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Real-Time Communication System Powered by AI for Specially Abled

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1. INTRODUCTION:

1.1 Project Overview

Communication is the method of sharing or exchanging information, ideas, or feelings. To have a better communication between two people, both need to have knowledge and understanding of a common language. But in the case of deaf and dumb people, the means they use for communicating is different from that of normal people. For overcoming this barrier, a model can be build based on machine learning. A model can be trained to recognize different gestures of sign language and translate them into English language. This will help a lot of people in communicating with deaf and dumb people with ease.

1.2 PURPOSE:

The main purpose of this project is to build a system for the differently abled people to communicate with others easily and efficiently.

2. LITERATURE SURVEY

2.1 Existing Problem

➢ Face based Real Time communication for disable people. It has automated real time behaviour monitoring.

➢ Communication learning user interface model for children with autism with goal directed design method.

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2.2 References links:

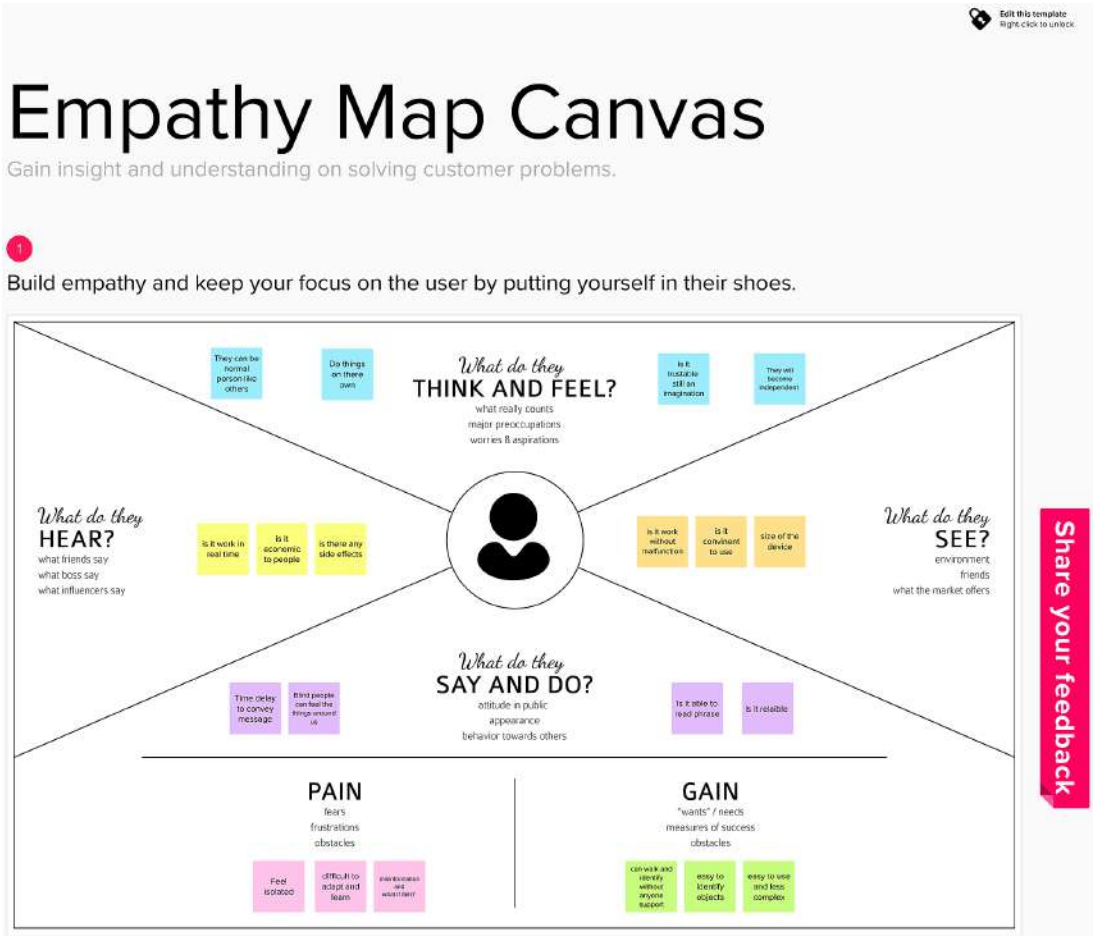
Image Processing:https://keras.io/api/preprocessing/image/
Model Building:https://youtu.be/umGJ30-15_A
OpenCV: https://www.youtube.com/watch?v=mjKd1Tzl70I
Flask App:https://www.youtube.com/watch?v=lj4I_CvBnt0
IBM cloud account registration:https://www.youtube.com/watch?v=4y_zD-0Q3F8&feature=emb_imp_woyt
CNN deployment:https://www.youtube.com/watch?v=BzouqMGJ41k&feature=emb_imp_woyt

