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Sign Language to Text and Audio Converter for Deaf and Dump People

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ABSTRACT: Sign language is a natural language that uses different means of ex-pression for communication in everyday life. As compare to other sign language ISL interpretation has got less attention by researcher. This paper presents an Automatic translation system for gesture of manual alphabets in English sign language. It deals with images of bare hands, which allows the user to interact with the system in a natural way. System provides an opportunity for deaf persons to communicate with normal people without the need of an interpreter. We are going to build a systems and methods for the automatic recognition of English sign language. The first step of this system is to create a database of English Sign Language. Hand seg-mentation is the most crucial step in every hand gesture recognition system since if we get better segmented output, better recognition rates can be achieved. The proposed system also includes efficient and robust hand segmentation and tracking algorithm to achieve better recognition rates. A large set of samples has been used to recognize 43 isolated words from the Standard English sign language. In proposed system, we intend to recognize some verybasic elements of sign language and to translate them to text and vice versa in English language

KEYWORDS: Segmentation, deaf, gesture Recognition, tracking Algorithm, Interpreter.

I. INTRODUCTION

In recent years hand gesture recognition system is one of the most trending topic for research. The disabled person who is unable to talk and unable to speak uses the gestures for communication purpose. There are many people in the world who cannot understand the hand gestures or a sign languages. All the peoples who cannot understand the sign languages can use the automated system which can recognize the gestures and their meaning. The ability to speak or the power of speech is something we take for granted. It is the most effective and powerful way of sharing thoughts and emotions. It is the bridge that facilitates the communication with others. However, a large fraction of the world's population is not blessed with this ability. Hearing loss, also known as deafness, is one of the most common disabilities world-wide. Deafness is a partial or total inability to hear in one or both ears, it could be permanent or temporary. Deafness is defined as a degree of hearing loss such that a person is unable to under- stand or process speech even in the presence of amplification. According to the World Health Organization (WHO) statistics, around 466 million people worldwide are deaf, 34 million of those are children.

The WHO also estimated that over 900 million people will have this disability by 2050 [1]. English Alphabets To communicate in sign language requires a specific sign language that can be used as way of communication. Our proposed system is implemented in English sign language. English sign language is Indian sign language used as medium of communication. 2 shows the sign language images for corresponding Marathi alphabets. Proposed system is designed to recognize the 43 English sign which consist of vowels and consonants. During the recognition English sign language is translated into corresponding English text and similarly for vice versa.

II. RELATED WORK

1. **Paper Name:** Multimedia technologies to teach Sign Language in a written form.

Author: Farkhadov M.P.

Abstract :- In this paper we investigate the features of signs in the Sign Languages and the related problems of how to describe the features linguistically. We present a brief overview of the existing Sign notations; the notations

allow us to record all Sign elements in the form of a sequence of characters using alphabetic, digital, and various graphic elements. Also, we substantiate our choice of Signwriting system to record Russian Sign Language, where the signs and rules allow us to set the spatio-temporal form of Signs compactly and precisely. Next, we give examples of a SignWriting using these characters. Finally, we demonstrate the multimedia program SWiSL, an on-line platform to help people improve their recognition skills in Sign Language writing.

2. **Paper Name:** :- Crawling and Classification Strategies for Generating a Multi- Language Corpus of Sign Language Video

Author: Frank M. Shipman and Caio D.D. Monteiro.

Abstract : Although there is considerable sign language content available online, it can be hard to locate content in a specific sign language on a particular topic. The Sign Language Digital Library (SLaDL) aims to improve access through the generation of a multi-language corpus of sign language video. SLaDL uses a combination of crawling to collect potential sign language content and applying multimodal sign language detection and identification classifiers to winnow the collected videos to those believed to be in a particular sign language. Here we compare the quantity and variety of sign language videos located via breadth-first, depth-first, and focused crawling strategies. Then we examine the accuracy of different approaches to combining textual metadata and video features for the 3-way classification task of identifying videos in American Sign Language (ASL), British Sign Language (BSL), and without-sign language. Finally, due to the high computational cost of generating the video features used for classification, we explore the trade-offs when using a cascading classifier and when generating features based on motion in sampled frames on classifier accuracy.

