American Sign Language Recognition Using Hand Gestures

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Outline

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  - Inspiration
  - Problem statement
- Applicability of this project
  - Technologies used
- Working
- Conclusion & future scope

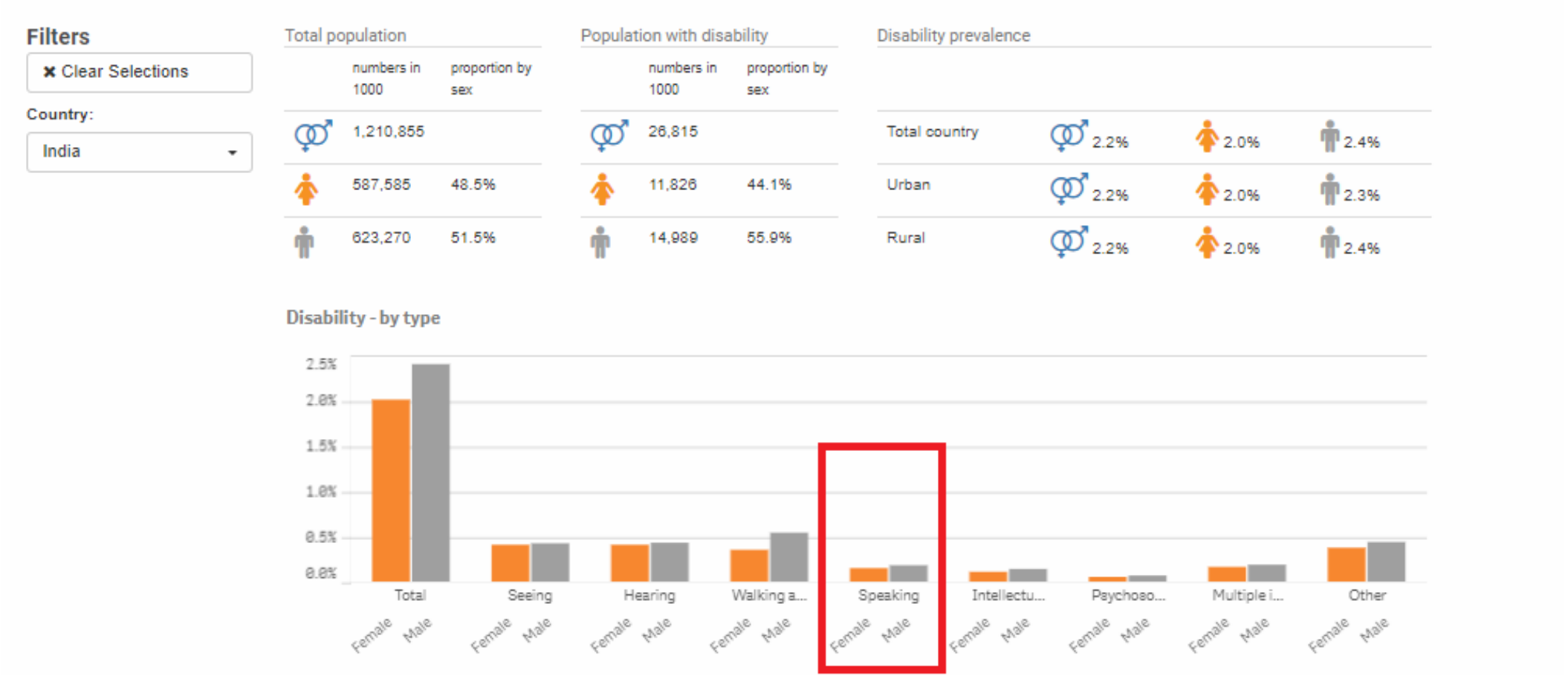
Introduction.

