AI MACHINE LEARNING ANALYTICS

SIGN LANGUAGE DETECTION

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OUTLINE

Introduction to our project

- PROBLEM STATEMENT AND SOLUTION
- THE GOAL OF THE PROJECT
- SIMILAR PROJECTS VS. OURS
- OUR PROCESS
- TRYOUT
- IMPORTANT APLICATIONS ENVISONED

THE PROBLEM

THE SOLUTION

THE PROBLEM

The issue today.

In the world that we live in today there are plenty of tools and machines that let us comprehend and understand different languages from a across the world and that is great. But a problem that no one tackles and that seems to go unnoticed is understanding sign language and allowing deaf and mute people to communicate as easy as it should be.

THE SOLUTION

Interpretation application.

What we are aiming to achieve is to develop an application through which people can communic with ease as if they both were in the same position.

An application that is able to analyse the signs they use to communicate, make images of them and translate it to the other person leading to enjoying conversations and life as everyone else.

Final Goal of the Project

Created an AI algorithm capable of recognizing the following hand signs:

Hello

Please

Yes

No

I love you

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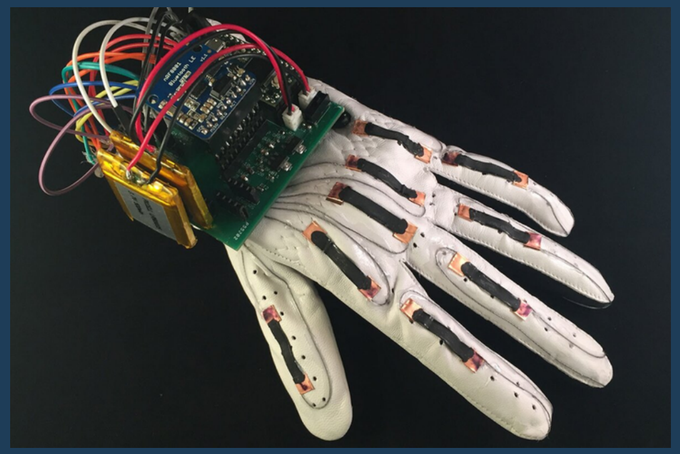
Similar Projects vs. Ours

SIMILAR PROJECTS

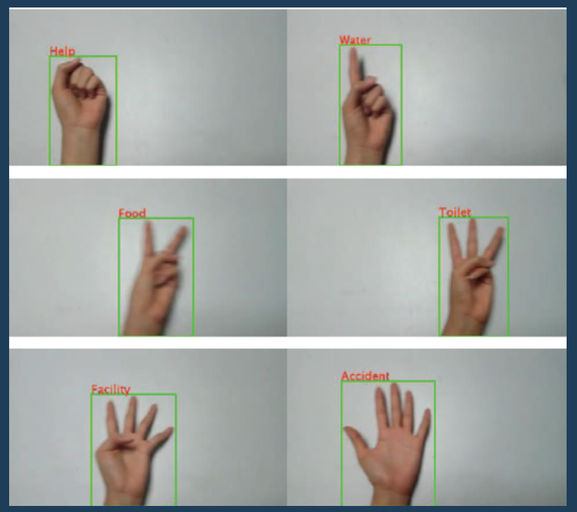
COLOR MARKER APPROACH

Each colored section represents a different region of the hand. Detects movement, position and motion of the hands. Simple and less expensive.



