

**Project Proposal**

Signify

**Course: CSE422 ; Artificial Intelligence Lab**

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**Submission Date :10|3|2022**

Signify (Sign Language Detection)

**Overview:**

This Proposal Interprets The Idea Of “Signify” A Sign Language Detection Using Image Processing. It Is A Part Of Artificial Intelligence Lab Which Is 1.5 Credit Course Going On Computer Science & Engineering Department At Metropolitan University Sylhet. This Proposal Explains The Details Of The Project Idea.

**Background and Motivation:**

Sign Language Is Manual Communication Commonly Used By People Who Are Deaf And Dumb. Sign Language Is Not Universal. People Who Are Deaf From Different Countries Speak Different Sign Languages. The Gestures Or Symbols In Sign Language Are Organized In A Linguistic Way. Each Individual Gesture Is Called A Sign. Deaf And Mute People Use Hand Gesture Sign Language To Communicate, Hence Normal People Face Problems In Recognizing Their Language By Signs Made. Hence There Is A Need For Systems That Recognize The Different Signs And Conveys The Information To Normal People. While Automatic Speech Recognition Has Now Advanced To The Point Of Being Commercially Available, Automatic Sign Language Detection Is Still In Its Infancy. So We Want To Make Such A Project By Which We Can Make Something Useful And Beneficial For People Who Are In Need.

**Objective :**

We Want To Make A Sign Language Detection With Better User Interface And More Beneficial.

❏The Objective Of This Project Is To Identify The Symbolic Expression Through Images So That The Communication Gap Between A Normal And Hearing Impaired Person Can Be Easily Bridged.

❏To Develop An Automatic Sign Language Detection System With The Help Of Image Processing And Computer Vision Techniques.

❏To Use Natural Image Sequences , Without The Signer Having To Wear Data Gloves Or Colored Gloves, And To Be Able To Recognize Hundreds Of Signs.

❏Communication Is Always Having A Great Impact In Every Domain And How It Is Considered The Meaning Of The Thoughts And Expressions That Attract The Researchers To Bridge This Gap For Every Living Being.

❏To Provide A Real Time User Interface So That Signers Can Easily And Quickly Communicate With Non-Signers.

❏To Efficiently And Accurately Recognize Signed Words, From Bangladeshi Sign Language, Using A Minimal Number Of Training Examples.

**User Interface :**

Our Project User Interface Will Be Very User Friendly. Anyone Can Use Our Project Easily. There Will Be System Of Labeling New Images And Train Them For New Sign Language. There Will Be An Option Of Subtitle Where Subtitle Will Visible While Sign Language Is Detected.

Also There Will Be Percentage Of Accuracy Of Detection Images. User Can Use Camera For Image Processing With The Help Of OpenCV.

**Project Features :**

* Detecting Sign Language From Human Pose Estimation.
* Subtitle System For Sign Language.
* Labeling New Images.
* Train Images For Sign Language.
* Real Time Sign Language Recognition Using Image Processing.
* Hand Gesture Recognition For Sign Language.
* Finger Detection For Sign Language Recognition.
* OpenCV For Faster Image Processing.
* Use of TensorFlow give flexibility and control with feature.

**Technologies:**

* Python
* TensorFlow
* OpenCV

**Timeline:**

|  |  |
| --- | --- |
| Time | To Do |
| Week 1 | Study Selected Article And Write Summary |
| Week 2 | Learning Python and Practice |
| Week 3 | Developing Code |
| Week 4 | Deploy Project |

