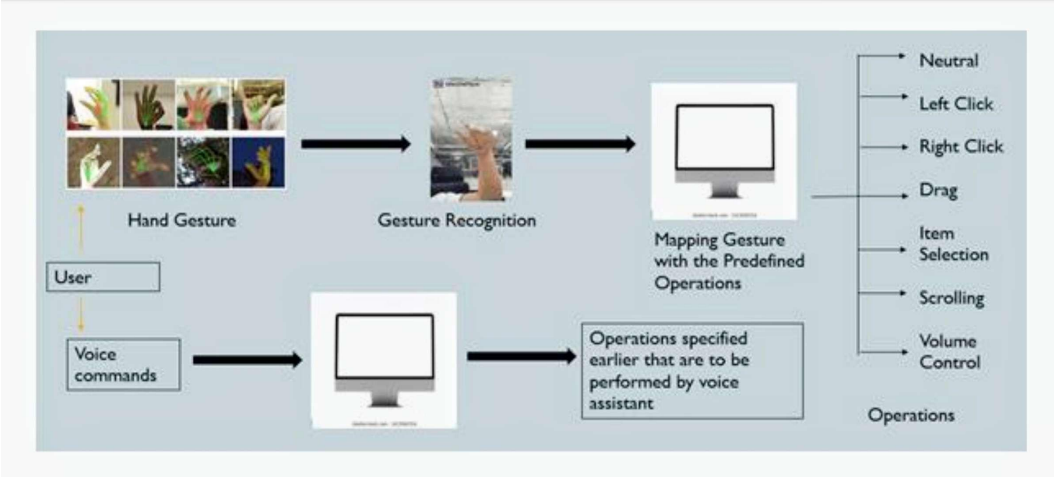
PROPOSED SYSTEM :

The system enables touchless computing using hand gestures and voice commands, eliminating the need for a physical mouse. It integrates computer vision (OpenCV), AI-based voice recognition, and automation to enhance accessibility. The system supports gesture-based mouse control, AI voice assistance, WhatsApp messaging, and web automation, ensuring a seamless, secure, and user- friendly experience, especially for individuals with disabilities.

OBJECTIVES :

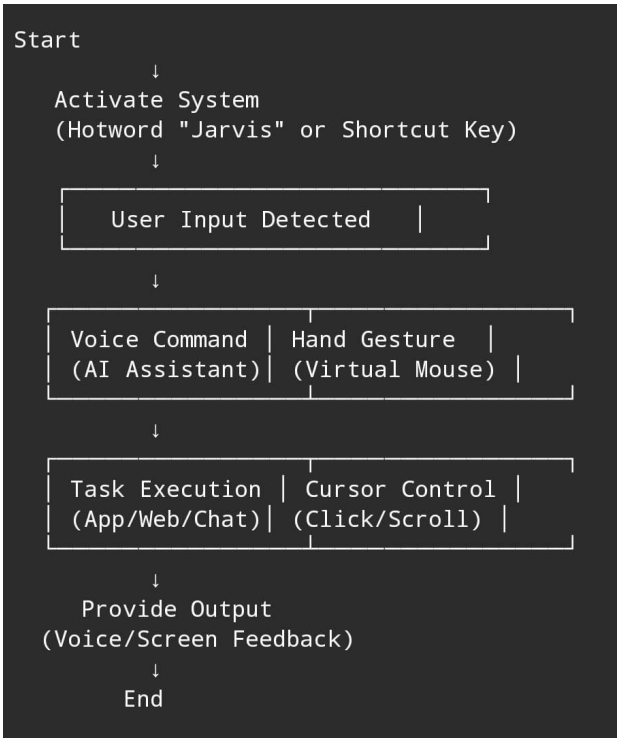
1. Enable Touchless Computing – Replace the traditional mouse with gesture-based control using computer vision.
2. Integrate AI Voice Assistance – Allow users to perform tasks using voice commands for hands-free interaction.
3. Enhance Accessibility – Improve computer usage for individuals with disabilities through intuitive controls.
4. Ensure Security & Efficiency – Process data locally to maintain privacy and optimize performance.

