



AUGMENTATIVE COMMUNICATION FOR DEAF AND DUMB

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Abstract: People get to know one another through sharing their ideas, thoughts, and experiences with others around them. There are several ways to accomplish this, the best of which is the gift of "Speech." It will be unjust if we overlook those who are denied this priceless gift: the deaf and dumb. The usage of "Sign Language" is the only mode of communication available to the deaf and dumb. Mute people can make hand gestures with their fingers, which will be transformed into speech so that regular people can understand them. The deaf and dumb communicate through sign language, which is difficult to decipher for those who are not familiar with it. As a result, software for the phone that can translate motions into text and speech is required. This will be an innovative step toward allowing deaf and dumb people to communicate with the general population without the use of a secondary device other than a Smartphone. We'll be working on an app that will make it easier for people who are deaf or hard of hearing to communicate. Flutter is used for the front end, and Python script is used for the backend. It attempts to provide dumb people with an effective and economical means to express them by converting motions to text and deaf people's speech to text and gestures. This application will create a better society where community sees them as one and people will look into their abilities than disabilities. This application will create a better society where community sees them as one and people will look into their abilities than disabilities.

Index Terms - Flutter, Python, Decipher.

I. INTRODUCTION

One of the major issues confronting our society is that persons with disabilities are struggling to keep up with the rapid advancement of technology. Deaf and dumb persons generally communicate through sign language; however they have trouble communicating with others who do not comprehend sign language. It's a difficult task to address the concerns of people with hearing and vocal impairments with a single helping system. In order to converse with them, people go through training. The goal of this project is to create an application that allows people to communicate with persons who are differently abled without having to learn American Sign Language.

With the rapid development of technology, especially artificial intelligence and its subsets it is easy to capture human gestures in motion. With the improving technology in the field of fabrication of chips, we can witness the evolution of Smartphone and its processor makes this project more efficient in terms of its performance. In addition to this, the project aims at communicating with the help of inbuilt components of Smartphone i.e., camera, microphone, speaker and display to perform respective functions which eliminates the need of secondary device. With the improvement in telecommunication, it is reliable to transmit and receive the data or information in a short span of time.

II. LITERATURE SURVEY

- Prof. Dr. C. S. Shinde [1] proposed hand recognition system which can be used as human-computer interface and can be easily controlled through hand gestures movements. In this system no additional sensor is needed. Deep convolution neural network algorithm is used in this system. Deep learning deals with heavy data set. The training of neural network is done for a heavy set of data.
- Mandlenkosi Shezi [2] proposed a software prototype for facilitating of communication with hearing-impaired individuals. This paper presents a application that aims to communicate by introducing deaf chat in the design of mobile applications for hearing impaired people.
- Jyoeta Singha [3] proposed a method for continuous video sequences of the signs. In segmentation, first skin filtering is used that gives the skin region i.e. hand from the image and then histogram matching algorithm is used.

