

Configuration Manual

MSc Research Project

Master of Science in Artificial Intelligence

HAIYAN HU

Student ID: x22247327

School of Computing
National College of Ireland

Supervisor: Kislay Raj

National College of Ireland
MSc Project Submission Sheet
School of Computing



Student Name: HAIYAN HU.....

Student ID:x22247327.....

Programme: Master of Science in Artificial Intelligence **Year:** 2025

Module:MSc Research Project.....

Lecturer:Kislay Raj.....

Submission

Due Date:15/09/2025.....

Project Title: A Lightweight SLR System Based on MobileNetV3, BiLSTM, and Attention Mechanism

Word Count:301..... **Page Count:**2.....

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Date:11/09/2025.....

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Code link:

Because GitHub has project size limit. So my code is uploaded in Google Drive. you can download it from here.

https://drive.google.com/file/d/1mSnzMh0hfutPBFn6O1MBCVfmzdNbPYbd/view?usp=drive_link

1. Project Overview

This project implements a lightweight Sign Language Recognition system.

This project seeks to develop a system that recognizes American Sign Language (ASL) word level videos. I begin by using MobileNetV3-large to extract image features before using a BiLSTM(Bidirectional Long Short Term Memory Network) to model temporal information. Furthermore, I also add an attention mechanism to bring better attention to the key frames in the video to improve the recognition. Methods such as image augmentation and label smoothing were used when testing the model to make it more generalizable and stable. In general, the sum of the project was developed and validated based on the WLASL-300 dataset. Ultimately, I got good recognition results while keeping the model structure relatively simple

2. System Requirements

Operating System: Windows / Linux / MacOS

Python Version: 3.8+

Hardware: Recommended NVIDIA GPU with CUDA support

Required Python packages:

torch>=2.0.0

torchvision>=0.15.0

opencv-python>=4.5.0

numpy>=1.21.0

pandas>=1.3.0

scikit-learn>=1.0.0

albumentations>=1.3.0

matplotlib>=3.5.0

seaborn>=0.11.0

tqdm>=4.62.0

Pillow>=8.0.0

jupyter>=1.0.0

ipykernel>=6.0.0

python-dateutil>=2.8.0

3. Installation Guide

Clone or unzip the project folder.

Install dependencies:

```
pip install -r requirements.txt
```

4. Dataset Preparation

Ensure the dataset folder follows this structure:

```
slr_project/  
  data2/  
    WLASL_300/  
      train/  
      test/  
      validation/  
    frames/  
      train/  
      test/  
      validation/
```

5. How to Run

The main code is in the experiments file. Inside is the .ipynb file that can be run in Jupyter Notebook.

6. Notes

CUDA is optional but recommended for better performance.

Ensure dataset paths are consistent with the code.

If dependency conflicts occur, use a Python virtual environment.