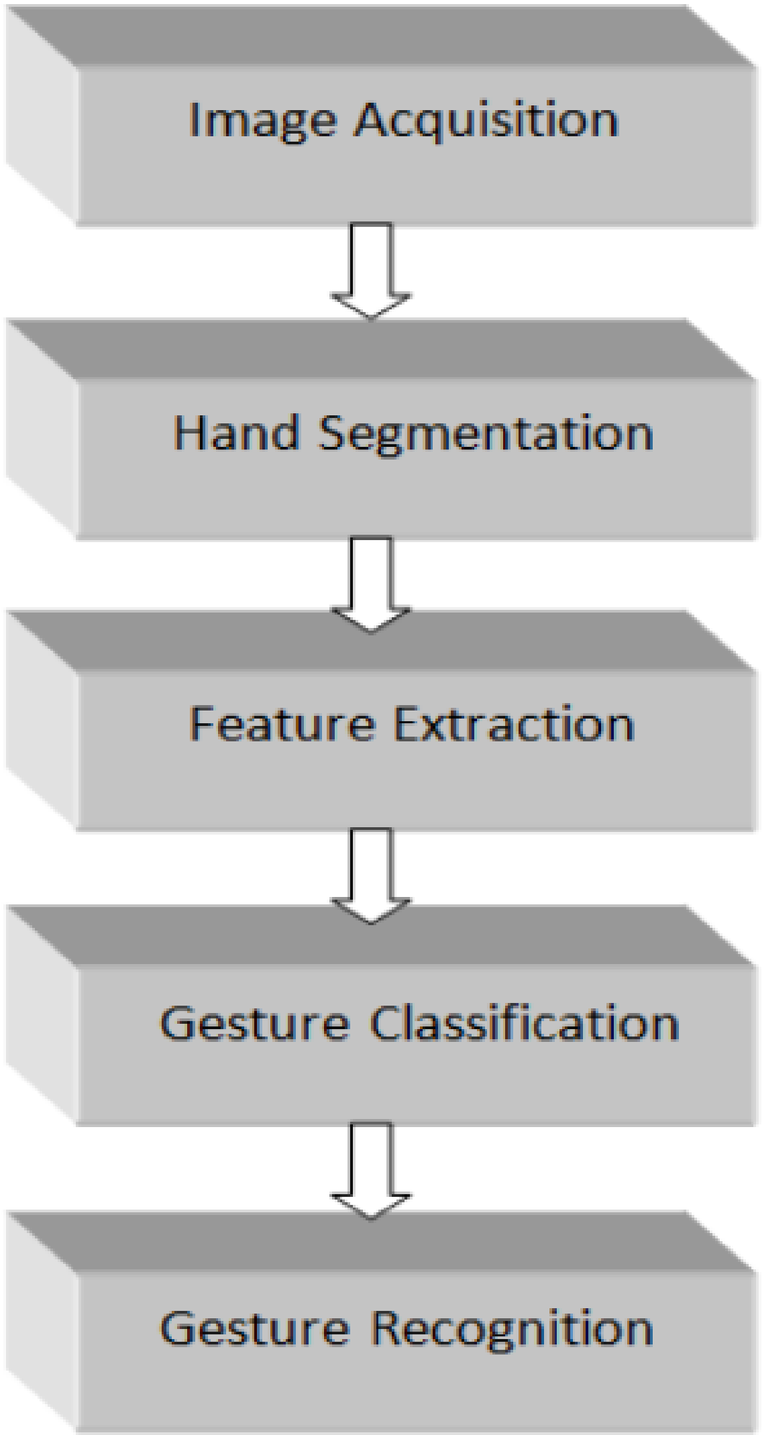
GLOVE-BASED APPROACH

- Glove with attached sensor. Hand detection is not required.
- Physical connection user-computer is needed. Very expensive.



VISION-BASED APPROACH

- Requires camera
- Real-time situations
- Faces problems with the background, variations in the lighting, and the color of skin.



What are we doing different?

APPLY TENSOR FLOW LIBRARY

Process:

1. Read the images
2. Detect hand keypoints
3. Recognize hand gestures

Why tensorflow?

- For object detection and gesture recognition
- Apply what we have learned in class

