GESTURE TRANSLATION INTO ASL

PROJECT PROPOSAL

Course: CSCE 5222 Feature Engineering

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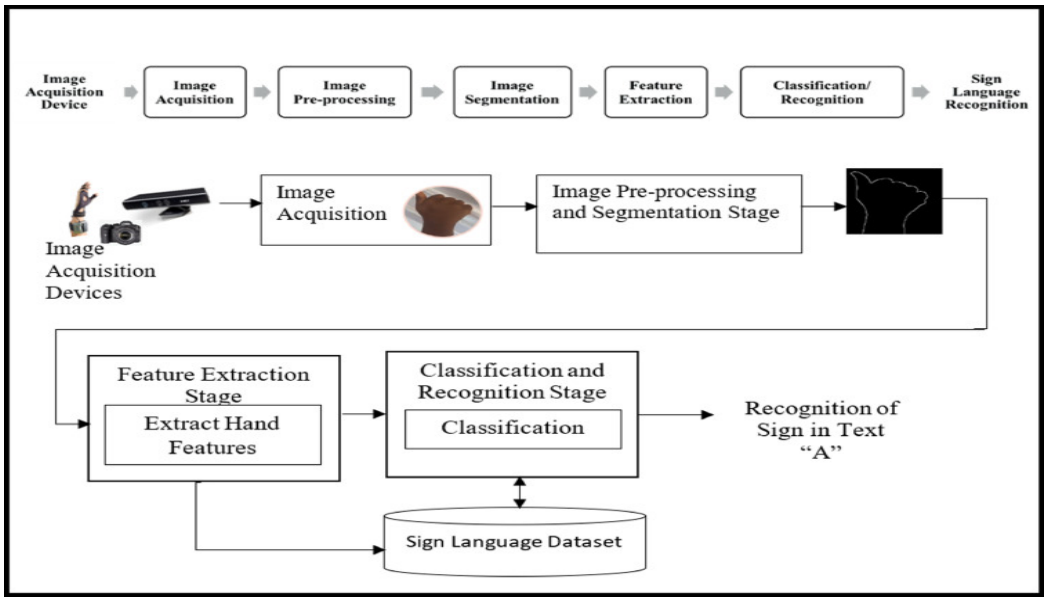
GitHub Link:

https://github.com/SreejaBellamkonda/FE-GestureTranslation

IDEA DESCRIPTION

For the past few years, technology is taking place in every aspect. In financial sectors, industrial sectors mainly health sectors. Every hospital is getting better equipment to cure diseases. Recently, the newly invented equipment for handicapped people helps them walk, talk, and recognize other people, making them easy. Our project is related to handicapped people who cannot talk and listen and just understand us by recognizing the gestures. Using image classifications, we will translate the gestures or images into American sign language. For that, we are using the feature engineering technique which includes machine learning.



GOALS & OBJECTIVES

The goal of this project is translation. The gestures of the hand are translated into American Sign Language for that we will use the image classifications, will collect the data, and train the models. Then will check the absolute accuracy rate of the translations.

Objective:

- We have many projects related to gesture recognition but in this project, we are translating the gestures into ASL.
- Collect the alphabetical data where the gestures represent the signs and the letters.
- We apply deep learning and CNN image classifications to recognize the movement of the hand.
- Will compare the results of each image and explain the approaches to be done during the implementation and makes the changes accordingly.

MOTIVATION & SIGNIFICANCE

Deafness is known as a common problem. Where the person has the inability to hear the voice. This may occur in both ears or in one ear. This might occur due to genetics or infection and noise exposure. Similar to this mutism is one of the disabilities where they cannot talk, and lack of voice. This can occur in one person. Sometimes due to deafness mutism may occur or vice versa. This is a common problem now most people face. So, in 18's American Sign Language has been invented and they can express their feelings and can talk with their hands. Since then, many inventions have taken place. Many gadgets are invented but few projects don't helpfully for the person. So, sign language is an easy way to learn and a priceless technique. This sign language is identified by gestures and facial expressions.

In this project, images are captured, or the gestures images are collected then by applying the feature extraction method we identify the position or the sign or the letter of that image. So, machine learning and deep learning techniques can extract the image perfectly and gives accurate results. We can also check the accuracy level of each image gesture.

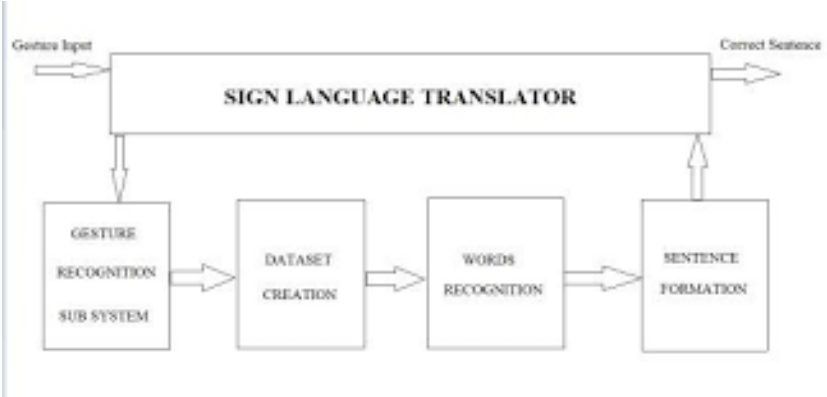
LITERATURE SURVEY

In this study, they used machine learning techniques such as Convolution Neural networks which have an accuracy of 83.2%, and the KNN is used to measure the distance. The RGB is also proposed in the project to capture the gesture.

Reliably we use Neural Networks for image classification and image filtering and check the histograms for the images captured. We can also plot the accuracy rate of each image and identify the most used gesture among the images. And plot the confusion matrix possibly.

EXPECTED OUTCOME

The expected is sign language recognition which means if we gesture input, it should identify the gesture of the hand if it is in the symbol or shape or the alphabetical letter. Then identify the accuracy rate of the image and find the most used gesture of all the images. We can also plot the histograms for the images and apply filters and find the difference between each image.



REFERENCES

1. Shin, Jungpil, et al. “American Sign Language Alphabet Recognition by Extracting Feature From Hand Pose Estimation - PMC.” *PubMed Central (PMC)*, 31 Aug. 2021, www.ncbi.nlm.nih.gov/pmc/articles/PMC8434249.

2. Gu, Yutong, et al. “Frontiers | American Sign Language Translation Using Wearable Inertial and Electromyography Sensors for Tracking Hand Movements and Facial Expressions.” *Frontiers*, 1 Jan. 2001, www.frontiersin.org/articles/10.3389/fnins.2022.962141/full.

3. “ASL Alphabet.” *ASL Alphabet | Kaggle*, www.kaggle.com/datasets/grassknoted/asl-alphabet. Accessed 18 Oct. 2022.

4. “Hand Gesture Recognition Database With CNN.” *Hand Gesture Recognition Database With CNN | Kaggle*, www.kaggle.com/code/benenharrington/hand-gesture-recognition-database-with-cnn. Accessed 18 Oct. 2022.