- Inspiration for this project

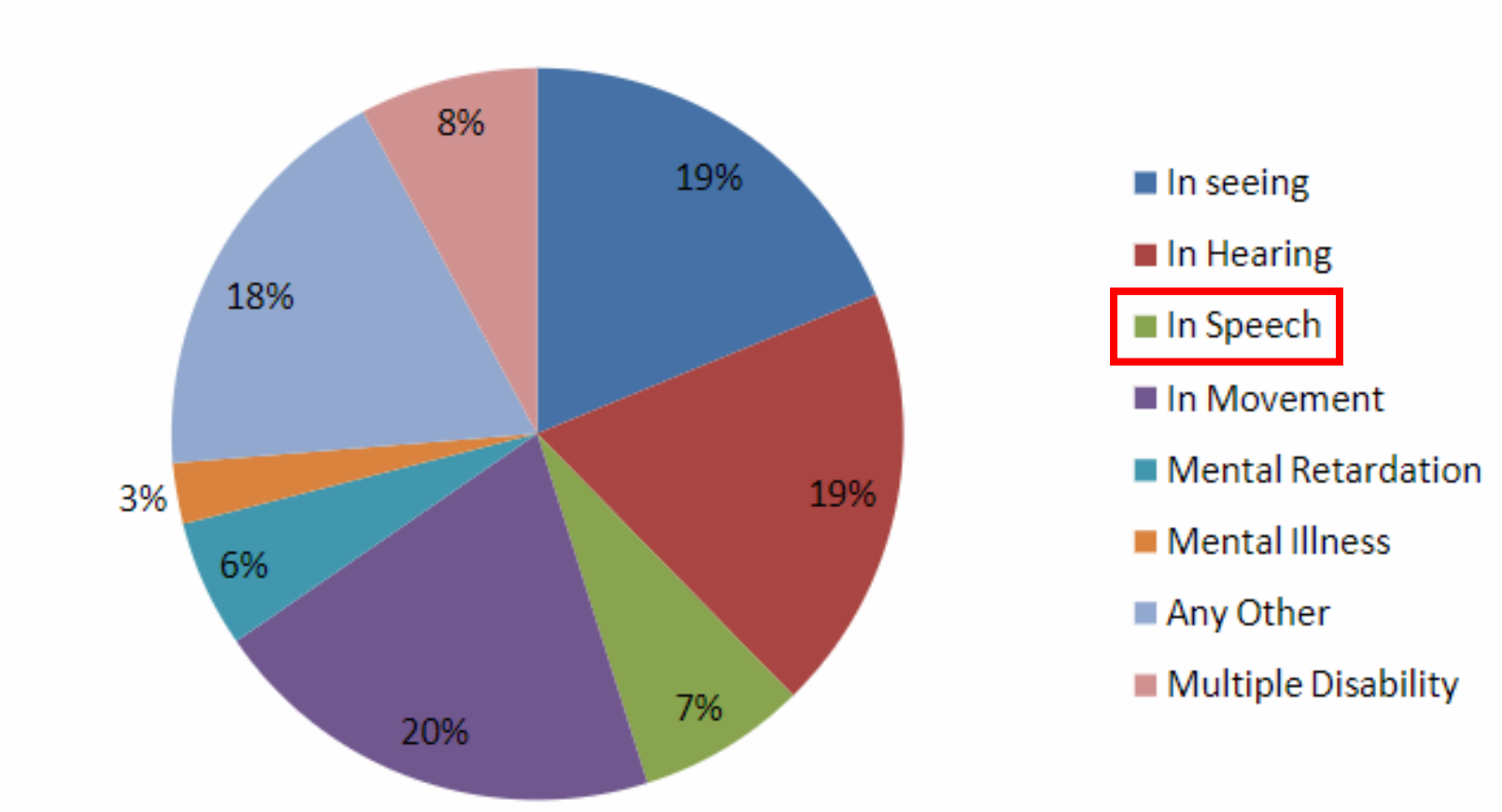
- Some of the major problems faced by a person who are unable to speak is they cannot express their emotion as freely in this world. Utilize that voice recognition and voice search systems in smartphone(s).

- Audio results cannot be retrieved. They are not able to utilize (Artificial Intelligence/personal Butler) like google assistance, or Apple's SIRI etc. because all those apps are based on voice controlling

