Digital Hand Mouse Using Computer Vision

Department – Computer Science and Engineering
SDG –
SDG 4: Quality Education
SDG 9: Industry, Innovation and Infrastructure
SDG 10: Reduced Inequalities

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Problem Statement

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Traditional input devices like mouse and touchpads can be difficult for people with disabilities, cause ergonomic issues, and pose hygiene risks in shared environments.

Key Solution:

Develop a digital hand mouse using computer vision that uses a webcam to track hand gestures for cursor control and clicking, offering a contactless, accessible, and hygienic alternative.

Introduction

- Traditional mouse can be hard to use and unhygienic.

- Touchless control is increasingly needed.
- Computer vision tracks hand gestures via webcam.

- Hand gestures replace mouse movements and clicks.

- Improves accessibility, hygiene, and ease of use.

Objectives

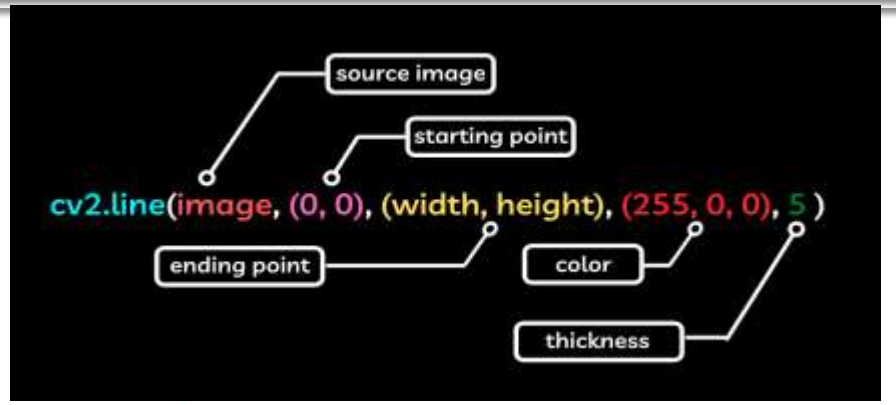
1. Develop a real-time hand tracking system using a webcam and computer vision techniques.
2. Design gesture-based controls to simulate mouse actions like movement, click, and scroll.
3. Ensure accuracy and responsiveness of gesture recognition across different lighting and backgrounds.
4. Create an accessible and user-friendly interface for people with limited physical mobility.
5. Reduce physical contact with devices to promote hygiene in shared or sensitive environments.

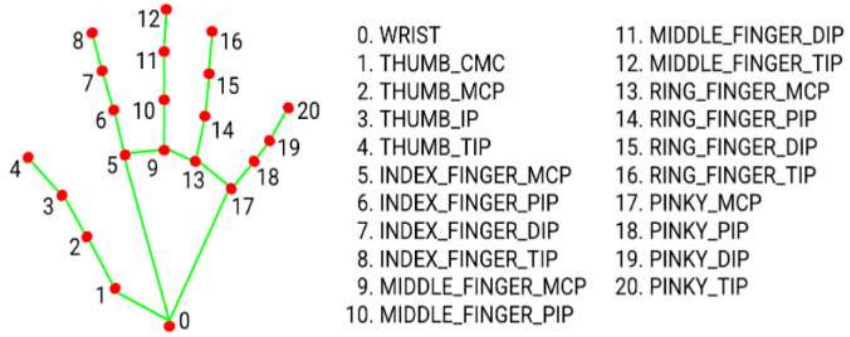
Execution


Virtual Mouse
Virtual Mouse Instructions:
1. Move cursor: Use Index Finger
2. Left Click: Thumb + Index Finger
3. Right Click: Thumb + Middle Finger
4. Drag: Thumb + Ring Finger
5. Scroll: Thumbs Up / Down
ts due to floating-point round-off errors from different computation orders. To turn them off, set the environment variable `TF_ENABLE_ONEDNN_O
PTS=0`.
INFO: Created TensorFlow Lite XNNPACK delegate for CPU.
WARNING: All log messages before absl::InitializeLog() is called are written to STDERR
W0000 00:00:1746085615.569522 20164 inference_feedback_manager.cc:114] Feedback manager requires a model with a single signature inference. D
isabling support for feedback tensors.
W0000 00:00:1746085615.614704 20164 inference_feedback_manager.cc:114] Feedback manager requires a model with a single signature inference. D
isabling support for feedback tensors.
W0000 00:00:1746085618.868722 4420 landmark_projection_calculator.cc:186] Using NORM_RECT without IMAGE_DIMENSIONS is only supported for the
square ROI. Provide IMAGE_DIMENSIONS or use PROJECTION_MATRIX.
OUTLINE
TIMELINE

Tools and Technologies

1) Opencv-python :- A library for real-time computer vision, enabling tasks like image and video processing.
2) Mediapipe :- A framework for real-time media processing, used for tasks like hand tracking and landmark detection.
3) PyAutoGUI :- A Python library to programmatically control the mouse and keyboard for automation tasks






Thank You