**Final Submission:** We Hope That We’ll Complete Our Project Within 1st Or 2nd Week Of June.

**List Of 10 Articles**

1. Real-Time Sign Language Detection Using Human Pose Estimation ([Link](https://link.springer.com/chapter/10.1007/978-3-030-66096-3_17))
2. Real Time Bangladeshi Sign Language Detection using Faster R-CNN ([Link](https://ieeexplore.ieee.org/abstract/document/8660780))
3. Sign language recognition using image processing ([Link](https://media.neliti.com/media/publications/342497-sign-language-recognition-using-image-pr-cde337dc.pdf))
4. Sign language recognition using image based hand gesture recognition techniques ([Link](https://ieeexplore.ieee.org/abstract/document/7916786))
5. Finger Detection For Sign language Recognition ([Link](http://www.iaeng.org/publication/IMECS2009/IMECS2009_pp489-493.pdf))
6. Real time Hand Gesture Recognition using different algorithms based on American Sign Language ([Link](https://ieeexplore.ieee.org/abstract/document/7890854))
7. Sign Language Recognition Using Deep Learning on Custom Processed Static Gesture Images ([Link](https://ieeexplore.ieee.org/abstract/document/8537248))
8. Sign Language Recognition: A Deep Survey ([Link](https://www.sciencedirect.com/science/article/abs/pii/S095741742030614X))
9. Sign Language Recognition System Using TensorFlow Object Detection API ([Link](https://link.springer.com/chapter/10.1007/978-3-030-96040-7_48))
10. Real time Sign Language Recognition using PCA ([Link](https://ieeexplore.ieee.org/abstract/document/7019333))

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**Sign Language Recognition Using Image Processing** ([Link](https://media.neliti.com/media/publications/342497-sign-language-recognition-using-image-pr-cde337dc.pdf))

Gesture Recognition and feature extraction using a web camera. In this approach, the image is captured through webcam attached to the system. First the input image is preprocessed and threshold is used to remove noise from image and smoothen the image. After this apply region filling to fill holes in the gesture or the object of interest.

This helps in improving the classification and recognition step. Then select the biggest blob in the image and remove all small object, this is done to remove extra unwanted objects or noise from image. When the preprocessing is complete the image is passed on to feature extraction phase. The test image is classified in nearest neighbor’s class in training set.

**Introduction:**

Hands are human organs which are used to manipulate physical objects. For this very reason hands are used most frequently by human beings to communicate and interact with machines. Most important and immediate information exchange between man and machine is through visual and aural aid, but this communication is one sided. Although hands are most commonly used for day to day physical manipulation related tasks, but in some cases they are also used for communication. Hand gestures support us in our daily communications to convey our messages clearly. Hands are most important for mute and deaf people, who depends their hands and gestures to communicate, so hand gestures are vital for communication in sign language. If computer had the ability to translate and understand hand gestures, it would be a leap forward in the field of human computer interaction. The dilemma, faced with this is that the images these days are information rich and in-order to achieve this task extensive processing is required. Every gesture has some distinct features, which differentiates it from other gestures, HU invariant moments are used to extract these features of gestures and then classify them using KNN algorithm. Real life applications of gesture based human computer interaction are; interacting with virtual objects, in controlling robots, translation of body and sign language and controlling machines using gestures.

We study and develop system by using thinning algorithm to make the cut image of the human hand for simple recognition of the painted gesture. All the signs wont to represent alphabets and numbers are recognized using the planned technique.

This project presents an approach to develop a real-time hand gesture recognition enabling human computer interaction. It is uses only a webcam and Computer Vision technology, such as image processing that can recognize several hand gestures. The applications of real time hand gesture recognition are numerous, due to the fact that it can be used almost anywhere where we interact with computers ranging from basic usage which involves small applications to domain-specific specialized applications. Currently, at this level our project is useful for the society but it can further be expanded to be readily used at the industrial level as well. Gesture recognition is an area of active current research in computer vision.

**Sign Language to Speech Conversion System:**

People with speech impairment find it difficult to communicate in a society where most of the people do not understand sign language. The idea proposed in this paper is a smart glove which can convert sign language to speech output. The glove is embedded with flex sensors and an Inertial Measurement Unit to recognize the gesture.

In this project, background history of project, their need their future scope is given in this project so that we get to know how system will prove beneficial to peoples to use. Hand gesture technique is used in this project.

**System Description:**

User can offer image to the system then system can perform image preprocessing steps then perform feature extraction and match with info pictures and find result.

In this paper, we have developed a novel sign language learning system based on 2D image sampling and concatenating to solve the problems of conventional sign recognition. As a result, we obtained high accuracy using only 2D images obtained from a low-cost camera with much less data size than previous studies.

**Future work:**

There are some aspects of projects which can be improved in future.