

AN EFFICIENT COMMUNICATION SYSTEM FOR BLIND, DUMB AND DEAF PEOPLE

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ABSTRACT

India is densely populated country. The numbers of blind, deaf and dumb people are high as 70 million. Hand gestures are a strong communication for hearing impaired society. It is helpful for establishing between human and computer. The point of the venture is to build up a system for blind, deaf and dumb people that will help them live a better life.

User will record a voice and the voice will be sent to the server. The server will convert speech to text. After that text will be classified, sign will be generated and sent over to the application of dumb or deaf person and the opposite system i.e. sign to speech can be developed for communication with visually impaired people. Hence, visually and hearing impaired people can communicate efficiently and effortlessly using this system.

Keyword : - Image processing, Text recognition, Gesture Recognition, Sign Language

1. INTRODUCTION

The essential application for communication via signs acknowledgment is to enhance the dialect training. Computer acknowledgment of sign based communication is an imperative research issue for empowering correspondence with hearing disabled individuals. Signs are solid medium of correspondence for hearing debilitated society. It is useful for building up correspondence among human and computer. In this framework we propose a consistent communication through signing sign acknowledgment framework where hand is utilized for playing out any sign. Perceiving a communication via signs from persistent signals is an extremely difficult research issue.

In this system user will begin video from camera. User will have the capacity to enroll distinctive signs to promote acknowledgment utilizing camera. At the point when user will begin acknowledgment action and give different hand signs in front of camera sign will be identified and windows operation like enter or begin will be performed. For instance Thumbs up sign indicates ENTER button.

2. MOTIVATION OF PROJECT

For communication between deaf person and a second person, a mediator is required to translate sign language of deaf person. But a mediator is required to know the sign language used by deaf person. But this is not always possible since there are multiple sign languages for multiple languages.

So to understand all sign languages, Hand gestures of deaf people by normal people this system is proposed. System gives output in the form of sound.

3. BACKGROUND STUDY

[1] Brunna Carolinne, Rocha Silva, Geovanne Pereira Furriel [2017] [Methodology and comparison of Devices for Recognition of Sign Language Characters] In this paper they have proposed a framework which is equipped for recognizing gesture based communication characters and contrasting them all together with confirm design with better precision. It consists of gestospacial and facial expression for purpose of transmitting expressions.

[2] Cheok Ming Jin,Zaid Omar [2016] [A Mobile Application of American Sign Language Translation Via Image Processing Algorithm] In this paper they have established Image processing techniques which is used to recognize images of several sign language signs. They have successfully implemented the platform that is able to recognize and translate 16 different American Sign Language signs.

[3] Soohwan Kim,Dong Hwan Kim, Sung –Kee Park [2010] [Object Modelling for Environment perception through human robot interaction] In this paper they have proposed another system of question demonstrating for condition discernment through human-robot connection. Especially, inside a multi-display question demonstrating design, they have handled the gestural dialect part utilizing a stereo camera.

[4] Rafiqul Zaman Khan1 & Noor Adnan Ibraheem [2012] [Survey on Gesture Recognition for Hand Image Postures] In this paper they have proposed Gesture Recognition for Hand Image Postures. Human PC cooperation is the utilization of the hand as an information gadget. We can likewise utilize the console and mice. Need the client to be situated in a particular area. In this gadget the critical thing is hand acknowledgment framework the input feature.

[5] Jayshree R.Pansare,Hrushikesh Dhumal,Sanket Babar,Kiran Sonawale, Ajit Sarode [2013] [Real Time Static Hand Gesture Recognition System in Complex Background that uses Number system of Indian Sign Language] In this paper they have proposed Real Time Static Hand Gesture Recognition framework in Complex Background that utilizes Number arrangement of Indian Sign Language. Having capable correspondence amongst human and gesture based communication is the most common method for correspondence for hard of hearing and quiet individuals. In this paper right off the bat the picture is caught and after that that picture is changed over into RGB shading position then it utilizes dark configuration to identify the skin shading at that point separates hand partition utilizing blob procedure. At long last correlation is done between the current and dataset pictures.

