Hand Gesture Recognition Project - Requirements

Project Overview:

This project detects hand gestures using a webcam and classifies them (e.g., Light, Fan, Pump). It is built using OpenCV, Mediapipe (via cvzone), NumPy, and TensorFlow (for keras model).

The project also allows creating a custom dataset of gestures.

1. Setup Instructions

Step 1: Create a virtual environment (recommended)

Windows (Command Prompt):

python -m venv venv

venv\Scripts\activate

Linux/Mac:

python3 -m venv venv

source venv/bin/activate

Step 2: Install dependencies

Run this command after activating your venv:

pip install -r requirements.txt

#Step 3: Run the project

- For real-time gesture detection:

python gesture_predict.py

- For dataset creation (saving gesture images):

python gesture_dataset.py

Press 'q' to quit the program anytime.

2. Dependencies

opencv-python==4.10.0.84 # For computer vision (reading webcam, image processing)

cvzone==1.6.1 # Simplifies Mediapipe + OpenCV hand tracking

mediapipe==0.10.11 # Google’s library for hand detection/landmarks

numpy==1.26.4 # For matrix/image operations

tensorflow==2.15.0 # To load and run keras hand gesture model

scipy==1.12.0 # Required by TensorFlow/keras backend

3. Notes

- labels.txt must contain your gesture labels (e.g., Light, Fan, Pump).

- keras_model.h5 is your trained model for gesture classification.

- Dataset script saves gesture images into the Data/ folder.

- Prediction script shows detected gesture on live webcam feed.

Example Labels (labels.txt):

*Light

* Fan

* Pump

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