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Text to Sign Language Conversion by Using Python and Database of Images and Videos

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Abstract: **-- The aim of this system is to design an independent communication system for a person who is deaf and hard of hearing. This system is used for converting text to sign language. It is the vision-based system. It takes input as alphabets and numerals and converts them into equivalent sign code and displays on a screen. In this system, we are going to used Indian sign language. Sign language is not same for all part of the world. Sign language is defined as the language of deaf and dumb people by using which they are able to express their thoughts. By using sign language they can transmit messages by combining hand shapes and different movement of hands. Sign language has their own alphabets and grammar. By creating a system that converts text to sign code, which is helpful for communication between normal people and hard of hearing the person.**

Keywords: **Python, Raspberry Pi, Input device, HDMI Display.**

INTRODUCTION

Text to sign language conversion is mainly focused on communication between ordinary people and deaf-mute people. Sign language paves the way for deaf-mute people to communicate .Sign language is a visual language that is used by deaf and dumb as their mother tongue. It is figure out about 240 sign language have exist for spoken language in the world. Sign language is a type of language that uses hand movements, facial expressions and body language to communicate. It is used by the people who are deaf and people who can hear but cannot speak. But it is also used by some hearing people, most often families and relatives of the deaf, and interpreters who enable the deaf and wider communities to communicate with each other. Sign Language is a structured language where each gesture has some meaning and code assigned to it used by deaf sign user, it has own grammar and structure. Sign language is only the way of communication for deaf sign user. With the help of advanced science and technology many techniques are developed by the researcher to make the deaf people communicate very fluently. Sign Languages are the basic means of communication between hearing impaired people. Imagine you want to have a conversation with a deaf person then sign language has various gesture and body languages to convey messages as opposite to that of verbal speech pattern. Already this may seem a tedious task, especially if you have no idea on how to communicate using sign language. Such is the problem faced by millions of deaf people who are unable to communicate and interact with hearing people. e.g. text and gesture recognition systems. Recognition of sign language is very important not for engineering field but also for society. The advancements in technology thus hold the promise of providing solutions for the deaf to communicate with the society. Sign language translation systems will be able to improve communication and allow the deaf community to enjoy full participation in day-to-day interaction and access to information and services. Sign languages all over the world use both static and dynamic gestures, facial expressions and body postures for communication. At the first sight, as an idea, how difficult could make a sign languages converter. Loss of hearing and speech can cause people to become isolated and lonely, having worse affected on both their social and working life. Looking up the meaning of a sign is not a straightforward task. Sign Language is a well structured code gesture where every gesture has a meaning assigned to it. Sign Language is the only means of communication for deaf people. With advancement of science and technology many techniques have been developed not only to minimize the problem of deaf and dumb people but also to implement it in different fields. Sign language is a language which instead of voice or sound patterns uses manual communication and body language to convey the meaning. This involves mostly the combination of shapes, orientation and movement of the hands. Sign language is not only used by deaf but also who can hear, but cannot physically speak. All India Federation of the Deaf estimates around 4 million deaf people and more than 10 million people have hearing problem in India. Studies say that, one out of every five deaf people in the world is an Indian. Out of those, more than 1.5 million deaf

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people in India use Indian Sign Language (ISL) as a mode of communication. ISL is not only used by the deaf people but also by the hearing parents of the deaf children, the hearing children of deaf adults and hearing deaf educators. However, due to the inherent difficulty in their written texts, an automatic Text-to-ISL translation system could help to make more information and services accessible to the hearing impaired. Moreover, the system will not only improve information access, but it can also be used as an educational tool to learn ISL. This work is aimed to develop an automatic Indian Sign Language recognition platform for hearing impaired persons of India. Another important aspect of this work is that, the proposed system will be able to recognize different hand gestures of Indian Sign Language as well as some of the different signs and the system can give the interpretation of the recognized gestures in the form of text messages displayed on LCD screen. Obtained text will be sent to a mobile as a message with the help of a Bluetooth model or GSM and using text to speech software this message will be converted to voice form. Sign language is a natural way of communication or hearing and impaired people. Sign movement of one or both hands, accompanied with the facial expression, which corresponds to a specific meaning. Translator is the communication between and sound impaired person and the person and person that do not understand sign language, avoiding by this way the intervention of an intermediate person. And allow communication using their natural way of speaking. People who are deaf and dumb often tend to feel uncomfortable around other people, when drawing attention to their hearing problem. Those people wants to be like their friends with good hearing, so this drives a thought in them to mainly keep to themselves and to not take part in activities with those normal people. Sign languages are used by mute people as a medium of communication. Sign languages are used to convey thoughts with symbols, and objects etc. They also convey combination of words and symbols (i.e. gestures). Gestures are different patterns made by the curls and bends of the fingers. Gestures are the best medium for their communication.