[6] G. R. S. Murthy & R. S. Jadon [2009] [A Review of Vision Based Hand Gestures Recognition] In this paper they have proposed A review Of Vision Based Hand Gestures Recognition. It is a System which can distinguish the human signals and use for the gadget control. Signal might be characterized as a physical development of the hands, arms, face and body to pass on data and significance. Signal acknowledgment isn't just following the human development yet additionally important charge.

[7] Siddharth S. Rautaray Anupam Agrawal [2012] [Vision based hand gesture recognition for human computer interaction: a survey] In this paper they have proposed Vision based hand motion acknowledgment for human PC cooperation: Survey centers around three fundamental objects of hand position, identification, following and acknowledgment. Hand positions can be utilized to acquaint emotions or to communicate with others.

4. TECHNOLOGIES TO BE USED

4.1 BLOB DETECTION

This calculation draws rectangles around abandoned part. Strategies are gone for distinguishing districts in a computerized picture that vary in needs, Such as splendor or shading, contrasted with encompassing locales. Autonomously distinguish comparing districts in scaled variants of a similar picture.

A BLOB is the district of a picture in which a few properties are steady or roughly consistent. Every one of the focuses in a BLOB can be considered in some sense to be like each other.

4.2 TEMPLATE MATCHING

Layout coordinating is a method in computerized picture preparing for discovering little parts of a picture which coordinate a format picture. It can be utilized as a part of assembling as a piece of value control. An approach to explore portable robot, or as an approach to distinguish edges in pictures.

4.3 SKIN COLOR DETECTION

Skin location is the way toward discovering skin hued pixels and locales in a picture or a video. This procedure is normally utilized as a preprocessing advance to discover locales that possibly have human appearances and appendages in pictures.

5. SOFTWARE REQUIREMENTS

Operating System	: Windows 7/10
Application Server	: Tomcat 5.0 / 6X
Front End	: HTML, Java, JSP, AJAX
Scripts	: Java Script
Server Side Script	: Java Server Pages
Database Connectivity	: MySQL

6. HARDWARE REQUIREMENTS

Processor	: Pentium-III
Speed	: 1.1GHz
RAM	: 256 MB (min)
Hard Disk	: 20 GB
Key Board	: Standard Windows Keyboard
Mouse	: Two or Three button mouse
Monitor	: SVGA

7. FEATURES

1. Interface will allow user to start video from camera.
2. User will do different hand signs in front of camera.

3. GUI interface – User will be able to see Video and recognized sign.
4. User will be able to operate windows after recognizing sign.

