Indian Sign Language Recognition Using Deep Learning.

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I.   Introduction

Humans have many different ways to communicate with each other like, by verbally speaking in different regional language or by expression and many more. Sign Language is specifically focused towards Deaf and Dumb People. It's the language they use to communicate with each other and others who know SL(Sign Language). Sign Languages are gestural languages which contain symbolic encoded message for communication without speech channel. They are unique in some ways in that they cannot be written like spoken language. Sign language varies from country to country with its own vocabulary and grammar like American Sign Language(ASL) , French Sign Language(FSL) ,Indian Sign Language and many more depending upon the region. Indian Sign Language (ISL) is a language used by Indian deaf and dumb community.

In India the count of hearing impaired people, is more compared to other countries. Not all of them use ISL but, more than one million deaf adults and around half million deaf children use ISL as a mode of communication. But as per our research, Among all the sign languages , ASL is the one in which most research has been done and there hasn't been significant amount of research done on ISL.

So our attempt is to overcome the communication barrier in such a way that it may help normal people and speech and hearing impaired people to communicate with each other effectively

II.   Tools and Tech.

Computer Vision is one of the emerging field of Computer Science that focuses on replicating the human eye. It enables the computer to understand and identify

the content of image or video frame in the same way that humans do. Open CV is the Open source Computer vision Library.
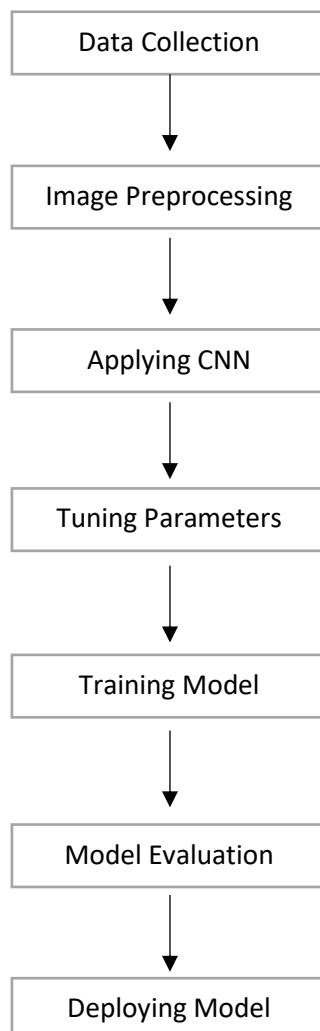
Deep Learning is the Subset of Machine Learning that teaches the computer to do what comes naturally to humans by processing data and creating patterns for use in decision making. Deep Learning consist of Neural Networks that are used to mimic the human brain. Convolution Neural Network is used to visualize the data from images and videos.

Language: Python

Packages used:-

- OpenCV
- TensorFlow
- Keras (included in Tensorflow version >2.0)
- OS

III. <u>Project Flow</u>

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┌─────────────────────┐
│   Data Collection   │
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┌─────────────────────┐
│  Image Preprocessing │
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┌─────────────────────┐
│    Applying CNN     │
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           ▼
┌─────────────────────┐
│  Tuning Parameters  │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│   Training Model    │
└─────────────────────┘
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┌─────────────────────┐
│  Model Evaluation   │
└─────────────────────┘
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┌─────────────────────┐
│   Deploying Model   │
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IV. Conclusion & Future Work

❖ At present the training is done on smaller dataset and thus the model is not that accurate, We assume that training the model on larger dataset and applying additional layers will increase accuracy.

❖ As our model is trained on digit's data (Numbers), our goal is to train on alphabetical data.

❖ As this dataset is custom made, the number of images are not enough to gain more accuracy so we will try to increase number of images as well as accuracy at different angles.