Project Name: Facial and Vision based cursor control system

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Project Overview: This project aims to develop an AI-driven mouse control system that enables users to interact with digital devices using eye movements, voice commands, and IMU-based motion tracking. By integrating computer vision, speech recognition, and inertial sensors, the system allows hands-free cursor movement, selection, and execution of commands. This enhances human-computer interaction (HCI), particularly benefiting accessibility solutions, assistive technologies, and hands-free device control.

Objectives:

1. Eye Tracking & Blinking Clicks: Uses a webcam to track gaze and detect blinks for clicking.
2. IMU-Based Cursor Control: Tracks head movements for smooth cursor navigation.
3. Voice Command Integration: Executes actions like scrolling and other functionalities via speech recognition.
4. Optimized for Low Latency: Ensures real-time responsiveness for seamless user interaction.

Core Tasks:

- **Eye Tracking & Cursor Control**: Utilize computer vision techniques to track gaze and map it to cursor movement.
- **Voice Command Integration:** Implement speech recognition models for executing mouse operations.
- **IMU-Based Motion Tracking:** Use inertial sensors to enhance movement precision and provide an alternative control method.
- **Performance Optimization:** Reduce processing time and improve system responsiveness.
- **User Testing & Feedback:** Conduct trials to evaluate usability and refine the system.

Tools & Technologies:

- **Programming Languages:** Python
- **Computer Vision:** OpenCV, MediaPipe (for eye tracking)
- **Machine Learning & AI:** TensorFlow, SpeechRecognition (for voice commands)
- **Hardware:** Webcam**,** Microphone**,** IMU Hardware

Conclusion: This project redefines traditional input methods by enabling users to control devices through eye movements, voice commands, and IMU-based motion tracking. By leveraging AI, computer vision, and real-time sensor processing, it ensures an intuitive, touch-free interaction ideal for assistive technologies, gaming, and automation. Its adaptability makes it a valuable solution for enhancing accessibility and hands-free digital interactions.