Davis Data Science Club

Spring 2023

Sign Language Detection in Python using Tensorflow

Reference:
Real Time Sign Language Detection: https://youtu.be/pDXdlXlaCco
Install Tensorflow: https://youtu.be/dZh_ps8gKgs

Note: Will follow the above references *deeply* for the setup and training models, then upload our own images for detection.
Will require a real time camera (webcam) for this project

Concept: Computer Vision
In-use: Python, Tensorflow Object Detection Model, Deep Learning, Trello (to assign tasks and coordinate)
Target: Detect 26 alphabets in American Sign Language in real time using a webcam and using Images
Difficulty Level: Intermediate
To-Do: Build and train a model that detects 26 alphabets in American Sign Language
Extension in future: Action Recognition for Sign& Export model to Tensorflow JS for integration in ReactJS Apps
Meeting Times: Meet once a week for at least 30-45 minutes can be in-person or online; meeting time to be decided later through when2meet:
My best available times: Tuesday afternoon onwards & Thursday Morning; weekends maybe

8-week plan: (Tentative)

Date:	**Week:**	**Start/In-Process Tasks**	**Completed Tasks**	**Team Members (TBD)**
04/18	1	Clone Repo; Collect & Label images (can require more time and get pushed by a few days or a week)		
04/25	2	Create Label Map & Generate TFRecord	Finish collecting and labeling Images (can require more time and get pushed by a few days or a week)	
05/02	3	Model Configuration & Updating it	Label Map & Generating TFRecord	
05/09	4	Train model	Model Configuration & Updating it	
05/16	5	Detecting in real-time	Loading and Training Model; Detecting in real-time	
05/23	6	TBD		
05/30	7	TBD		
06/06	8	TBD		

26 Alphabets Chart: https://deafchildren.org/2019/06/free-asl-alphabet-chart/

What's Covered:

1. Labelling Images for Object Detection
2. Training Tensorflow for Sign Language
3. Detecting Sign Language in Real Time

Steps:

1. Clone repo
2. Collect Images - code
3. Setup labelImg
4. Label Images
5. Update labelmap
6. Train model
7. Update checkpoint
8. Detect

Tasks:

- Everyone has to clone repo on their pc

- Collect Images - code : will mostly be provided by me, just for convenience since everyone has to start collecting images themselves
    - However, in the code will have to make a minor changes according to the alphabet they are collecting images for; that includes changes in label list and number of images

The tasks will have to be done in the following order
Some can be done simultaneously and collaboratively by different members

1. Setup Labelling:
    - 26 alphabets : {a,b,c,.....,z,}
    - Collect and label 10 images for each alphabet

    - Each person would have 4-6 alphabets

2. Create Label Map and generate TFRecord for Train and Test
    - Will be using 80/20 for training and testing the model

3. Copy Model Config to Training Folder and Update Config for Transfer Learning
    - Have to update the configuration according to ‘our’ project

4. Train model - **EVERYONE** has to train on personal pc - will take a long time according to our number of steps and the number of objects

5. Detect in real-time - **EVERYONE** has to train the model