PRANVEER SINGH INSTITUTE OF TECHNOLOGY

Mini Project Proposal

Team Id: 23_CS_AIML_2A_05

Team Details:

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Project Title:

Sign Language Detection

Domain: (Select all relevant Options)

1. Software-Web Application	2. Software-Mobile Application
3. Artificial Intelligence/Machine Learning/Deep Learning	4. Computer Vision/Image Processing
5. Blockchain	6. Internet of Things
7. Natural Language Processing	8. Big Data / Cloud Computing
9. Others (Specify if any):	

Problem Statement:

In our progressive society, it is necessary to socialize with all people to whether for recreation or for a purpose. Communication is important for every human being. However, people who have a hearing disability and/or a speech disability need a different way to communicate other than vocal communication. They resort to sign language to communicate with each other. However, Sign Language requires a lot of training to be understood and learn and not every person may understand what the sign language gestures mean. Learning sign language is also time consuming as there are no effective, portable tool for recognizing sign language. Hearing or Speech disabled people who know Sign Language require a translator who also knows Sign Language to explain their thoughts to other people in an effective manner. To help overcome these problems, this system helps hearing or speech disabled people to learn as well as translate their sign language.

Proposed Solution:

The proposed system consists of a camera which captures a video feed. This video feed is processed frame by frame. A library called OpenCV [9] is used to process this video feed. The contours for the frames in the video are identified by darkening the image and obtaining the white border of the hand. This border is used to identify the contours of the hand. The contours are then used to identify the type of symbol provided in the video feed. Before actually using this system as mentioned above, it is required to train the system with the dataset of images which contain alphabets of the Sign Language. These are mapped to their equivalent English alphabet and fed to the system. The system gets trained on this data and stores the training results as file. A support vector machine model [8] is used. In machine learning, support vector machines are supervised learning models with associated learning algorithms that analyse data used for classification and regression analysis. Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other,

making it a nonprobability binary linear classifier. A library called scikit-learn [10] provides the necessary SVM Model ready for training.

Unique/Distinctive feature of the solution:

Hand gestures are a powerful way for human communication, with lots of potential applications in the area of human computer interaction. Vision-based hand gesture recognition techniques have many proven advantages compared with traditional devices. However, hand gesture recognition is a difficult problem and the current work is only a small contribution towards achieving the results needed in the field of sign language recognition. This paper presented a vision-based system able to interpret static hand gestures from the Portuguese Sign Language. Experiments with two different datasets were carried out in order to find the best hand features, among two different types, in terms of Portuguese Sign Language gesture classification. The extracted features were tested with the help of the RapidMiner tool for machine learning and data mining. That way, it was possible to identify the best SVM parameters for learning and classification. The obtained parameters were able to achieve very good results in terms of real-time gesture classification with a minimal difference (0,2%) between the two hand features. The proposed solution was tested in real time situations, were it was possible to prove that the obtained classification models were able to recognize all the trained gestures being at the same time user independent, important requirements for this type of systems.

Tools/Technology Uses:

Hardware Requirements:

Operating System

A computer with at least 4GB of RAM and a 2GHz dual-core processor

Software Requirements:

Visual Studio Code

Notepad

Google Chrome

Microsoft Edge

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(To be Filled by Faculty/Evaluator)

Proposal Evaluation:

1. Right Identification of the Problem (Appropriate selection of the problem)?
   a) Excellent b) Good c) Needs Improvement d) Unacceptable

2. Relevance of the Solution (Adequately addressing the problem/need)?
   a) Excellent b) Good c) Needs Improvement d) Unacceptable

3. Innovativeness in the Solution (Distinctive innovative components/features of the solution)?
   a) Excellent b) Good c) Needs Improvement d) Unacceptable

4. Uniqueness of the Solution (Intellectual Property Component)?
   a) Excellent b) Good c) Needs Improvement d) Unacceptable

Improvements/ Suggestions by the Evaluator:

1.
2.
3.
4.

Name of Faculty:

Designation:

Signature with Date:

Guidelines:

- One Proposal per team will be submitted by the team leader only.
- A Team can have maximum 5 Members.
- Upload the document in .doc or .pdf format with font size 12, single spacing, Times New Roman font only.