2.3 Problem Statement Definition

To address the challenges faced by deaf-mute persons in their daily life so they can interact with Normal people feel hopeful. Converting sign language into human hearing speech and vice versa Using Convolutional Neural Network in the desired language. Deploying our solution to provide a Faster response in the desired language.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



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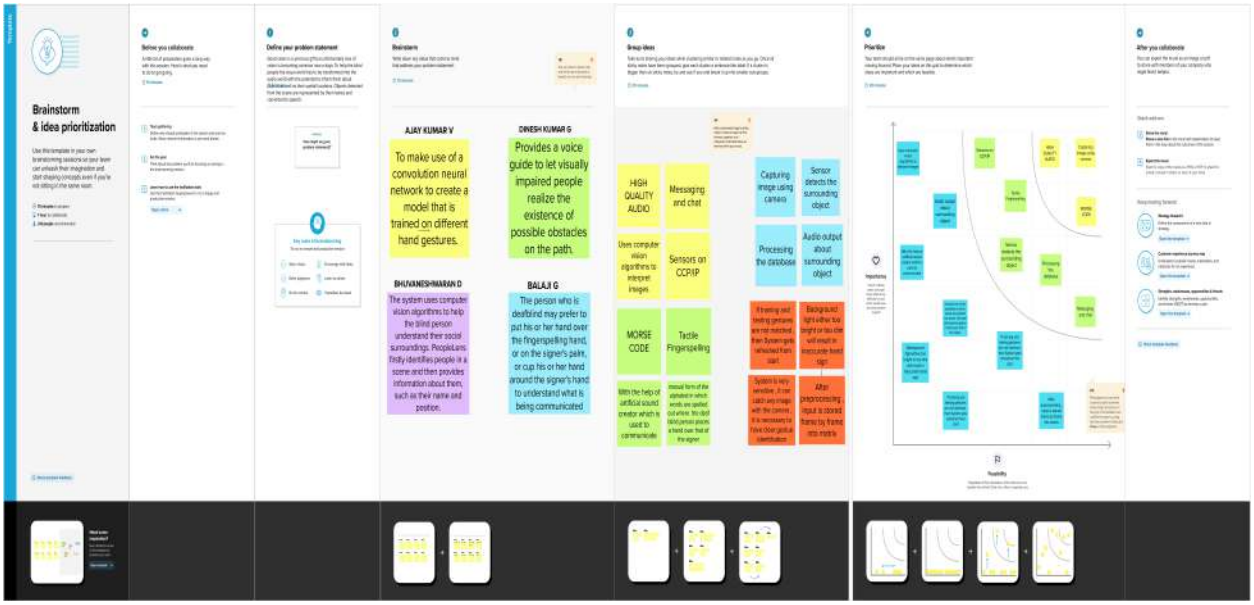
3.2 Ideation & Brainstorming



3.3 Proposed Solution

• An application that converts sign language to the voice heared by normal person.
• And also the speech converted to sign language which understand by deaf and dumb people.
• Our app is made & trained using Convolution Neural Network (CNN).

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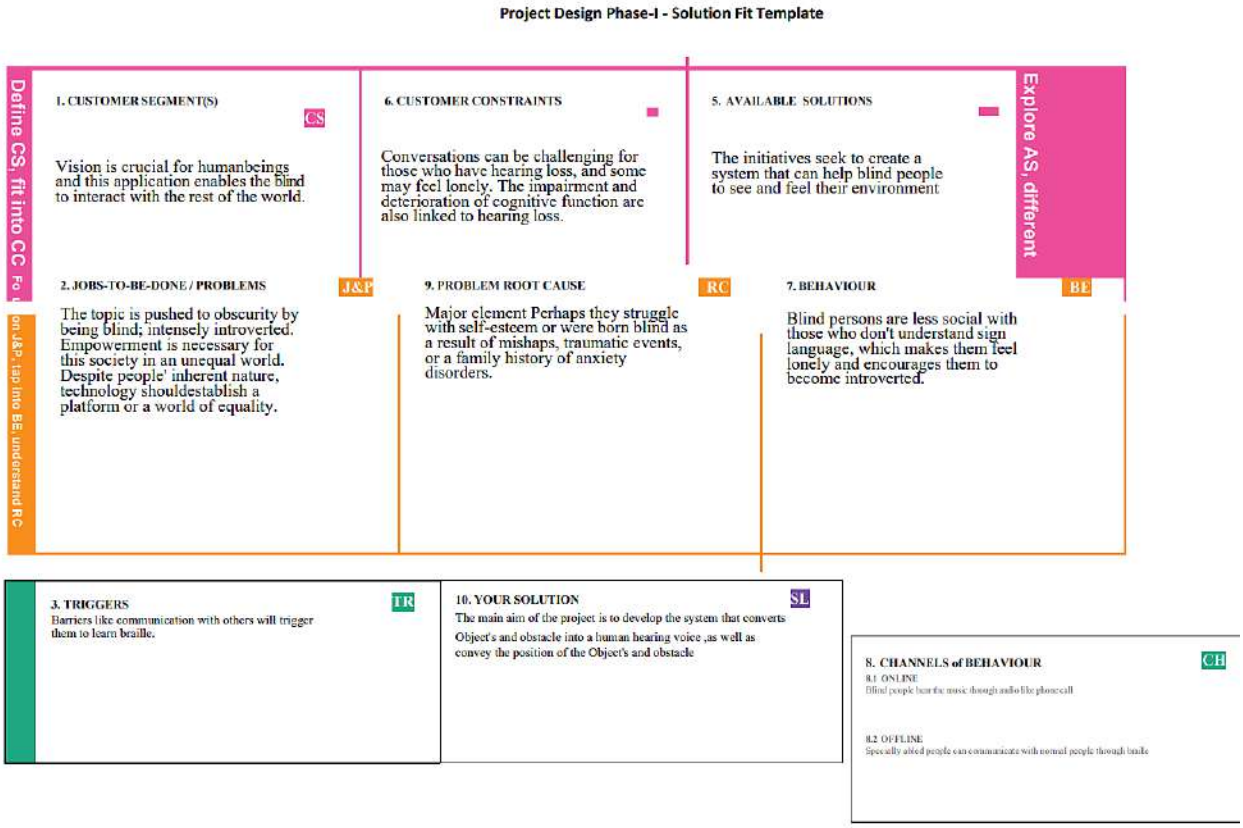
3.4 Problem Solution Fit