III. METHODOLOGY

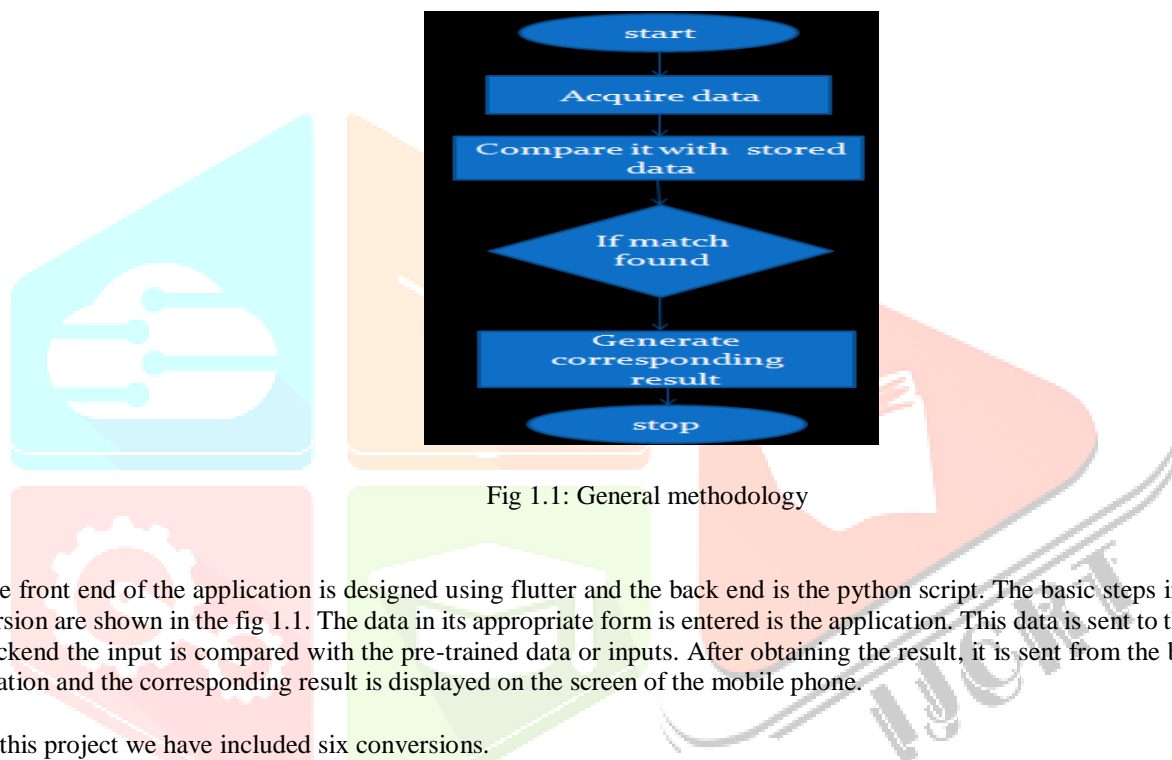


Fig 1.1: General methodology

The front end of the application is designed using flutter and the back end is the python script. The basic steps included in the conversion are shown in the fig 1.1. The data in its appropriate form is entered in the application. This data is sent to the backend. In the backend the input is compared with the pre-trained data or inputs. After obtaining the result, it is sent from the backend to the application and the corresponding result is displayed on the screen of the mobile phone.

In this project we have included six conversions.

A. Sign to speech

The sign to speech conversion is designed for the convenience of dumb people. They can express what they want to communicate using hand gestures. These gestures are captured using mobile phone camera. The camera identifies the lines of skeleton. These lines of skeleton are evaluated in the numpy and it predicts the output based on pre-trained dataset. The lines of skeleton are evaluated using mediapipe library, which is an open source library. After the output is evaluated the result will be displayed in the form of Audio in the front end of the application.

B. Sign to text

In this conversion the media pipe which is an open source library helps to predict the lines of skeleton based on the gestures shown to the mobile phone camera. It predicts the output after evaluating the pre-trained dataset in the server and the resulting output, which is in the form of text, is displayed in the mobile phone application screen with the help of opencv library. This opencv library is mainly used to display the text on the screen and to capture the gestures with the help of mobile phone camera.

C. Text to Speech

For converting text to speech, we are using inbuilt flutter library. By using this inbuilt flutter library, it consumes less data and the time to convert the text input into speech transcription output. Here text is entered in the space provided in application design and this text is converted to speech and the result is obtained with the help of mobile phone speaker.

D. Speech to sign

In this conversion speech is first converted to text and this text is then converted to signs or gestures. The speech obtained as input is converted to text with the help of Google API and the text so obtained is then sent to the server, where it is evaluated and finds for the appropriate video or gesture which describes the text. This output, in the form of video or gesture is sent to the application or front end and displayed on the screen.

E. Speech to text

In this conversion Speech is entered as input with the help of microphone of the mobile. This entered audio is converted to text with the help of speech recognition. This conversion can take place offline without the need of internet connectivity. The output of the conversion, in the form of text is then displayed on the mobile phone screen.