SYSTEM ARCHITECTURE :



IMPLEMENTATION

The implementation of NI-SPARSH begins with system activation through the hotword "Jarvis" or a shortcut key. Once activated, the system detects user input, which can be either hand gestures or voice commands. For gesture-based control, OpenCV and MediaPipe track hand movements to perform mouse actions like clicking, scrolling, and dragging. If the user provides a voice command, speech recognition and AI processing interpret the input to execute tasks such as opening applications, web searches, and WhatsApp automation. The system then provides real-time feedback through voice or on-screen responses, ensuring a smooth and intuitive user experience. This integration of computer vision and AI enables a touchless and efficient human-computer interaction system.



RESULTS AND DISCUSSION :

The system was successfully enabled gesture-based mouse control and AI voice assistance. Hand gestures worked well in good lighting, but accuracy dropped in low-light conditions. The voice assistant efficiently handled commands, though background noise occasionally affected recognition. Local processing improved security, reducing reliance on cloud services. Overall, NI-SPARSH enhanced accessibility and efficiency, making it a viable alternative to traditional input devices.
Future improvements will focus on better noise filtering and enhanced gesture tracking.

CONCLUSION :

The system successfully integrates gesture-based mouse control and AI voice assistance, providing a touchless and efficient human-computer interaction experience. By eliminating the need for physical input devices, it enhances accessibility, especially for individuals with disabilities. The system demonstrated high accuracy in hand gesture tracking and voice command execution, though minor challenges remain in low-light conditions and background noise interference. Overall, NI-SPARSH represents a significant step toward intuitive, secure, and user-friendly computing, paving the way for future advancements in touchless technology.

ACKNOWLEDGEMENT

We would like to express my sincere gratitude to our supervisor, Prof. Priyanka P. Kakade, for their continuous support and guidance throughout this project. I would also like to thank my colleagues for their valuable feedback and assistance during the implementation phase.

REFERENCES :

1. P. Mistry and P. Maes, "Mouseless: A Computer Mouse as Small as Invisible," CHI 2011.
2. A. Pradhana, B.B.V.L. Deepak, "Design of Intangible Interface for Mouseless Computer Handling using Hand Gestures," IEEE, 2023.
3. S. Shriram, B. Nagaraj, J. Jaya, et al., "Deep Learning-Based Real-Time AI Virtual Mouse System Using Computer Vision," European Journal of Scientific Research, 2011.
4. T.M. Bhruguram, S. Jophin, M.S. Sheethal, P. Philip, "A New Approach for Hand Gesture- Based Interface," IEEE, 2002.
5. L. Mühlbach, D. Ruschin, "Touchless Interaction-Novel Chances and Challenges," HCI 2009.
6. R. de la Barré, P. Chojecki, U. Leiner, "Virtual Mouse Using Hand Gesture," International Research Journal of Engineering and Technology, 2018.
7. A. Gupta, N. Sharma, "Human–Computer Interaction and Virtual Reality Research in Cognitive InfoCommunications," Applied Sciences, 2021.
8. Jude, G. M. Poor, D. Guinness, "Realtime Computer Vision with OpenCV," Queue, 2012.
9. R. Kumar, M. M. Ali, "Chatbot Design and Implementation Techniques," International Journal of Engineering and Technology, 2020.
10. H. Qian, X. Li, H. Zhong, et al., "Pchatbot: A Large-Scale Dataset for Personalized Chatbot," arXiv, 2020.
11. T. Lalwani, S. Bhalotia, A. Pal, et al., "Implementation of a Chatbot System Using AI and NLP," IJIRCST, 2018.
12. S. P. R. Karri, B. S. Kumar, "Deep Learning Techniques for Chatbot Implementation," ICCCI, 2020.
13. M. Skorikov, K. N. J. Omar, R. Khan, "Voice-Controlled Intelligent Personal Assistant," IEEE TENCON, 2018.
14. N. Goksel-Canbek, M. E. Mutlu, "Artificial Intelligence: Learning with Intelligent Personal Assistants," Int. J. Human Sciences, 2016.
15. M. B. Hoy, "Alexa, Siri, Cortana, and More: An Introduction to Voice Assistants," Medical Reference Services Quarterly, 2018.
16. F. Nasirian, M. Ahmadian, O.-K. Lee, "AI-Based Voice Assistant Systems: Evaluating from the Interaction and Trust Perspectives," AMCIS, 2017