4. REQUIREMENT ANALYSIS

4.1 Functional Requirements

- ❖ User Registration
- ❖ User confirmation
- ❖ Update profile
- ❖ User Authentication
- ❖ Report

4.2 Non Functional Requirements

- ❖ Usability
- ❖ Security
- ❖ Reliability
- ❖ Performance
- ❖ Availability
- ❖ Scalability

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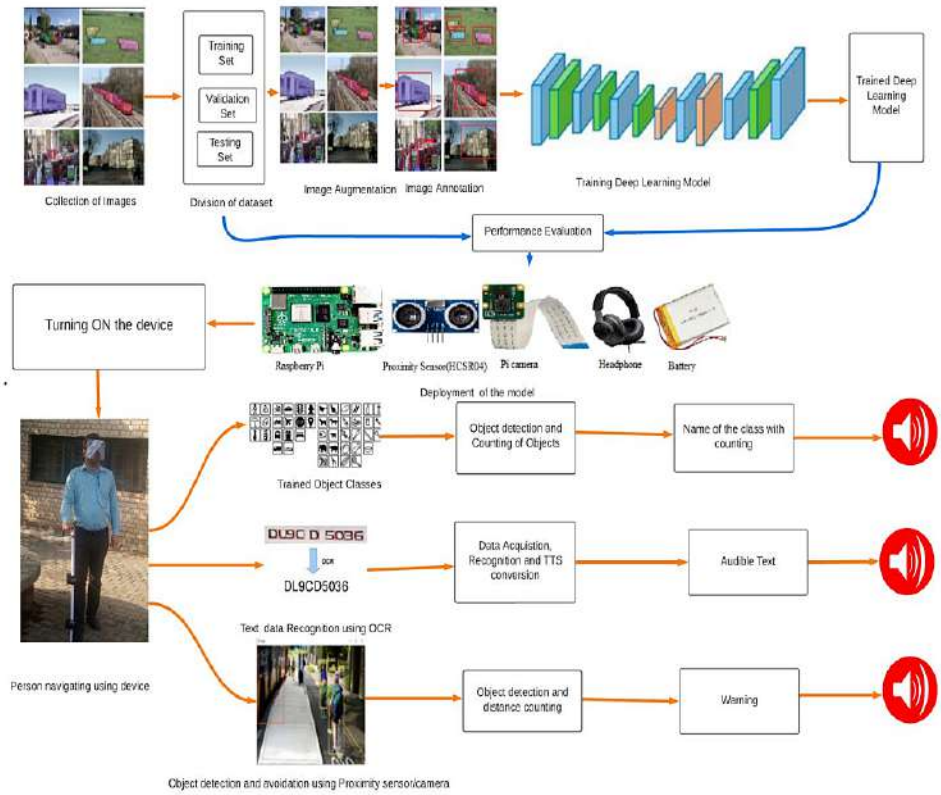
5. PROJECT DESIGN

