Team MPassion

Real time sign language to speech converter

Problem Statement

Enable better communication between people using sign language i.e. people with speaking & hearing disability and those who communicate via speech.

A lot of problems faced by people with auditory impairments are due to inability to communicate with people who don’t use sign language. While it may not be feasible to treat them medically, we think enabling a communication channel would alleviate their problems.

Overview of Problem

- Approximately **69 lakh** Indians suffer from hearing or speech disabilities. (Source: Census Report of 2011)
- There are just about 250 certified ISL(Indian Sign Language) interpreters in the country.
- NGOs, ISLRTC deaf communities are working towards increasing number of ISL interpreters and making ISL India's 23rd official language.

Overview of Problem (contd.)

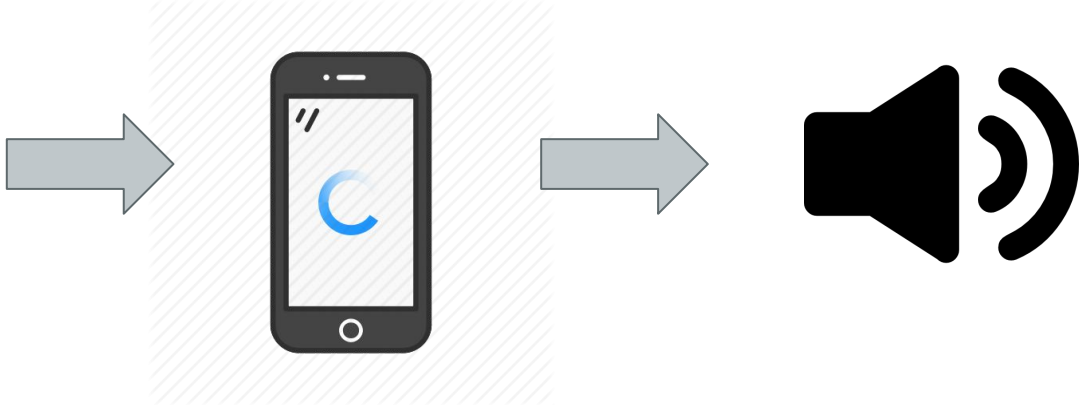
- The **Rights of Persons with Disabilities Act** prescribes provision of sign language interpreters at public facilities, services, schemes, and programs. There is no implementation till date.
- Children deprived from learning sign language and deaf children are forced to attempt speech which is very uncomfortable for them.

Problems faced due to communication barrier:

- Reliability on sign language interpreters who are very few in number
- Inaccessibility to information in public offices and private firms
- Inability to communicate with family: About 90% of deaf population has hearing parents and 88% of the parents don't know sign language
- Depression and anxiety due to social exclusion

Solution Proposed:

Real time sign language to speech converter app



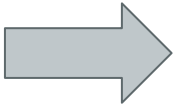
Impact of Solution:

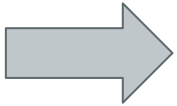
- Problem of lack of sign language interpreters would be solved to a great extent.
- Would improve job opportunities for the disabled.
- Would help mental health counsellors and doctors to treat ailments of people using sign language better.
- Would be used in public offices and private firms to effectively disseminate information and solve queries of people with auditory impairments.
- Sign language would be taught to more people with speaking and hearing disability thus enabling social inclusion and relieving them from the pressure to attempt speech.

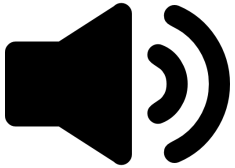
Future improvements and Additions

- Sentence level translation
- Integration in phone /video calling to enable long distance communication
- Speech to text/sign language integration

Technical Aspect of Proposed Solution







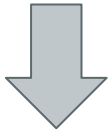


Image frames generated from live input video

Image pre-processed to be fed to neural network

CNN model with image augmentation

Predicted gesture output in form of text converted to audio

Dataset Used:

ASL BU Corpus dataset used for training.

Approximately 1500 images, 55/class.

