International Journal of Research Publication and Reviews

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

Wave to Adjust: A Smart Gesture-Based Volume Control System

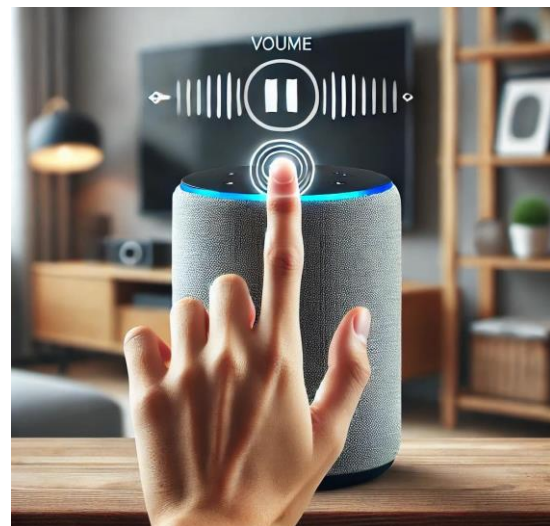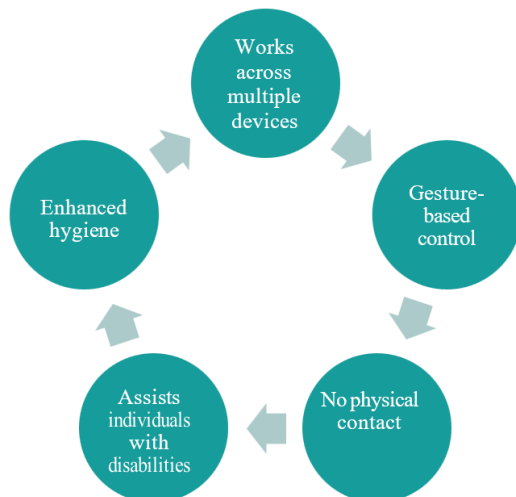*Hirutthik Rosan R*

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Introduction:

Problem Statement: Traditional volume control methods (physical buttons, voice control) are inconvenient, unhygienic, or unreliable.
Solution: A touch-free, gesture-based system using computer vision and machine learning for seamless volume
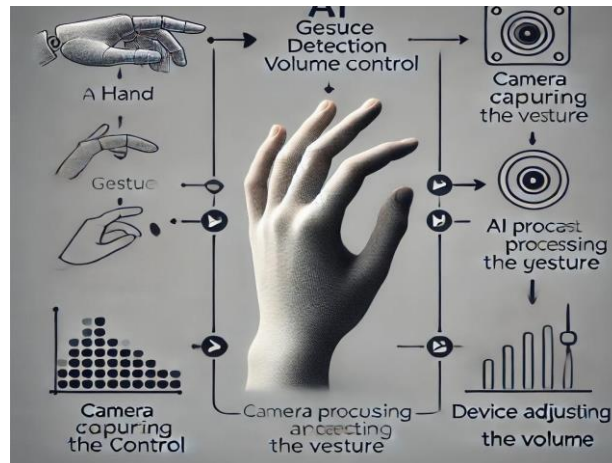

Key Features & Benefits :

System Architecture& Functionality

- **Gesture Capture**: Uses cameras/depth sensors to detect movements.
- **Recognition:** Mediapipe classifies gestures (swipe up/down, pinch).

- **Command Mapping**: Converts gestures to volume actions.
- **Device Control**: Executes commands via system APIs.
- **Feedback:** Visual/audio/haptic response for user confirmation.

Implementation & Advantages :

Implementation:

- Uses OpenCV/Mediapipe for gesture recognition.
- Works in real-time across various environments.
- Trained with diverse datasets for reliability.

Advantages:

- Hands-free operation: Useful in kitchens, driving, public spaces.
- Seamless integration: Works with existing audio systems.
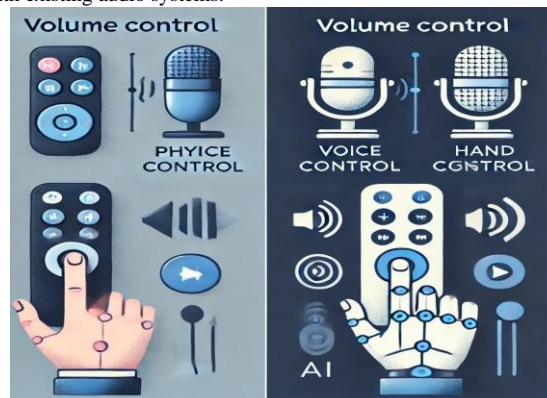
Future Enhancements & Conclusion

FUTURE ENHANCEMENTS:

- Improve accuracy in different lighting conditions.
- Add multi-gesture support for complex commands.
- AI integration for a hybrid voice + gesture control.
- Expand to smart homes, healthcare, and IoT devices.

CONCLUSION:

- Provides a hygienic, accessible, and intuitive alternative to traditional volume controls.
- A step forward in touch-free human-machine interaction.