Assistive Technology

Assistive technology is any device that helps a person with a disability to complete an everyday task. If you break your leg, a remote control for the TV can be assistive technology. If someone has poor eyesight, a pair of glasses or a magnifier is assistive technology. Assistive technology is technology used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible. Assistive technology can include mobility devices such as walkers and wheelchairs, as well as hardware, software, and peripherals that assist people with disabilities in accessing computers or other information technologies. For example, people with limited hand function may use a keyboard with large keys or a special mouse to operate a computer, people who are blind may use software that reads text on the screen in a computer-generated voice, people with low vision may use software that enlarges screen content, people who are deaf may use a TTY (text telephone), or people with speech impairments may use a device that speaks out loud as they enter text via a keyboard. Assistive technology includes many specialized devices as well, like typing telephones for people who are deaf and motorized wheelchairs for people who cannot walk. Assistive technology can be “low-tech” (something very simple and low-cost, like a pencil grip), or “high-tech” (something sophisticated, like a computer). Assistive technology can be critical for the person using it – if you wear glasses, think how hard it would be to get through the day without them! This project itself is an application of using flex sensor in assistive technology. Other applications of assistive technology are walkers, wheelchair, glasses for people with less vision, text telephone for deaf and speakers for dumb.

Application

- Walkers
- Wheelchair
- Glasses for people with less vision
- Text telephone for deaf Speakers for dumb

LITERATURE SURVEY

Overview of Existing System

The under mentioned research reviews are related to my research topic but my research topic is specifically deferent in view that it works in real time “higher mathematics” sign gesture to speech and text conversion. In [1] paper, As per the Amit kumar shinde in his on the study of sign language to text and vice versa reorganization using computer vision in Marathi Sign language recognition is one of the most growing fields of research today and it is the most natural way of communication for the people with hearing problems. A hand gesture recognition system can provide an opportunity for deaf persons to communicate with vocal people without the need of an interpreter or intermediate. The system is built for the automatic recognition of Marathi sign

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language. Providing teaching classes for the purpose of training the deaf sign user in Marathi. The system can train new user who is unaware of the sign language and the training will be provided through offline mode. In which user can learn sign language with the help of database containing predefined sign language alphabets as well as words. A large set of samples has been used in proposed system to recognize isolated words from the standard Marathi sign language which are taken using camera. The system contains forty-six Marathi sign language alphabets and around 500 words of sign language are taken. Considering all the sign language alphabets and words, the database contains 1000 different gesture images. The proposed system intends to recognize some very basic elements of sign language and to translate them to text.

In [2] paper, As per the Neha Poddar, Shrushti Rao, Shruti Sawant, Vrushali Somavanshi, Prof. Sumita Chandak as dicussed on the Study of Sign Language Translation using Gesture Recognition that is Communication is an integral part of human life. But for people who are mute & hearing impaired, communication is a challenge. To understand them, one has to either learn their language i.e. sign language or finger language. The system proposed in this project aims at tackling this problem to some extent. In this paper, the motivation was to create an object tracking application to interact with the computer, and develop a virtual human computer interaction device. The motivation behind this system is two-fold. It has two modes of operation: Teach and Learn.