3. **Paper Name:** SignQuiz: A Quiz based tool for learning fingerspelled signs in Indian Sign Language using ASLR Jestin Joy, Kannan Balakrishnan, Sreeraj M

Abstract : Sign Language is one of the medium of communication for deaf people. One should learn sign language to interact with them. Learning usually takes place in peer groups. There exist very few study materials for sign learning. Because of this, the process of learning sign language learning is a difficult task. Fingerspelled sign learning is the initial stage of sign learning and moreover, are used when no corresponding sign exist or signer is not aware of it. Most of the existing tools for sign language learning use external sensors which are costly. This paper discusses Sign Quiz, which is a cost effective web based fingerspelled sign learning application for Indian Sign Language (ISL) utilizing Automatic Sign Language Recognition (ASLR) technique. Sign Quiz helps to learn signs without any external help. This is the first attempt in Indian Sign Language (ISL) for learning fingerspelled signs using Deep Neural Network (DNN). Results indicate that Sign Quiz is better than printed medium for fingerspelled sign learning

4. **Paper Paper Name:** Toward a Mexican Sign Language System using Human Computer Interface

Author: - C.R. Estrivero-Chavez, M.A. Contreras-Teran, J.A. Miranda-Hernandez, **abstract :** This article presents a new algorithm that serves as support for people interested in learning sign language base on the Mexican Sign Language Dictionary provided by the CONAPRED (National Council to Prevent Discrimination) in the 2011 edition. The system uses the Leap Motion machine shadow interaction system to capture the position of each finger of both hands, and by geometric modelling up to 27 signs can be statically modelled with an accuracy of 99.80

III. METHODOLOGY

1. Functional Requirements

Functional Specification:

The application is user-friendly.

It provides an easy interface to the user.

The accessibility or response time of the application should be fast. Dependency and Constraints:

End User application will be developed in Windows OS. All scripts shall be written in Python.

The application design pattern shall be Singleton.

2. FUNCTIONAL INTERFACE REQUIREMENTS

A. User Interfaces:

Application Based M Sign Language.



B. HARDWARE

RAM : 8 GB

As we are using Machine Learning Algorithm and Various High Level Libraries Laptop RAM minimum required is 8 GB. Hard Disk : 40 GB

Data Set of CT Scan images is to be used hence minimum 40 GB Hard Disk memory is required. Processor : Intel i5 Processor

PyCharm IDE that Integrated Development Environment is to be used and data loading should be fast hence Fast Processor is required

IDE : Spyder

Best Integrated Development Environment as it gives possible suggestions at the time of typing code snippets that makes typing feasible and fast.

Coding Language : Python Version 3.5

Highly specified Programming Language for Machine Learning because of availability of High Performance Libraries. Operating System : Windows 10

Latest Operating System that supports all type of installation and development Environment

SOFTWARE INTERFACES:

Operating System: 64bit Windows 10 Coding Language: Python Design Constraints: Spyder & PyCharm

INTERFACES:

3. NON-FUNCTIONAL REQUIREMENTS

Performance Requirement:

The performance of the functions and every module must be well.

The overall performance of the software will enable the users to work efficiently. The performance of detecting Depression levels should be fast.

The performance of providing virtual environment should be fast.

Safety Requirements:

The application is designed in modules where errors can be detected and fixed easily. This makes it easier to install and update new functionality if required.

4. SOFTWARE QUALITY ATTRIBUTES

The software has many qualities and attributes that are given below:

Adaptability: This software is adaptable by all users.

Availability: This software is freely available to all users. The availability of the software is easy for everyone.

Maintainability: After the deployment of the project if any error occurs then it can be easily maintained by the software developer.

Reliability: The performance of the software is better which will increase the reliability of the Software. *User*

Friendliness: Since the software is a GUI application; the output generated is much user friendly in its behaviour.

Integrity: Integrity refers to the extent to which access to software or data by unauthorized persons can be controlled.

Security: Users are authenticated using many security phases so reliable security is provided. *Testability:* The software will be tested considering all aspects.

IV. EXISTING SYSTEM

SVM or Support Vector Machine is a linear model for classification and regression issues. It works well for many real-world issues and can solve both linear and non-linear problems. The SVM concept is straightforward: A line or a hyperplane that divides the data into classes is produced by the algorithm. SVMs are utilised in web pages, intrusion detection, face identification, email categorization, gene classification, and handwriting recognition, among other applications. We utilise SVMs in machine learning for a number of reasons, including this. Both classification and regression on linear and non-linear data are supported.

V. PROPOSED SYSTEM

A CNN is a particular type of network design for deep learning algorithms that is utilised for tasks like image recognition and pixel data processing. Although there are different kinds of neural networks in deep learning, CNNs are the preferred network architecture for identifying and recognising objects. Using a variety of building pieces,

including convolution layers, pooling layers, and fully connected layers, CNN is intended to automatically and adaptively learn spatial hierarchies of feature through backpropagation.