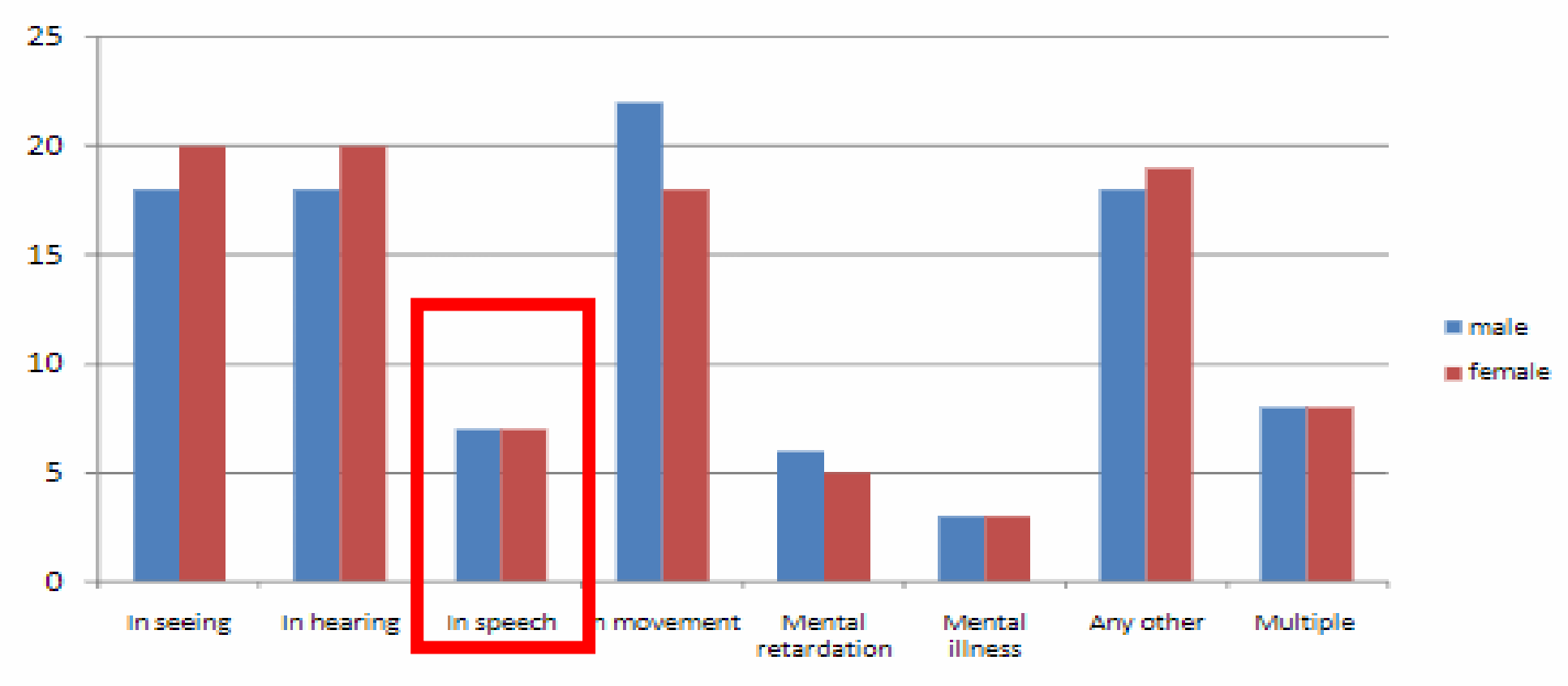
Statistics retrieved from United Nation Statistics Division



Disabled population by type of disability in India census 2011



Distribution disabled person by sex and by type of disability (%) in India Census 2011



Problem Statement

- Given a hand gesture, implementing such an application which detects pre-defined American sign language (ASL) in a real time through hand gestures and providing facility for the user to be able to store the result of the character detected in a txt file, also allowing such users to build their customized gesture so that the problems faced by persons who aren’t able to talk vocally can be accommodated with technological assistance and the barrier of expressing can be overshadowed.

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Practical Application and essence of this application

- Real time American standard character detection based on gesture made by user
- Customized gesture generation
- Forming a stream of sentences based on the gesture made after a certain interval of time.
- TTS assistance mechanisms concerning to the illiterate people.

- Technologies Used
- **Python 3.6.**
- **Tensorflow framework, Keras API**
- **Real-time computer vision using OpenCV**
- **Industrial standard GUI making application (PyQT5), Tkinter.**
- **Offline TTS assistance for python (pyttsx3 lib)**