In [3] paper, As per the Shweta Doura, Dr . M.M.Sharmab [in this report study the Recognition of Alphabets of Indian Sign Language by Sugeno type Fuzzy Neural Network paper present that Sign Language Recognition has evolved as an important area of research in the past few years. Sign language can be defined as the language of the deaf and dumb people by which they are able to express their thoughts. Such people are not able to use acoustic means for the purpose of communicating, instead they convey message by making use of the Sign Language. Thus Sign language is a means developed for the deaf and dumb society by which they can visually transmit different sign patterns to convey their message by combining simultaneously hand shapes, movement of hands and orientation of hands which are also sometimes associated with the facial expressions.

In [4] paper, As per the Neha V. Tavari A. V. Deorankar Dr. P. N. Chatur in his report we study A Review of Literature on Hand Gesture Recognition for Indian Sign Language paper present that Sign language is the language of communication for deaf and dumb people. Most of these physically impaired communities are dependent on sign language translators to express their thoughts to rest of the world. This causes isolation of these people in society. Hence, Sign Language Recognition is one of the most growing fields of research today, which in fact is composed of various gestures formed by physical movement of body parts i.e. hand, arms or facial expressions. Gestures are considered as the most natural expressive way for communications between human and computers in virtual system. Hand gesture is a method of non-verbal communication for human beings for its freer expressions much more other than body parts. Hand gesture recognition has greater importance in designing an efficient human computer interaction system. In this paper a survey on various hand gesture recognition approaches is provided.

System Design

Input Text Similar to input image text will be stored either in the form of alphabet, or word, or in the form of sentence. The input text is entered into the system through keyboard. Pre-processing includes the selecting input, either image or text. Then gray scale convergence, edge detection, generation of array of image, compare or matching with database. All these functionality comes under preprocessing. If input given to system is correct or in proper way then preprocessing will be done correctly as well as easily.

Pattern Recognition/Matching parameters obtained from input image or text is compared with database. After matching correct values the corresponding result is displayed. Text/Sign Output If input given to system is in the form of sign then output will be text which is meaning of that input sign language image. And if input given to system is text then output is sign language image which has meaning of that text. Database plays an important role in giving correct and effective output for the system as our output of the system is based or dependent on database. The database contains images of alphabets, words, or sentences of Marathi sign language. Similarly during translation of text to sign input text is taken through keyboard. After that processing is done on input text and its features are extracted. These extracted features are matched with the features stored in the database. After matching correct result the output is displayed on the output screen. Same procedure is carried out for translation of word.

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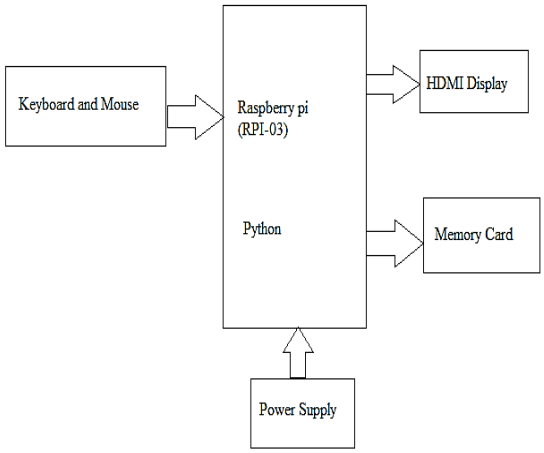

CONCLUSION

Sign language is one of the useful tools to ease the communication between the deaf and mute communities and normal society. Though sign language can be implemented to communicate, the target person must have an idea of the sign language which is not possible always. Hence our project lowers such barriers This project was meant to be a prototype to check the feasibility of recognizing sign language. With this project, normal people can communities with deaf or dumb using sign language and the text will be converted to images.

The proposed system has successfully interpreted 26 alphabets, 9 digits.

Hence this project is an attempt to make it easy to understand the actions of the dumb people by getting the output in the form of images and video. This project displays the equivalent symbols for alphabets as the output according to Raspberry pi Board makes this system compact and easily portable. It is easy to handle and makes us understand the hand gestures of the dumb people.

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