8. SYSTEM ARCHITECTURE

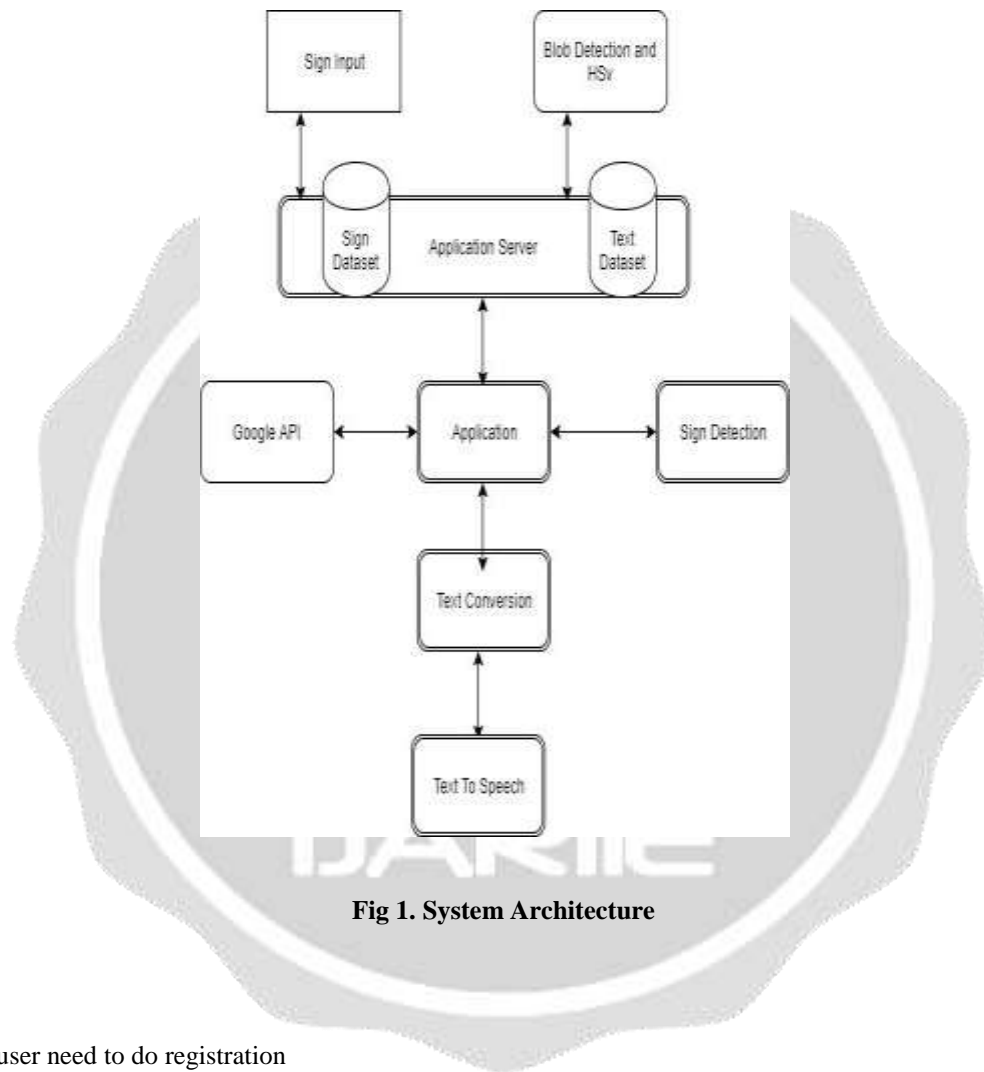


Fig 1. System Architecture

Process 1:

1. At first user need to do registration
2. User can login into system using registered username and password. If in case user forget the password they can select the forgot password option to reset the password.
3. After logging in into the system user gives the different signs as an input.
4. Using Blob Detection technique BLOB gets detected.
5. And then using HSV Conversion the captured colored image will get converted into black and white image.
6. After conversion the sign which the user has given will be compared with the signs stored in the dataset.
7. After comparison the text associated with the signs will get detected which is stored in the dataset.

Process 2:

1. By using Google API; the input speech gets converted into text.
2. And Speech to Text Conversion gets happen.
3. Then the Signs gets fetch as per text and Display.

Process 3:

1. On the other side text can be given as an Input.
2. Then text gets converted to Speech.
3. Appropriate signs get fetch and Display the result.

9. MATHEMATICAL MODEL**System Specification:**

$S = \{S, s, X, Y, T, f_{main}, DD, NDD, f_{friend}, \text{memory shared}, CPU_{count}\}$

- **S (system)**:- Is our proposed framework which incorporates following tuple.
- **S (initial state at time T)**:- GUI of Sign Language Recognition. The GUI gives space to enter a question/contribution for client.
- **X (input to system)**:- Information Query. The client needs to first enter the inquiry. The inquiry might be equivocal or not. The inquiry likewise speaks to what client needs to look.
- **Y (output of system)**:- Rundown of URLs with Snippets. Client needs to enter a question into Sign Language Recognition at that point Sign Language Recognition creates an outcome which contains significant and unessential URL's and their bits.
- **T (No. of ventures to be performed)**:- 6. These are the aggregate number of steps required to process an inquiry and creates comes about..
- **f_{main} (main algorithm)** :- It contains Procedure P. Procedure P contains Input ,Output and subordinates capacities. It demonstrates how the inquiry will be handled into various modules and how the outcomes are created.
- **DD (deterministic information)**:- It contains Video Data. Here we have considered VCS (hand signals) i.e. Video containing Signs which includes number of questionable inquiries. Such inquiries are client for indicating comes about. Subsequently, VCS is our DD.
- **NDD (non-deterministic information)**:- No. of info inquiries. In our framework, client can enter quantities of inquiries so we can't pass judgment on what number of questions client goes into single session. Consequently, Number of Input inquiries are our NDD.
- **f_{friend}** :- WC And IE. In our framework, WC and IE are the companion elements of the fundamental capacities. Since we will utilize both the capacities, both are incorporated into f_{friend} work. WC is Web Crawler which is bot and IE is Information Extraction which is utilized for removing data on program.