VI. RISK MANAGEMENT

Risk is made up of two parts: The probability of something going wrong, and the negative consequences if it does. Risk can be hard to spot, however, let alone pre-prepare for and manage. And, if you're hit by consequence that you hadn't planned for, costs, time and reputations could be on the line. This makes risk analysis an essential tool when your work involves risk. It can help you identify and understand the risk that you could face in your role. In turn, this helps you to manage these risks, and minimize the impact on your plans. In this article, we will look at how you can use Risk Analysis to identify and manage risk effectively. Please refer table for all the risks. You can refer following risk identification questionnaire.

- Network connection must be available.
- All nodes (mobile) must be active in network.
- Required resources must be available.
- User must have Smartphone.
- User gets reminder of what to do, when to do and thus work depend upon the location.
- Database should be maintain.

RISK ANALYSIS

The risks for the project can be analysed within the constraints of time and quality. What is Risk Analysis? Risk analysis is a process that helps you to identify and manage potential problems that could undermine key business initiatives or projects. To carry out a risk analysis, you must first identify the possible threats that you face, and then estimate the likelihood that these threats will materialize.

Risk analysis can be complex, as you will need to draw on detailed information such as project plans, financial data, security protocols, marketing forecasts, and other relevant information.

VII. SYSTEM DESIGN

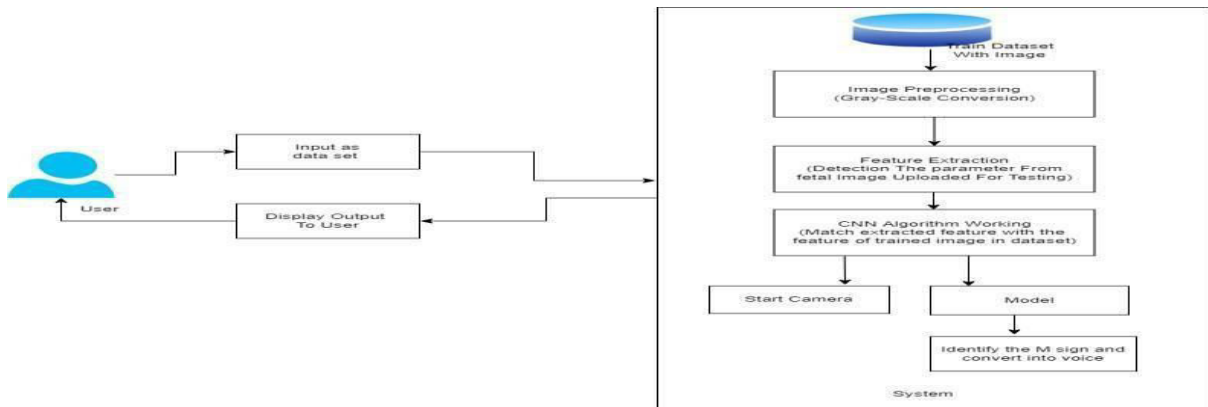


Figure: 1 System Architecture