F. Text to Sign

This conversion is helpful for dumb people to communicate. Text to sign conversion is the reverse of sign to text conversion. Here the text entered in the mobile phone is first converted to audio. This audio then evaluates the appropriate gestures with the help of pre-trained dataset and the appropriate sign or gesture is sent back to the application and displayed on the output screen.

IV. BLOCK DIAGRAM

Let us consider one conversion where we convert sign or gestures to text. In order to capture the gestures, the camera of our mobile phone is used. The Fig 2 shows the block diagram of our project. The gestures captured from the camera are in the form of frames.

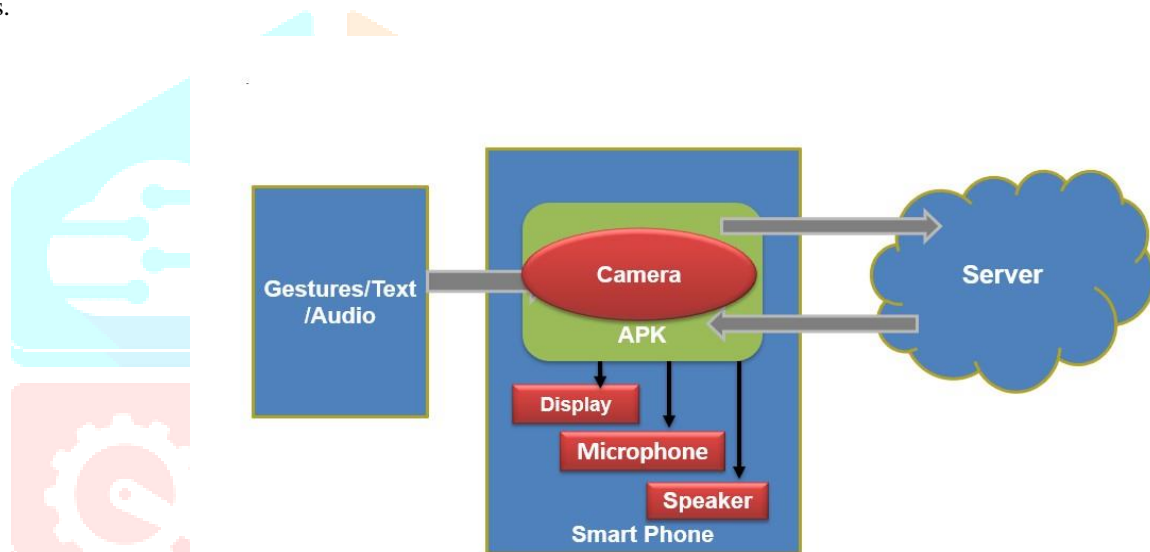


Fig 2: Block Diagram

These individual frames will be sent to the server. In the server the python script will be executed by using the captured individual frames as the input and once the execution of the code is completed, the output which is in the form of text is returned in the JSON format, and at last, in the application, JSON format is decoded into appropriate output and displayed on the screen. Similarly, in case of conversion of text to audio or text to video, the entered text is sent to the server similar to the previous case. The specific set of python lines in the script will be executed and the output is given back into the application in the form of audio or video according to our requirement.

V. ADVANTAGES AND DISADVANTAGES

A. Advantages

- Since mobile phones are lightweight and can be handled easily.
- This application is more flexible so that the deaf and dumb people can get employment opportunities easily after training.
- More words can be added.
- External wire connection is not required since the application can be downloaded from play store which is the inbuilt application of all mobile phones.

B. Disadvantages

- Since the application requires data connection, consumes more data.
- Takes time to load the application.
- The system fails to communicate if the words are not in the database or both the devices are not connected to each other.

VI. METHODOLOGY

The future scope of our project can be extended where a special feature can be added in our application where they can get the world-wide news in the form of videos. This app can be improvised so that there will be reduced grammatical errors and they can communicate in much more efficient way. Customized keyboards consisting of symbol keys which convert symbols to text can be developed, and this technique can be solely used in messaging application. This application can be made flexible enough so that the specially abled people can get employment opportunity after regressive training.

We hope that this application will create a better society where community sees them as one and people will look into their abilities than disabilities.

VI. REFERENCES

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