- **Memory shared:** - Database. Database will store data like rundown of beneficiaries, enlistment subtle elements and quantities of collectors. Since it is the main memory partook in our framework, we have covered it in the memory shared.
- **CPU_{count}:** - 2. In our framework, we need 1 CPU for server and least 1 CPU for customer. Thus, CPU_{count} is 2.

Subordinate capacities:

- Identify the processes as P.

$$S = \{I, O, P, \dots\}$$

$$P = \{VC, IE\}$$

Where,

- VC is Video Capture
- IE is Information Extraction.
- P is processes.
- WC = {U, VF}

Where,

U=input Query

VF is output of Video Capture which is Video Frames.

- IE = {VF, TM, Info}

Where,

- VF is input which is Video Frames given to IE
- TM i.e. Template matching technique is used to recognize signs (hand gestures).

Algorithm:

Step 1: Accept a Query (Q).

Step 2: Get Video from.

Step 3: call VC function

Step 3.1: Get U as Input to VC

Step 3.2: Output as VF

Step 4: call to IE Function

Step 4.1: Get VF as Input.

Step 4.2: Call Function TM

Step 4.3: Process TM as recognize different hand gestures.

Step 4.4: Get Relevant Information

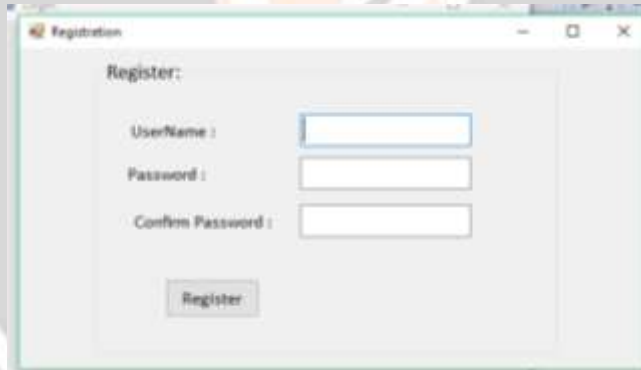
Step 5: Display Result.

Step 6: Stop.