5.1 Data Flow Diagram



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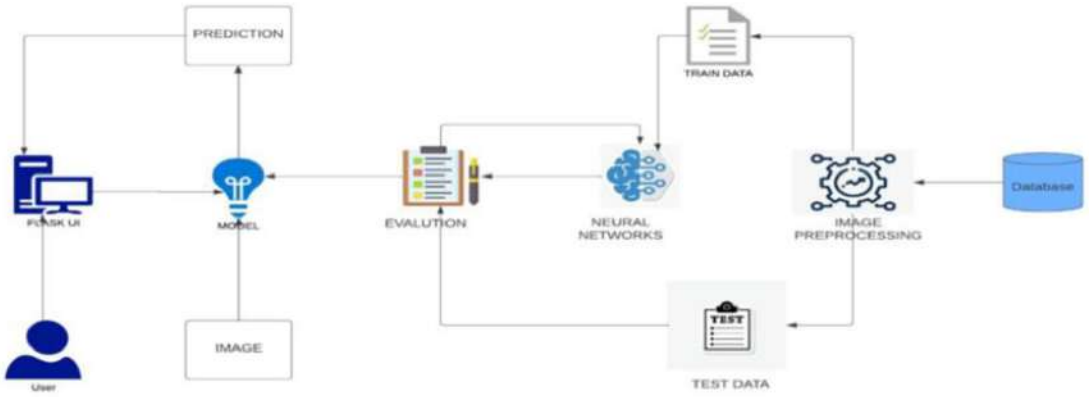
5.2 Solution & Technical Architecture

Technical Architecture:



5.3 User Stories

User Stories:

The below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user/web user)	Registration	1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	6	As a user, I can access the mobile interface			
Administrator	Cloud	1	Maintain the cloud account	Maintain the cloud account accessible to the user	Medium	Sprint-1
	Model	2	Use ML cloud model	Create the ML model to predict the images	High	Sprint-2
		3	Convert the result into output	This model predict the output into the voice	High	Sprint-3
	Database	4	Database administration	Create the database and maintain the information	Low	Sprint-4

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6. PROJECT PLANNING AND SCHEDULING

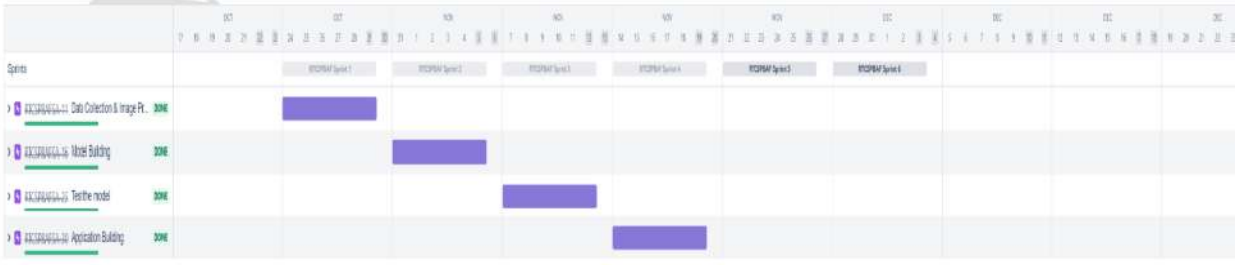
6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	Dataset has to be collected	12	High	BHUVANESHWARAN AJAY KUMAR
Sprint-1	Image Preprocessing	USN-2	Collected images has to be preprocessed	8	Medium	AJAY KUMAR BHUVANESHWARAN BALAJI
Sprint-2	Model Building	USN-3	Import the required libraries, add the necessary layers and compile the model	12	High	DINESH KUMAR BALAJI
Sprint-2	Model Training	USN-4	Training the image classification model using CNN	8	Medium	BHUVANESHWARAN AJAY KUMAR DINESHKUMAR
Sprint-3	Training & Testing	USN-5	Training the model and testing the model's	20	High	BHUVANESHWARAN **AJAY KUMAR**
Sprint-4	Implementation of the application	USN-6	Converting the input images into Speech	20	High	DINESH KUMAR BALAJI AJAY KUMAR BHUVANESHWARAN