1. DATA FLOW DIAGRAMS

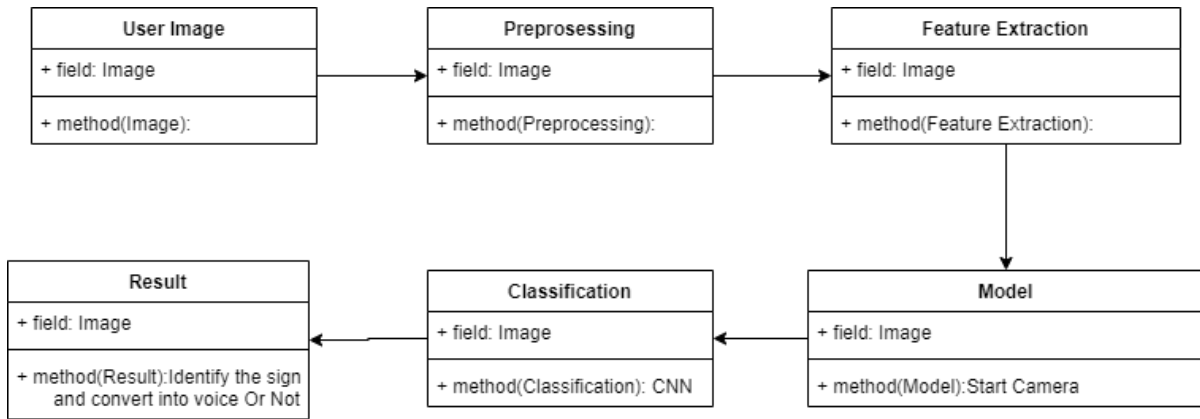
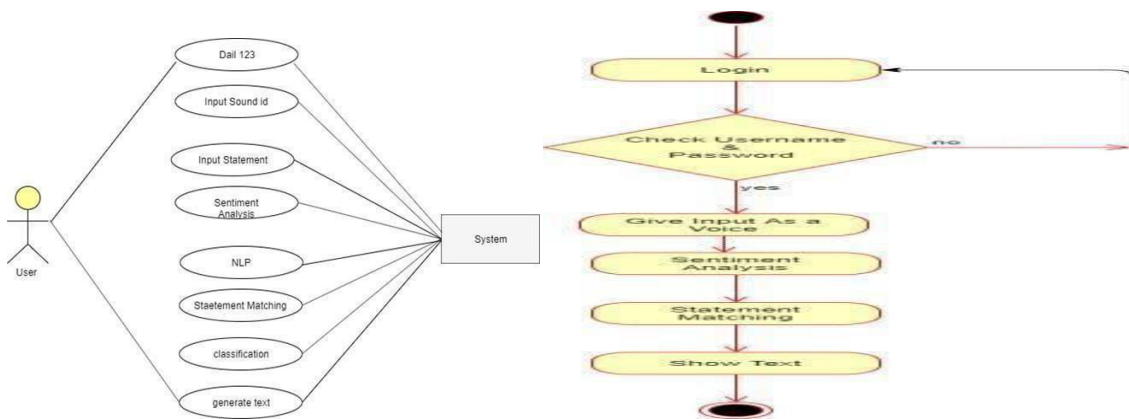


Figure 2: Use Case Diagram



II. FIGURE: 3 UML DIAGRAM FIGURE: 4 ACTIVITY DIAGRAM

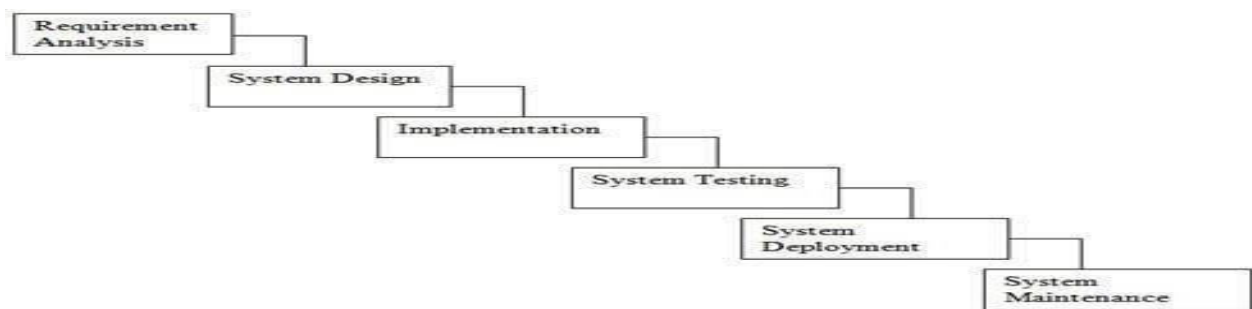


Figure 5: System Analysis Model

VIII.RESULTS



Figure 6: Main GUI Results



III. FIGURE 7: LOGIN RESULTS



Figure 8: Registration Results

IX. ALGORITHMS

CNN

A CNN is a particular type of network design for deep learning algorithms that is utilised for tasks like image recognition and pixel data pro-cessing. Although there are different kinds of neural networks in deep learning, CNNs are the preferred network architecture for identifying and recognising objects.

CNN LAYERS:

Convolutional Layer:-The foundation of a CNN is a convolutional layer.It has a number of filters (or kernels), whose settings must be learned over the course of training. Typically, the filters' size is smaller than the original image. Each filter produces an activation map after it convolves with the image.

Pooling Layer:-By merging the outputs of neuron clusters at the preceding layer into a single neuron at the subsequent layer, the pooling layers have the effect of reducing the dimensions of the hidden layer.

Fully Connected Layer:-A fully connected layer adds a bias vector after multiplying the input by a weight matrix. One or more fully connected layers come after the convolutional (and down-sampling) layers. As the name implies, every neuron in a layer that is fully linked has connections to every neuron in the layer above it.

Dropout:-Another typical characteristic of CNNs is a Dropout layer. The Dropout layer is a mask that nullifies the contribution of some neurons towards the next layer and leaves unmodified all others.