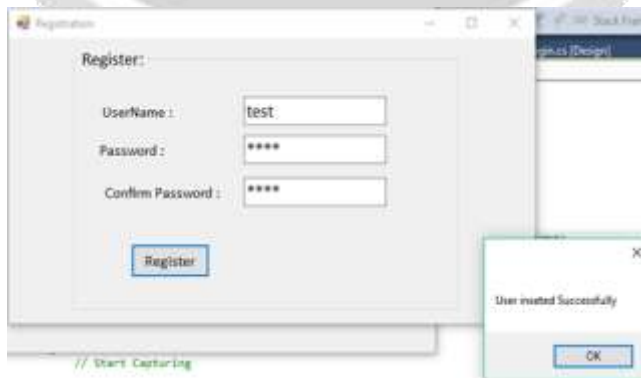
10. SCREENSHOTS



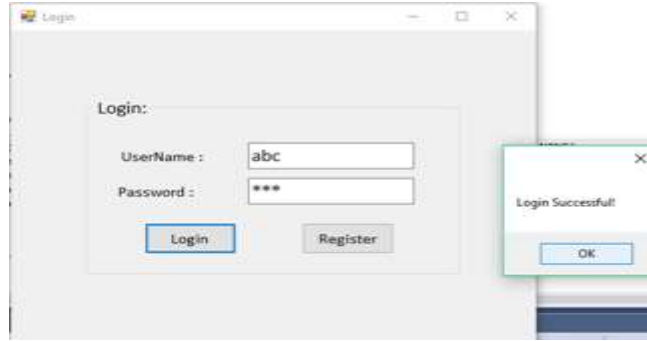
10.1 Login Form



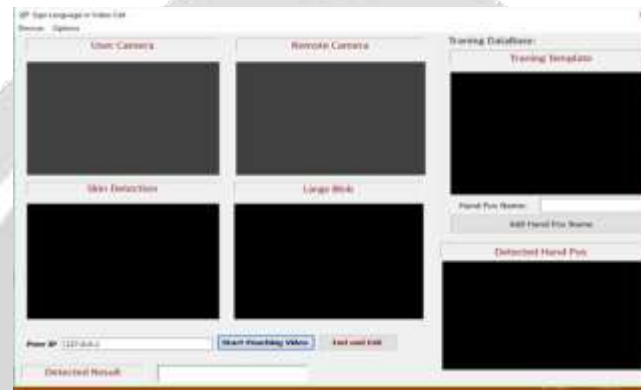
10.2 Registration Form



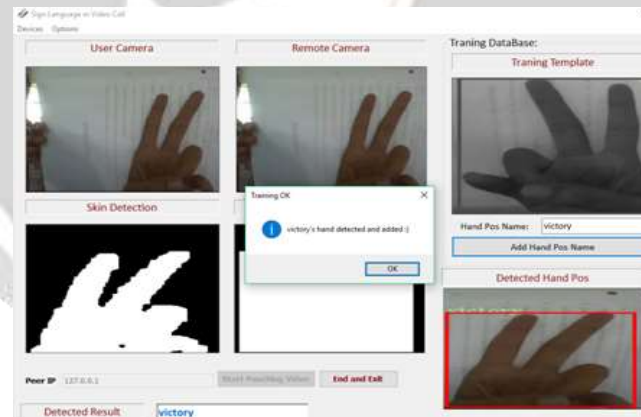
10.3 Registration Successful



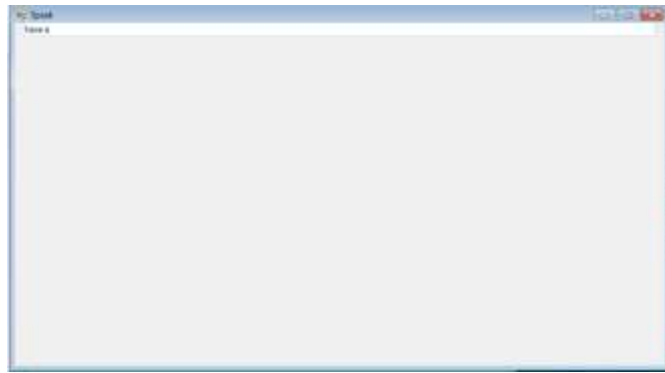
10.4 Login Successful



10.5 Capturing Window



10.6 Detected Result



10.7 Detected Result (Speech To Text)

11. GOALS AND OBJECTIVES

1. To implement a system for recognizing sign language hand configurations as described which will additionally provide the facility to each individual to define and upload his own sign language into system since each nation or even territorial gathering utilizes its own particular arrangement of signs.
2. To develop a tool which will help hard of hearing individuals in correspondence.
3. To develop a Gesture based communication, can be converted into content or sound in view of pictures, recordings, Signs can be converted to Speech so that there is a two-way communication.

12. CONCLUSIONS

Our proposed system aims to bridge the gap using Image Processing. Sign Language can be captured, recognized, stored and use of further computer operations.

13. ACKNOWLEDGEMENT

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14. REFERENCES

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[4]. Rafiqul Zaman Khan¹ & Noor Adnan Ibraheem [2012] [Survey on Gesture Recognition for Hand Image Postures]

[5]. Jayshree R.Pansare,Hrushikesh Dhumal,Sanket Babar,Kiran Sonawale, Ajit Sarode [2013] [Real Time Static Hand Gesture Recognition System in Complex Background that uses Number system of Indian Sign Language]

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