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

6.3 Reports From JIRA



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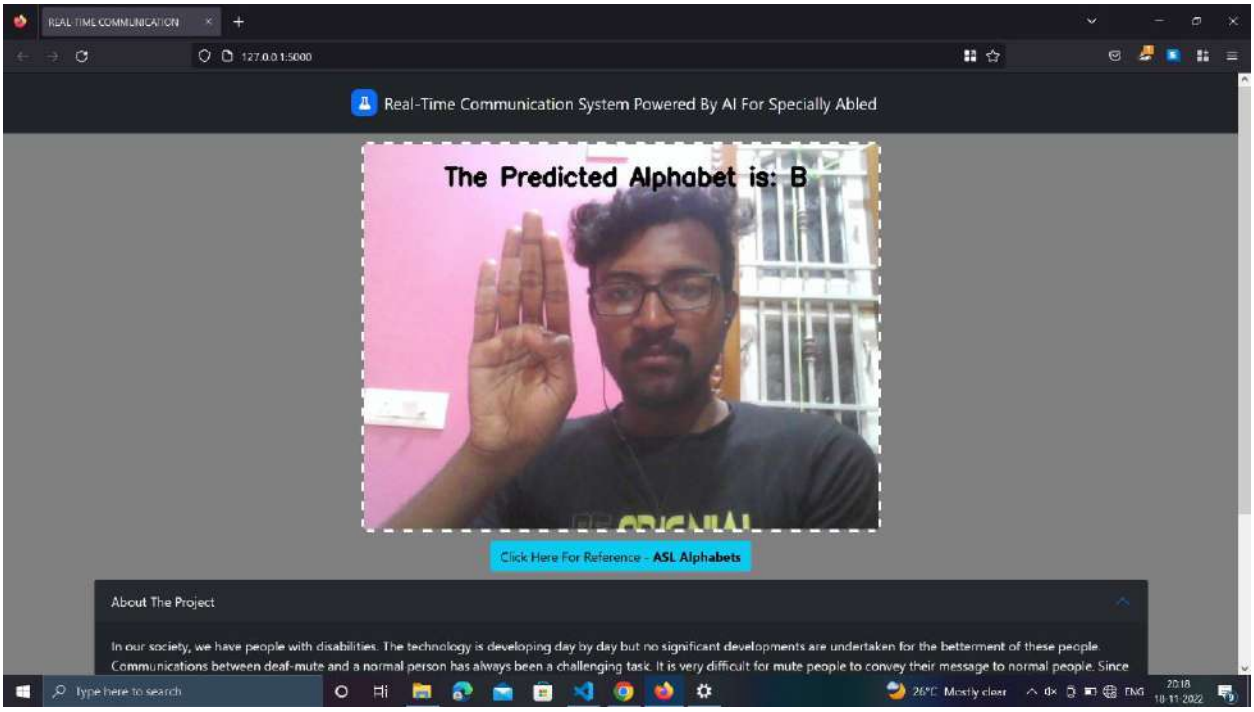
7.CODING AND SOLUTIONING

