

# SignLink: A Real-Time Sign Language Translation and Subtitling System for Video Conferencing Platforms.

## Weekly Report

### Project Setup, Design Document and Foundation Building

#### 1. Project Setup & Foundation Building

##### 1. Python Environment Setup

- Created isolated Python virtual environment as **signlink\_env**.
- Installed all core dependencies: OpenCV, MediaPipe, NumPy, Pandas).

##### 2. Real-time Pose Estimation Module

- Implemented **PoseEstimator** class using MediaPipe Holistic.
- Successfully extracts normalized pose + left/right hand landmarks in real-time.
- Integrated **OpenCV** for webcam video capture.

##### 3. Live Visualization & Debugging

- Built working main.py with live camera feed
- Added MediaPipe landmark drawing (skeleton + hand overlays)
- Implemented clean controls:
  - 'q' to quit
  - 'p' to toggle landmark printing

#### Successfully Completed Tasks:

- Development Environment Setup (Python Version: 3.8.10+ Virtual Environment: signlink\_env).
- Created isolated Python virtual environment signlink\_env.
- Established proper pip configuration.
- Basic Webcam Integration.
- Testing OpenCV webcam access.
- Implementing basic video capture functionality.
- MediaPipe Exploration.
- Experimenting with hand detection models.
- Testing pose estimation capabilities.
- Computer Vision: OpenCV, MediaPipe
- AI/ML: NumPy

## 2. Software Design Document :

We did some work on the software design documentation of the project.

### Group Members:

1. **Hassan Shahbaz:** Set up virtual environment, installed OpenCV/MediaPipe, implemented webcam integration.
2. **Behlol Abbas:** Worked on Software Design Document.

### Libraries and Dependencies Installation:

```
Downloading mediapipe-0.10.21-cp312-cp312-win_amd64.whl (51.0 MB)
 51.0/51.0 MB 1.4 MB/s
Downloading numpy-1.26.4-cp312-cp312-win_amd64.whl (15.5 MB)
 15.5/15.5 MB 1.1 MB/s
Downloading attrs-25.4.0-py3-none-any.whl (67 kB)
 67.6/67.6 kB 1.2 MB/s
Downloading flatbuffers-25.9.23-py2.py3-none-any.whl (30 kB)
Downloading protobuf-4.25.8-cp310-abi3-win_amd64.whl (413 kB)

Downloading absl_py-2.3.1-py3-none-any.whl (135 kB)
 135.8/135.8 kB 1.4 MB/s
Downloading jax-0.7.1-py3-none-any.whl (2.8 MB)
 2.8/2.8 MB 1.7 MB/s
Downloading jaxlib-0.7.1-cp312-cp312-win_amd64.whl (61.2 MB)
 61.2/61.2 MB 1.5 MB/s
Downloading opencv_contrib_python-4.11.0.86-cp37-abi3-win_amd64.whl
 9.3/46.2 MB 1.5 MB/s
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