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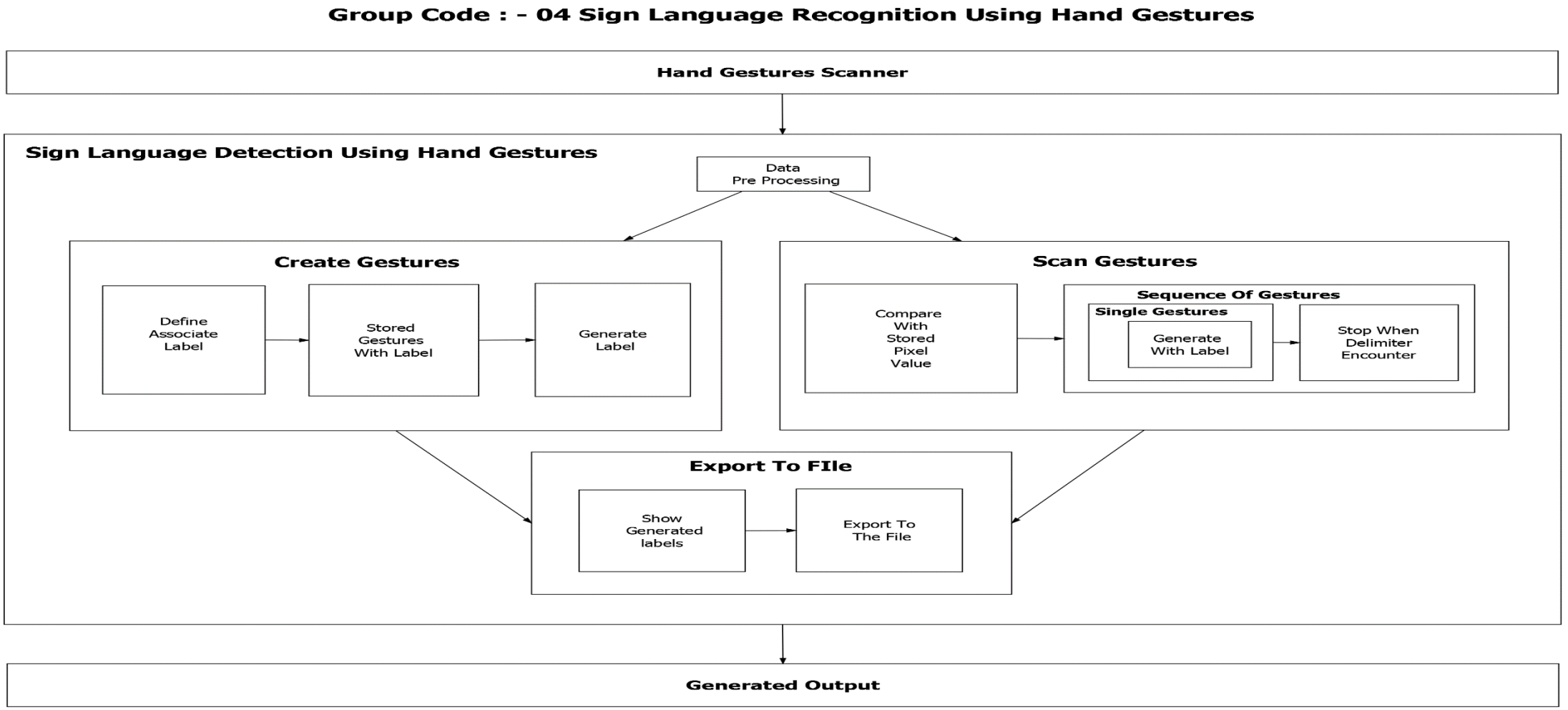
Working


Group Code : - 04 Sign Language Recognition Using Hand Gestures
Hand Gestures Scanner
Sign Language Detection Using Hand Gestures
Data
Pre Processing
Create Gestures
Define
Associate
Label
Stored
Gestures
With Label
Generate
Label
Scan Gestures
Compare
With
Stored
Pixel
Value
Sequence Of Gestures
Single Gestures
Generate
With Label
Stop When
Delimiter
Encounter
Export To FIle
Show
Generated
labels
Export To
The File
Generated Output

Core Modules

- Data Pre-Processing – In this module, based on the object detected in front of the camera its binary images is being populated.

- Scan Single Gesture –Based on Pre-Processed module output, a user shall be able to see associated label assigned for each hand gestures, based on the ASL.

Core Modules (Continue).

- Create gesture –A user will give a desired hand gesture as an input to the system with the text box available at the bottom of the screen where the user needs to type whatever he/she desires to associate that gesture with.

- Formation of sentence - scanned gesture character will be appended with the previous results forming a stream of meaning-full words and sentences.

- Exporting – A user would be able to export the results of the scanned character into an ASCII standard textual file format.

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Conclusion

- From this project/application we have tried to overshadow some of the major problems faced by the disabled persons in terms of talking. We found out the root cause of why they can’t express more freely. The result that we got was the other side of the audience are not able to interpret what these persons are trying to say or what is the message that they want to convey.

- Thereby this application serves the person who wants to learn and talk in sign languages. With this application a person will quickly adapt various gestures and their meaning as per ASL standards. They can quickly learn what alphabet is assigned to which gesture. Add-on to this custom gesture facility is also provided along with sentence formation. A user need not be a literate person if they know the action of the gesture, they can quickly form the gesture and appropriate assigned character will be shown onto the screen.

Future Scope

- It can be integrated with various search engines and texting application such as google, WhatsApp. So that even the illiterate people could be able to chat with other persons, or query something from web just with the help of gesture.

- This project is working on image currently, further development can lead to detecting the motion of video sequence and assigning it to a meaningful sentence with TTS assistance.

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References

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- https://www.quora.com/What-are-some-problems-faced-by-deaf-and-dumb-people-whileusing-todays-common-tech-like-phones-and-PCs
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