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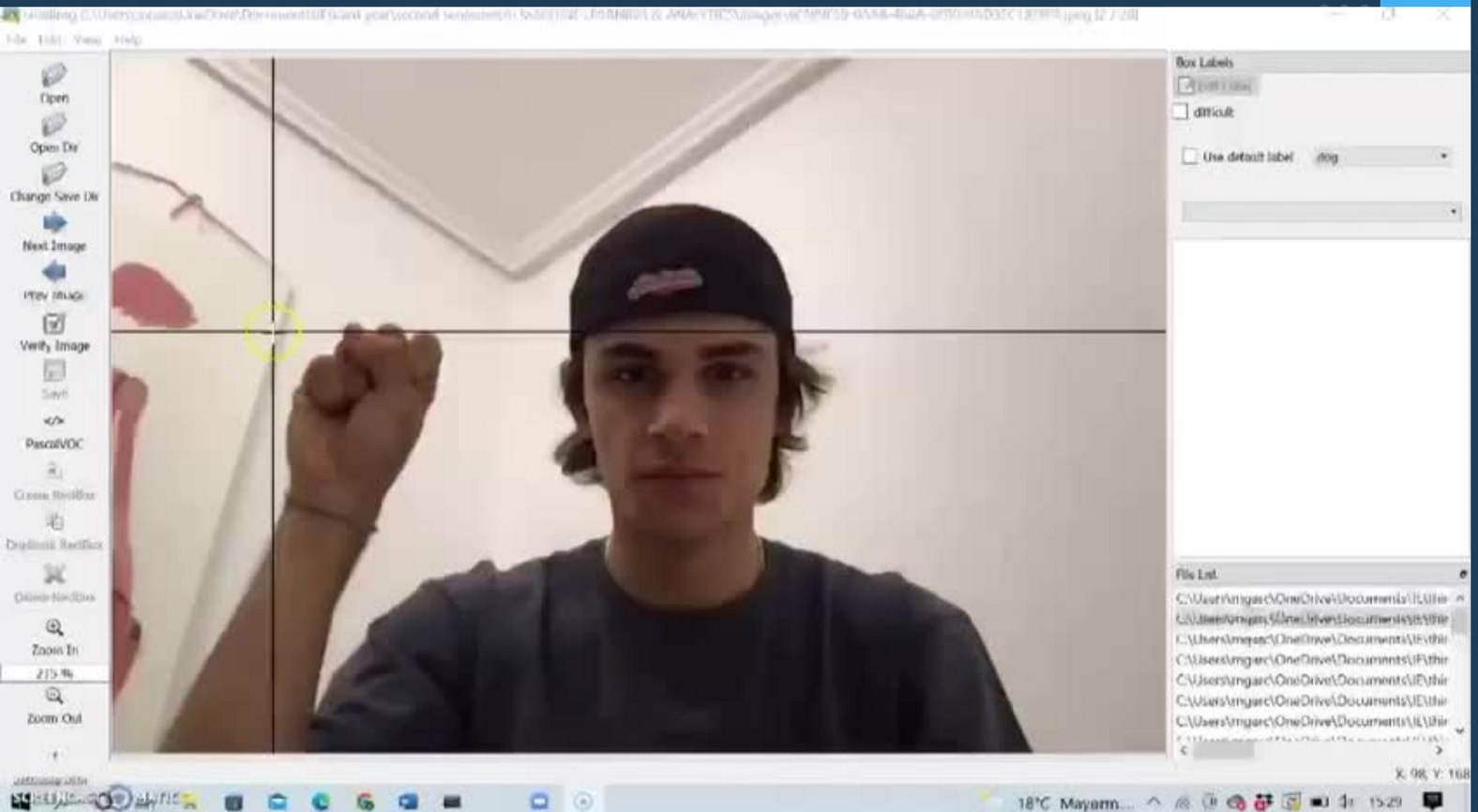
Our Process

Collect Images and Label them



Collect Images

We capture 15 image for each label, changing posture, lightning and models

Label Images

Label Image package (open source) --> returns xml file with all the details of the object captured

SPLIT OUR DATA

TRAIN SET

Contained around 12 images per label, making it a total of 60 images

TEST SET

Contained 3 images per label, a total of 15 images

THE NOTEBOOK

1. INSTALL OBJECT DETECTION API

Following the official tensflow tutorial.

2. CREATE A LABEL MAP

A dictionary which stored our 5 different labels in in pbtxt format, which is the format the library requires

3. CREATE TF RECORDS

tf record is a special file format that is used with the object detection api. We used a script that comes from the oficial tensorflow object detection tutorial.

4. DOWNLOAD PRETRAINED MODELS

We took a pretrained model from the oficial tensorflow model zoo. We based our choice based on speed rather than accuracy as we want to do a real time detection.

THE NOTEBOOK

5. CHANGE CONFIGURATIONS

We copied the configuration pipeline from the oficial model and paste it into our own folder so we could modify the parameters and adjust them to what we need for our object detection api.

6. TRAIN THE MODEL

We trained our model dricelty from our comand system, and we configured it for 10,000 steps.
It took 6 hours for our model to finnally finish training

7. LOAD THE MODEL AND DETECT IN REAL TIME

We loaded the model from our latest checkpoint and tried it out.

LET'S TRY IT OUT

our program

FUTURE IMPROVEMENTS OF OUR ALGORITHM

Applications in life

Expand labeled signs

Expand training set

Increase trainig steps to 20,000

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Important Applications

THE FUTURE

ONLINE COMMUNICATION

There is opportunity to upgrade the communication platforms and help those in need

PUBLIC SERVICE

Public Service offices and hospital can benefit of this technology

HOSPITALITY INDUSTRY AND RESTAURANTS

For a a better quality service that everyone will enjoy

THANK YOU VERY MUCH

ANY QUESTIONS?