Main.py
app.py
camera.py
ASL_Alphabets.pdf
index.html

8. TESTING

8.1 Test Cases
8.2 User Acceptance Testing

9. RESULTS



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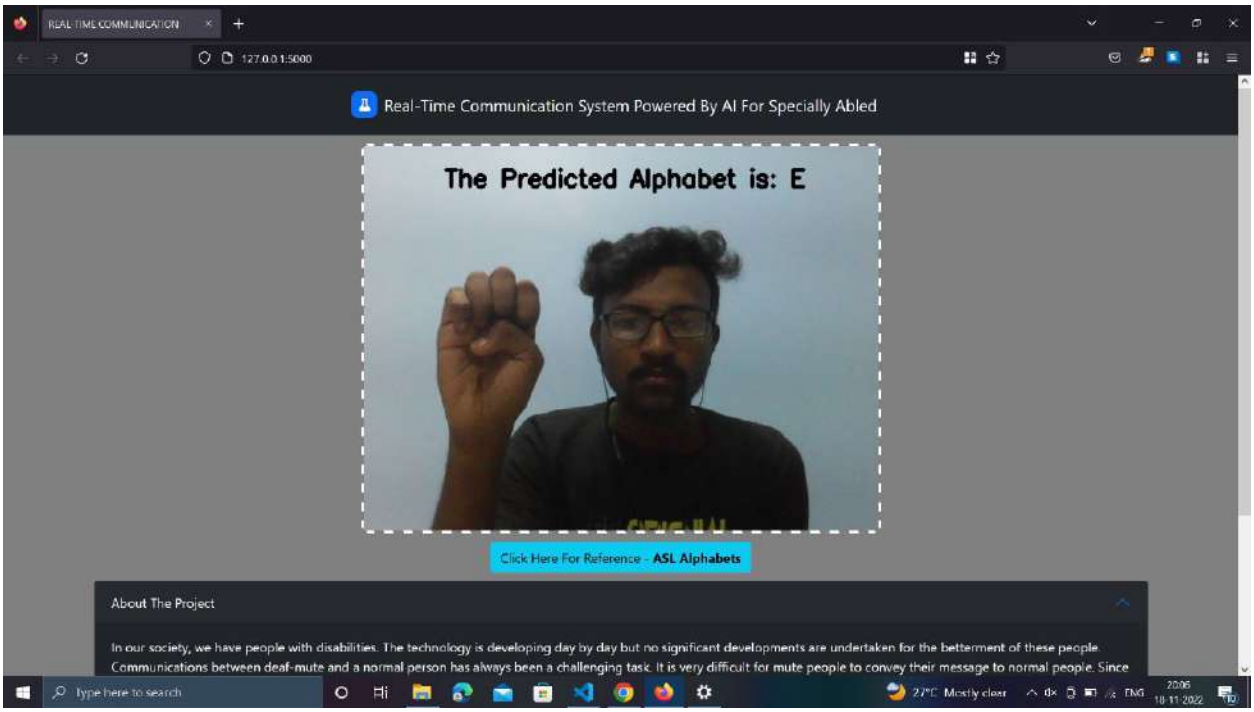
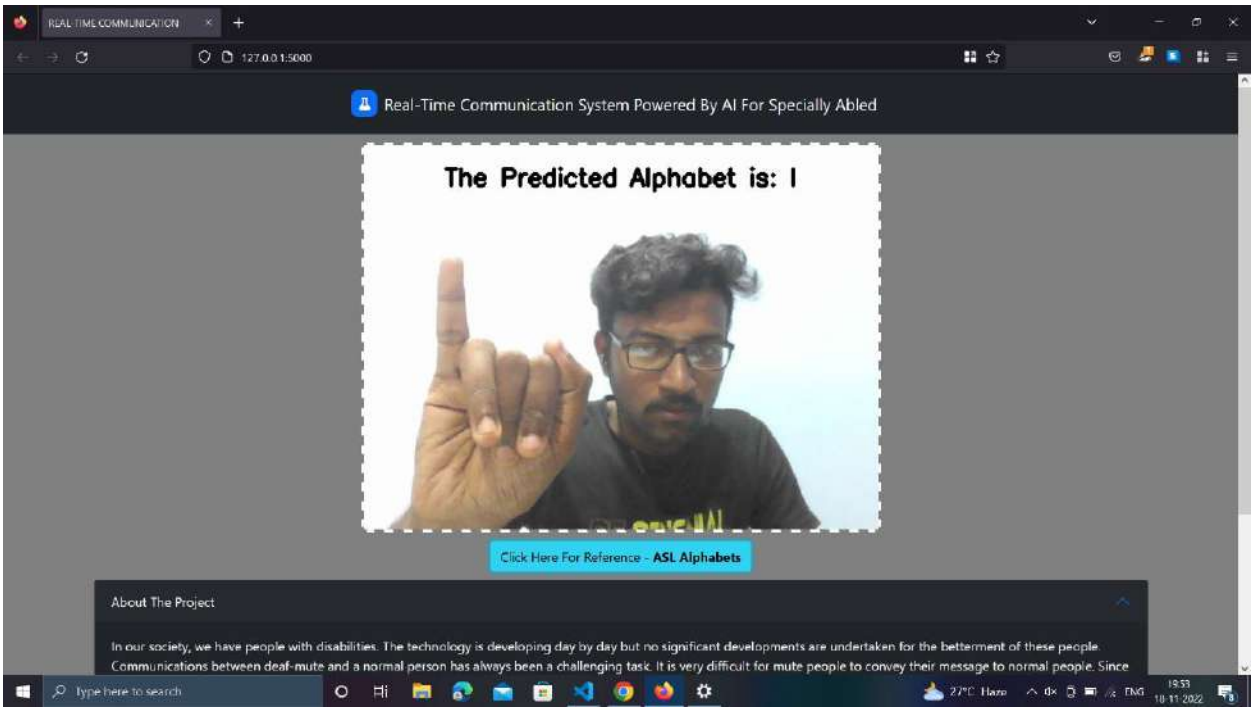
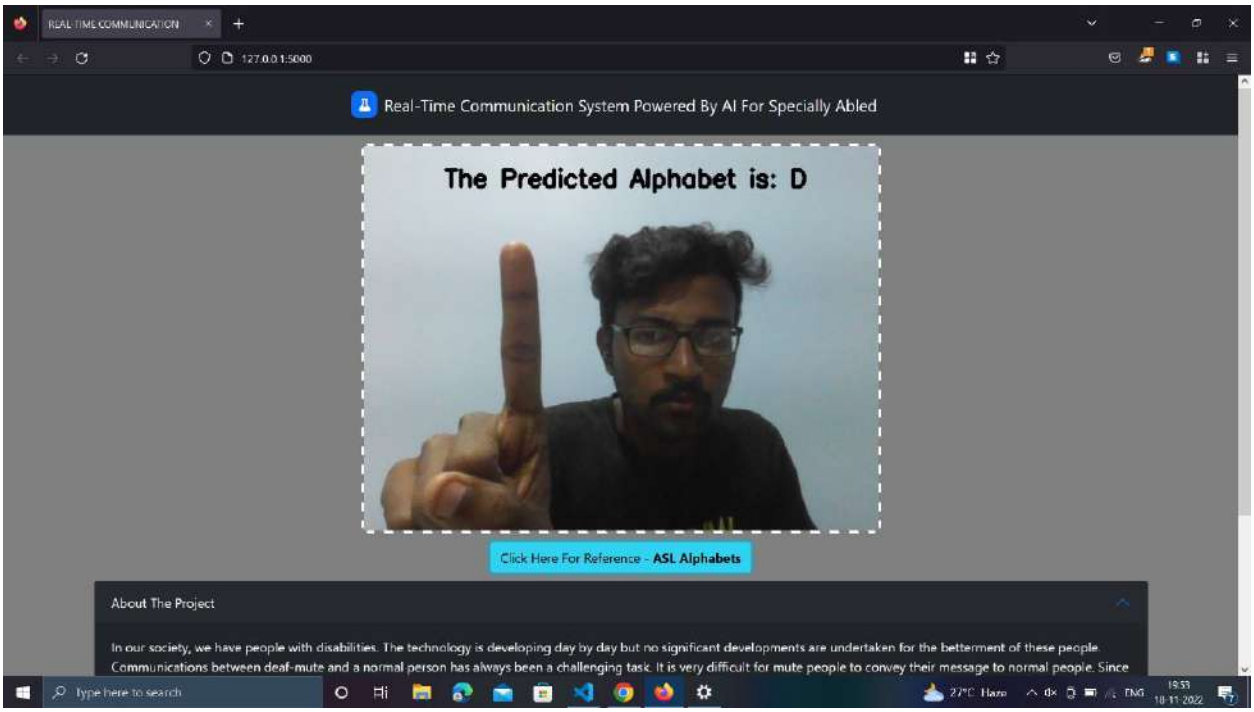

