

ASL Language Translation using ML

Ayush Porwal¹, Pooja Walke², Rishika Bagde³, Suraj Kamble⁴

^{1,2,3,4}Students, Dept. of Computer Engineering, Sinhgad College of Engineering, Maharashtra, India

Abstract - Hand sign recognition system has a good courtesy now days because of easy interaction between deafened and normal people which can translate the sign language into English language. The focus of evolving hand sign is to create a better communication between deaf and normal people for transmission information. This paper presents a survey on new technology of hand sign recognition both static and dynamic. It shows all method that was used for hand sign recognition in different research paper.

Key Words: Image processing, noise removal, feature extraction and matching, static and dynamic gesture

1. INTRODUCTION

The idea of sign recognition is to develop a technique which can identify particular human signs and use them to transfer information. In gesture recognition method, a camera displays the human body actions and communicates the data to a computer that uses the signs as input to control gadgets or application. The impression of developing hand sign recognition procedure is to develop and communication between human and computer and the recognized gestures are used to control the meaningful information. The principal components of a hand sign recognition process are data acquisition, hand localization, hand characteristics recognition and gesture identification. Sign is an indication of physical behavior or expressive expression. It consists of body gesture and hand sign. It divides into two categories: static sign and dynamic sign. Static hand gesture gratitude performed without any additional devices which are used for give instructions to machine. A person command the machine using his simple hands, the person hand's images are captured.

1.1 Problem Ingredients:

Another problematic with the current system is that the head's hastening is fairly limited when the background is confusing, but this is really a limit of the 30 Hz NTSC video signal and the speed of the computer than it is a limitation of the algorithm. A higher chronological sampling rate, coupled with a slightly faster machine, should cause a noticeable improvement in this area.

Design and implement a system that interprets the hand gestures to text in real time with the help of deep learning algorithm (CNN). There is increase in accuracy too. An attempt is made to show the output as collective words and not alphabets.

1.2 Goals and Objectives

The main impartial is to build a mediator between deaf and usual people which can translate the sign language into English language. With the growth of this normal people don't need to learn the sign language to communicate with the hearing impaired.

1.3. Scope

In various fields we can notice that the people with earshot or speaking impairment cannot express their thoughts because of which they don't consider various poles as their career option be it teaching profession or a company employee. Objective is to disruption his barrier.

The aim of this project is to translate signs into text. For this the detection of hand is necessary. Hand discovery will be followed by gesture recognition CNN model. Finally there will be a login system which will let the user register and use the model for translation.

2. LITERATURE REVIEW

Several techniques have been used to tackle the problem of sign language to natural language translation. Conventionally, sign language translation involves taking an input of video sequences, extracting motion features that reflect sign language linguistic terms, and then using machine learning or pattern mining techniques on the training data. For example, Ong et al. propose a novel method called Sequential Pattern Mining (SPM) that utilizes tree structures to classify signs [7]. Their data was captured using a mobile camera system and the motion features extracted included motion of the hands, location of the sign being performed, and hand shapes used. These data are collected temporally (i.e. at multiple time steps). The authors use an SPM method in order to address common issues with other models that have been used for sign language classification and translation, including unrefined feature selection and non-discriminatory learning. In general, there has been significant work done in using sequential pattern

mining methods to analyze temporal data [7][8]. Other authors use Hidden Markov Models (HMM) on features extracted from video frames to perform the same task. Starner et. al. hypothesize that the fine movements of a signers hand are actually not required, and that coarse position and orientation of the hand are discriminative enough to classify signs [10]. They also try two camera perspectives, one directly in front of the signer and the other on a cap that the person is wearing.

2.1. Paper name: Sign Language Recognition and Translation: A Multidiscipline Approach from the Field of Artificial Intelligence

Author: Becky Sue Parton.

In recent years, research has progressed steadily in regard to the use of computers to recognize and render sign language. This paper reviews significant projects in the field beginning with finger-spelling hands such as “Ralph” (robotics), Cyber Gloves (virtual reality sensors to capture isolated and continuous signs), camera-based projects such as the CopyCat interactive American Sign Language game (computer vision), and sign recognition software (Hidden Markov Modeling and neural network systems). Avatars such as “Tessa” (Text and Sign Support Assistant; three-dimensional imaging) and spoken language to sign language translation systems such as Poland’s project entitled “THETOS” (Text into Sign Language Automatic Translator, which operates in Polish; natural language processing) are addressed. The application of this research to education is also explored. The “ICICLE” (Interactive Computer Identification and Correction of Language Errors) project, for example, uses intelligent computer-aided instruction to build a tutorial system for deaf or hard-of-hearing children that analyzes their English writing and makes tailored lessons and recommendations. Finally, the article considers synthesized sign, which is being added to educational material and has the potential to be developed by students themselves.

2.2. Paper name: Sign Language Recognition using Temporal Classification.

Author: Hardie Cate, Fahim Dalvi, Zeshan Hussain

In the US alone, there are approximately 900,000 hearing impaired people whose primary mode of conversation is sign language. For these people, communication with non-signers is a daily struggle, and they are often disadvantaged when it comes to finding a job, accessing health care, etc. There are a few emerging technologies aimed at overcoming these communication barriers, but most existing solutions rely on

cameras to translate sign language into vocal language. While these solutions are promising, they require the hearing impaired person to carry the technology with him/her or for a proper environment to be set up for translation.

3. SURVEY OF PROPOSED SYSTEM

The application starts with capturing video using an internal or external webcam. We capture the video and excerpt the current image frame from that video after every 4 seconds. This 4 second postponement is the time frame for the user to be able to change the finger-spelling sign. This extracted image is to be processed to excerpt the feature content from it. This processed copy is then compared with the statistical database of all the finger-spellings. The processed image is then likened to every image in the database and the error between them is calculated. The image with least error or let us say the image that matches the input image the most is considered. The consistent alphabet to the matched image is considered and is showed to the user for the fingerspelling performed. The core part in these steps is processing the image. Before seeing the dispensation to be done on the extracted image, let us have a appearance on all the restraints and limitations we have for this method.

4. SYSTEM ARCHITECTURE

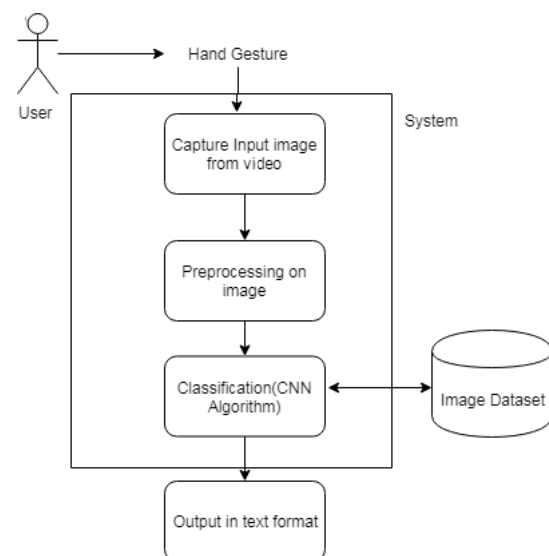


Fig.: System Architecture

5. CONCLUSION AND FUTURE WORK

In a first stage we try the face detection based on available database of OpenCV. Then for taking live streaming of camera the initialization has been done. The two sign detection like palm and fist by green rectangle which is skilled by integral images. The second stage is the extracted

image signs which are compared with stowed positive-negative essential image dataset and perform fingertip tracking by contour detection.

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