FYP Project Proposal

Project Title: Sign Language Recognition and Translation System Using Machine Learning and Computer Vision

1. Introduction

Communication is a fundamental human need, but deaf and hard-of-hearing individuals often face challenges when interacting with people who do not understand sign language. This project aims to develop a system to bridge this communication gap using machine learning and computer vision.

2. Problem Statement

Existing systems mostly support one-way communication. This project proposes a real-time two-way communication system that converts sign language to text/speech and vice versa.

3. Objectives

• Develop a two-way communication system
• Recognize sign language using YOLOv8
• Use MediaPipe for gesture tracking
• Convert sign to text and speech
• Build a Flask-based web app

4. Proposed Solution

The system will use YOLOv8 for detection, MediaPipe for tracking, and Flask for backend integration. It will capture gestures, process them, and generate appropriate outputs.

5. Methodology

Data collection, model training, gesture tracking, pattern matching, system development, and output generation.

6. Tools & Technologies

Python, Flask, YOLOv8, MediaPipe, OpenCV, HTML, CSS, JavaScript

7. Expected Outcomes

A real-time working system enabling communication between deaf and hearing individuals.

8. Scope

Supports alphabets and predefined gestures with real-time camera input.

9. Limitations

Depends on dataset size, lighting conditions, and predefined gestures.

10. Future Work

Expand dataset, improve accuracy, add mobile support, and enhance recognition capabilities.

11. Conclusion

This project provides a practical solution for improving communication accessibility using modern technologies.