REAL TIME COMMUNICATION
127.0.0.1:5000
Real-Time Communication System Powered By AI For Specially Abled
The Predicted Alphabet is: E
Click Here For Reference - ASL Alphabets
About The Project
In our society, we have people with disabilities. The technology is developing day by day but no significant developments are undertaken for the betterment of these people. Communications between deaf-mute and a normal person has always been a challenging task. It is very difficult for mute people to convey their message to normal people. Since
Type here to search
27°C Mostly clear
ENG
20:06
18-11-2022


REAL TIME COMMUNICATION
127.0.0.1:5000
Real-Time Communication System Powered By AI For Specially Abled
The Predicted Alphabet is: I
Click Here For Reference - ASL Alphabets
About The Project
In our society, we have people with disabilities. The technology is developing day by day but no significant developments are undertaken for the betterment of these people. Communications between deaf-mute and a normal person has always been a challenging task. It is very difficult for mute people to convey their message to normal people. Since
Type here to search
27°C Haze
ENG
19:53
18-11-2022

ss


REAL TIME COMMUNICATION
127.0.0.1:5000
Real-Time Communication System Powered By AI For Specially Abled
The Predicted Alphabet is: D
Click Here For Reference - ASL Alphabets
About The Project
In our society, we have people with disabilities. The technology is developing day by day but no significant developments are undertaken for the betterment of these people. Communications between deaf-mute and a normal person has always been a challenging task. It is very difficult for mute people to convey their message to normal people. Since
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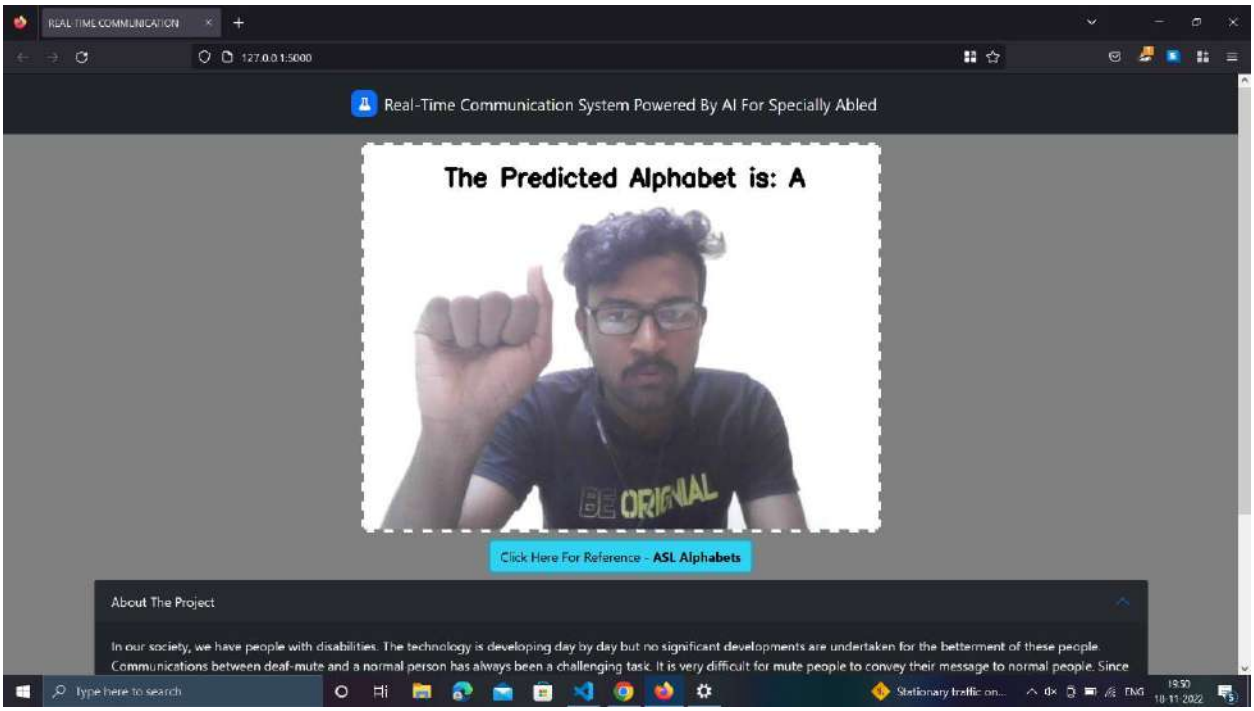
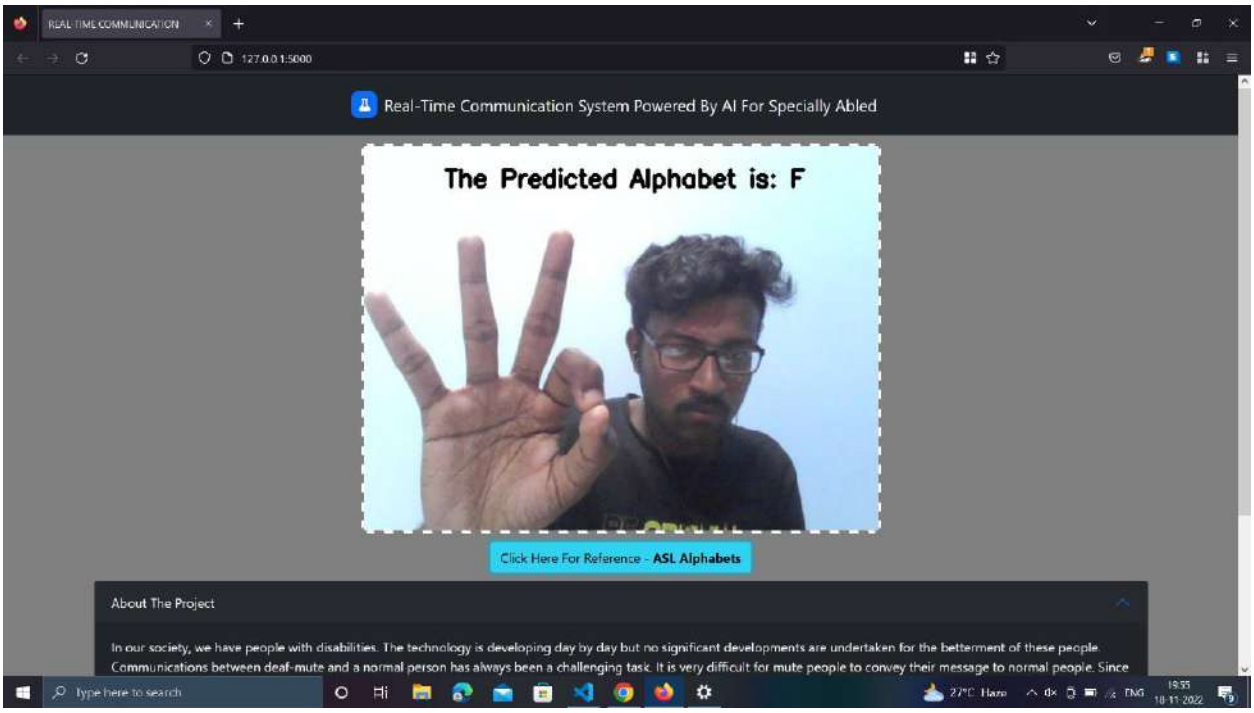
27°C Haze
ENG
19:53
18-11-2022


REAL TIME COMMUNICATION
127.0.0.1:5000
Real-Time Communication System Powered By AI For Specially Abled
The Predicted Alphabet is: A
BE ORIGINAL
Click Here For Reference - ASL Alphabets
About The Project
In our society, we have people with disabilities. The technology is developing day by day but no significant developments are undertaken for the betterment of these people. Communications between deaf-mute and a normal person has always been a challenging task. It is very difficult for mute people to convey their message to normal people. Since
Type here to search
Stationary traffic on...
ENG
19:50
18-11-2022

ss



10. ADVANTAGES AND DISADVANTAGES

Advantages:

➢ The speech is converted to sign language very quick to provide greater and faster understanding to specially-abled people.

➢ The user interface is convenient and simple for both people.

Disadvantages:

➢ The number of images and pixels for the model to train in the dataset is not high so accuracy is moderate level.

➢ It will be improved by changing the dataset.

➢ Currently, we have deployed a dataset in the model for the alphabets A to I only.

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11.CONCLUSION:

It aims to bridge the communication gap between deaf people and the rest of society. The proposed methodology translates sign language into English alphabets that are understandable to humans. This system sends hand gestures to the model, who recognizes them and displays the equivalent.

12. FUTURE SCOPE:

With the introduction of gesture recognition, the web app can easily be expanded to recognize letters beyond 'I', digits, and other symbols plus gesture recognition can also allow controlling of software/hardware interfaces. Having a technology that can translate hand sign language to its corresponding alphabet is a game changer in the field of communication and Ai for specially-abled people such as deaf or dumb.