Activation Functions:-The input attribute value will be passed directly to the following layer via the input layer neuron node. The output of the higher node and the input of the lower node in a multilayer neural network are functionally related. The activation function is the name of this process.

X. APPLICATIONS

- Deaf people frequently communicate through sign language, a kind of manual communication.
- Deaf people worldwide use a variety of sign languages; sign language is not a universal language.
- In sign language, the motions or symbols are arranged linguistically.
- They are all as diverse and rich as spoken languages. The most frequently used sign language worldwide is American Sign Language (ASL).
- The USA, Canada, as well as regions of Mexico, Africa, and Asia, all have signatories.

XI. ADVANTAGES

- Sign language gives many benefits to all children regardless of whether they are deaf or suffering with their hearing.

- Along with assisting kids in communicating and fully expressing themselves, it also helps kids become more socially adept by boosting their self-assurance and self-worth.
- a variety of hand, finger, arm, head, and face expressions are used in gestures to enable the deaf and hard of hearing communicate with those around them and vice versa.
- By visual descriptions, it enables kids to comprehend their surroundings and, as a result, contribute to society.

XII. DISADVANTAGES

- Gestures in sign language must be made using the hands. For those who don't have full use of their hands, this could be an issue.
- Even seemingly minor conditions like Parkinson's or arthritis can cause significant difficulties for those who must use sign language to communicate.
- Although some believe that newborn sign language can impede language development or delay speech, there is no reliable data to backup these assertions.
- In fact, some research suggest that it might promote language development, while others find no difference in the development of language skills.

XIII. CONCLUSION

Considering our above methodology, we come to the conclusion that the newly designed system of image processing technologies is suitable for parasite detection. The morphological segmentation technique and improved watershed segmentation technique proves to be the best in detection of the cells and segmenting them from the non-region of interest portion. To characterize the sort of plasmodium parasite for which we utilized machine learning technologies and cubic SVM proved to be the best by having the highest accuracy score. The system has been tested with around 110 thin film blood smear images and the results are satisfactory. The inconsistencies among the images was a challenge but we have tried to make our system robust. An alternative system for ML which can translate both ASL and ArSL alphabets and few words to text and speech, with the help of various sensors and a control unit mounted on a hand glove, displayed on a simple user interface using Python is presented. The main objective is to detect the change in gestures and convert them into human understandable form to bridge the communication gap between the deaf and the able people. The proposed model succeeded in reaching the target of replacing the necessary data set of ML with a more flexible system that works per user using a similar methodology, reaching 95.

REFERENCES

1. Goldin-Meadow S., Brentari D. Gesture, sign, and language: The coming of age of sign language and gesture studies. *Behav Brain Sci.* – 2017. – 60 p. DOI: 10.1017/S0140525X15001247. URL:
2. Zaytseva G.L. *Zhestovaya rech'. Daktilologiya: Uchebnik dlya studentov vysshikh uchebnykh zavedeniy [A Sign speech. Dacty-logy. Tutorial for students of higher educational institutions].* Moscow, Vlado Publ. – 2000. – 192 p. (in Russian)
3. I. J. M. A. W. Arslan Arif, Syed Tahir Hussain Rizvi and M. R. Shakeel, "Techno-talk: An american sign language (asl) translator," 2016 International Conference on Control, Decision and Information Technologies (CoDIT), Malta, pp. 665–670, 2016.
4. M. S. Z. K. Shaheer Bin Rizwan and M. Imran, "American sign language translation via smart wearable glove technology," 2019 International Symposium on Recent Advances in Electrical Engineering (RAEE), vol. 4, pp. 1–6, 2019.
5. A. C. Vaibhav Mehra and R. R. Choubey, "Gesture to speech conversion using flex sensors, mpu6050 and python," *International Journal of Engineering and Advanced Technology (IJEAT)*, vol. 8, no.6, p. 2249 – 8958, 2019.
6. A. M. Vijayalakshmi P., "Sign language to speech conversion," 2016 International Conference on Recent Trends in Information Technology (ICRTIT), Chennai, pp. 1–6, 2016.
7. F. R. Paulo Trigueiros and L. P. Reis, "Vision-based portuguese sign language recognition system," *Advances in Intelligent Systems and Computing*, vol. 275, 2014.
8. P. L. O. M. A. Rini and K. Y. Chow, "Real-time malaysian sign language translation using colour segmentation and neural network," *Instrumentation and Measurement Technology Conference*, Warsaw, Poland, 2007.



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