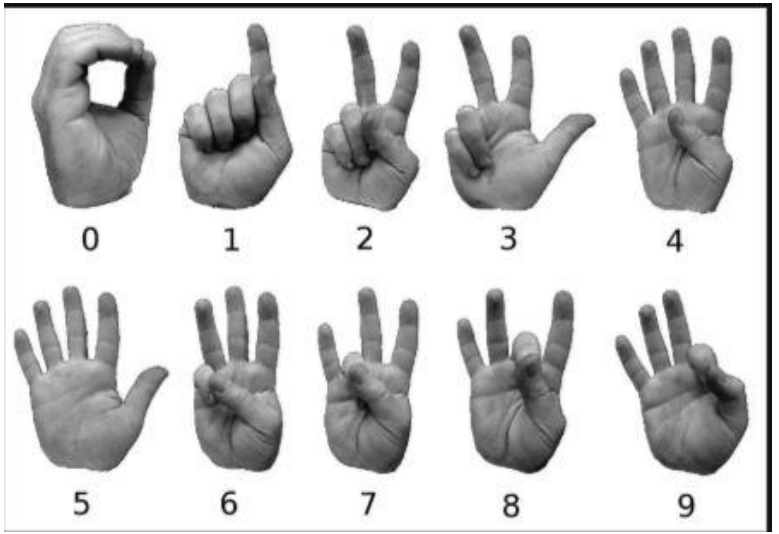
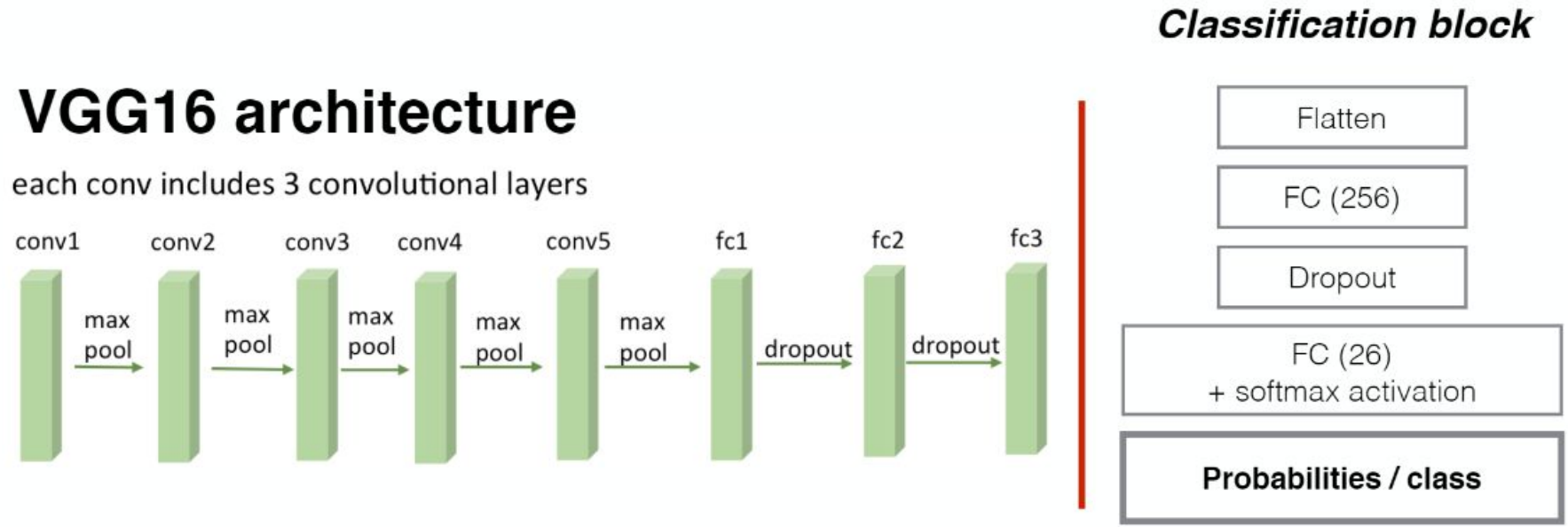


Image Pre-processing:

Image frames generated from live input video taken by phone camera are pre-processed before feeding into neural network.

- Background Subtraction
- Locate object (hand) specifically
- Padding image to square shape
- Resizing image to feed into neural network

Neural Network Architecture



Neural Network Architecture (contd.)

- Used transfer learning model
- Convolutional base (frozen layers) of VGG16 network for feature extraction.
- Classification block containing fully connected layer and softmax activated layer
- Model trained using images from dataset and augmented data from image data generator

Market Analysis

We plan to make the app available on PlayStore and introduce it in:

- Government Offices
- International and National transport stations
- NGOs
- 400+ schools for specially abled
- 134 AAI Airports in India

The proposed solution involves development and deployment costs which can be recovered through low price subscription plans or with monetary support from government.

Thank You!

Please reach out to us if you have any queries.

Contact: agr.prachi22@gmail.com
+91 8769782883