User MANUAL

PROGESTURE

This user manual provides a comprehensive guide for operating the ProGesture system, an AI driven hand gesture controlled prototype that translates high-speed computer vision into seamless computer commands.



COMPUTER ENGINEERING

By PROGESTURE

Purpose and Target Users

The purpose of the **ProGesture** system is to provide hands-free control during presentations and media playback while improving user interaction through intuitive gesture-based commands, specifically targeting students, presenters, educators, and professionals who utilize multimedia applications.

System Setup & Environment

For optimal performance, ensure the following conditions are met:

Operating Distance: Position yourself 0.6 to 2.0 meters from the camera to maintain accurate gesture detection.

Lighting Conditions: Keep your hands well-lit and clearly visible. Avoid strong backlighting (e.g., bright windows behind you), as it can obscure hand details and reduce detection accuracy.

Frame Stability: If the hand leaves the camera's field of view for more than 1.5 seconds, the system automatically resets to Normal Mode to ensure safe operation.

Gesture Cooldown: A 1.5-second delay is enforced after each recognized gesture to prevent unintended or repeated actions.

Device Specifications

Hardware

Processor: Minimum Intel i3 or equivalent (Intel i5 or higher recommended)

RAM: At least 4 GB (8 GB recommended for smoother performance)

Camera: Built-in or external webcam (minimum 720p resolution)

Storage: At least 500 MB of free disk space

Display: Standard monitor (1366×768 resolution or higher)

Software

Operating System: Windows 10 or later

Programming Language: Python 3.x

Libraries and Frameworks:

Flask (for web interface, if applicable)
OpenCV (computer vision processing)
NumPy (data processing)
MediaPipe (hand tracking, if used)
pdf2image (PDF handling)
Firebase Admin SDK (backend/database integration)

Device Materials and Components

Hardware

Computer: Main processing unit that runs the system

Webcam: Captures real-time hand gestures for detection

Display Monitor: Shows system interface and feedback (HUD)

Software

Gesture Recognition Module: Detects and interprets hand gestures using computer vision

Application Control Module: Converts gestures into commands (e.g., slide navigation, media control)

User Interface (HUD): Displays feedback such as gesture status and tracking area

Mouse Control Module: Enables cursor movement and clicking via gestures

Integration Module: Handles communication with external services (e.g., Firebase, file handling)

Application Specific Contrrols

PowerPoint Mode

ACTION	GESTURE	DESCRIPTION
Start Slideshow	Thumb Up (Fist)	Hold for 0.4s
Next Slide	Swipe Right	Move hand left → right
Previous Slide	Swipe Left	Move hand right → left
Zoom In/Out	Two-Hand Expand/Contract	Move hands apart/together
Exit Slideshow	Thumb Down	Hold for 0.4s

Video Player Mode

ACTION	GESTURE	DESCRIPTION
Play or Pause	Open Palm (still)	Hold for 2 seconds
Volume Up and Down	3-Finger Move	Move hand up or down
Skip Forward	Swipe Right	+10 seconds
Skip Backward	Swipe LEft	-10 seconds
Fullscreen	Thumbs Up	Toggle Fullscreen
Exit Fullscreen	Thumbs Down	Exit Fullscreen

Application Specific Contrrols

Documents Mode (PDF and Word)

ACTION	GESTURE	DESCRIPTION
Scroll Up	Two Fingers Up	Move hand with the fingers upward
Scroll Down	Two Fingers Down	Move hand with the fingers downward
Zoom In or Out	Two-Hand Expand or Contract	Adjust distance
Fullscreen	Thumbs Up	Toggle fullscreen
Exit Fullscreen	Thumbs Down	Exit fullscreen

Image Viewer Mode

ACTION	GESTURE	DESCRIPTION
Rotate Clockwise	Swipe Right	Rotate Image Clockwise
Rotate Counterclockwise	Swipe Left	Rotate Image Counteclockwise
Zoom In and Out	Two-Hand Expand and Contract	Standard Zoom
Fullscreen	Thumbs Up	Toggle Fullscreen
Exit Fullscreen	Thumbs Down	Exit Fullscreen

User Interface

The system provides visual feedback through an on-screen interface:

White Box: Active tracking zone (keep your hand inside)

Yellow Text: Current system action/status

Red/Green Text: Countdown indicators (activation/exit)

Mouse Mode Controls

Once activated:

Cursor Movement: Controlled by palm position

Left Click: Thumb touches side of index finger

Right Click: Make a fist briefly

Exit Mouse Mode: Remove hand from camera for 1.5 seconds

Troubleshooting

PROBLEM	SOLUTION
Gesture Not Detected	Improve lighting and hand visibility
Camera Not Working	Check webcam connection and permissions
Wrong Gesture Triggered	Reposition hand and slow movements
System Resets	Keep hand within camera frame

System Limitations

- Sensitive to lighting conditions
- Requires clear hand visibility
- May misinterpret gestures in complex backgrounds
- Performance depends on hardware capability

Future Improvements

- Improved gesture recognition accuracy
- Support for more applications
- Mobile compatibility
- Integration with voice commands

Any questions?

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