

# Electronics Department I.E.T Lucknow

Final Year Major Project



Project  
Topic

Block  
diagram

Conclusion

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# Sign Language Recognition Using F-R CNN and Text Conversion

## Problem Statement

- Understanding the exact context of symbolic expressions of deaf and dumb people is a challenging job in real life and requires expert knowledge of sign language to be able to communicate/ understand people using these forms of expression.
- Sign language is learned by deaf and dumb, and usually it is not known to normal people, so it becomes a challenge for communication between a normal and hearing impaired person.

Introduction

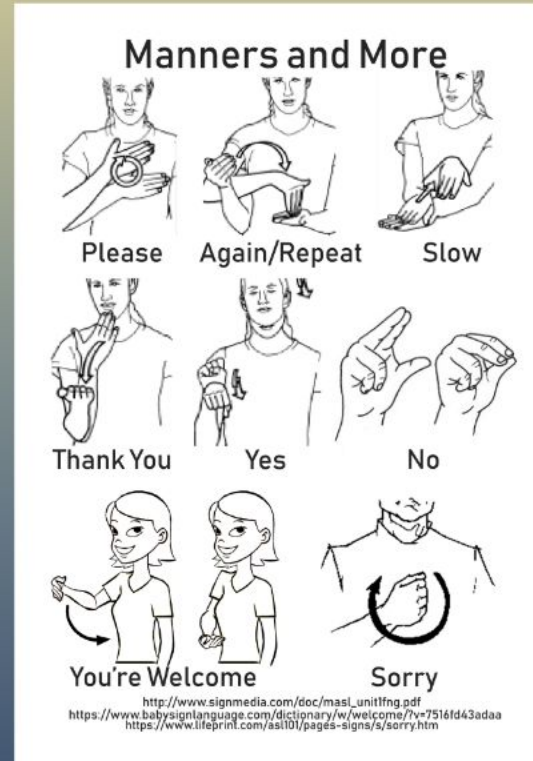
Sign  
Language

Working

Application

# Introduction

- In this project, we identify the sign language gesture using Image recognition, which further trains the model using Faster Region based CNN for better accuracy. Thus, each trained gesture will be classified accordingly helping the user to translate sign language in real time.
- The recognized sign is thus converted to equivalent text and displayed on a LED screen for better comprehension.



## Basic Sign Language



# Working of the R CNN algorithm

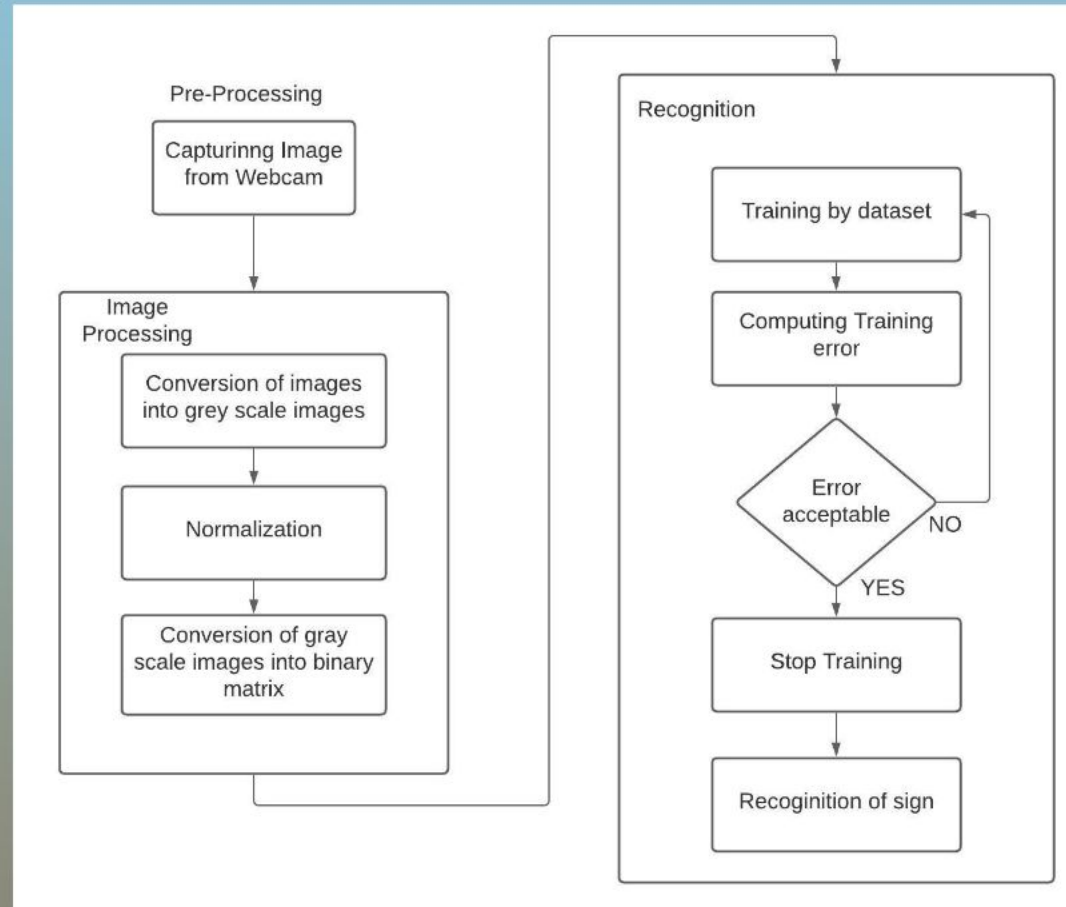
- The working will need 4 basic steps. These are- loading the data set, the design of the convolution neural network, training of the Faster R-CNN object detector, and finally evaluation of trained detector to get the efficiency
- Once the ROI ( that is the hand) is detected, the type and size of input layer is defined. Next, the middle layer of the network should be defined. The medium layer that will be created here will be made of repeating blocks of convolutional, rectified linear units and pool layers. Finally, a final layer consisting of fully connected layers will be created. Next, the design of the CNN is completed by combining the input, middle and final layers. The next stages will be configuration of training options followed by final training of fast R-CNN detector.

# Applications

The software will have immense real life application in assisting communication with speech impaired people. Some of them are-

- In helping the deaf-dumb community via Web/App based model, which will bridge the gap of communication between normal and differently-abled people. This has wide applications in communication at various public places.
- Creating real time translation tools that will translate the expression and gestures simultaneously as the person performs them, thus opening many new domains for speech impaired people.

# Workflow

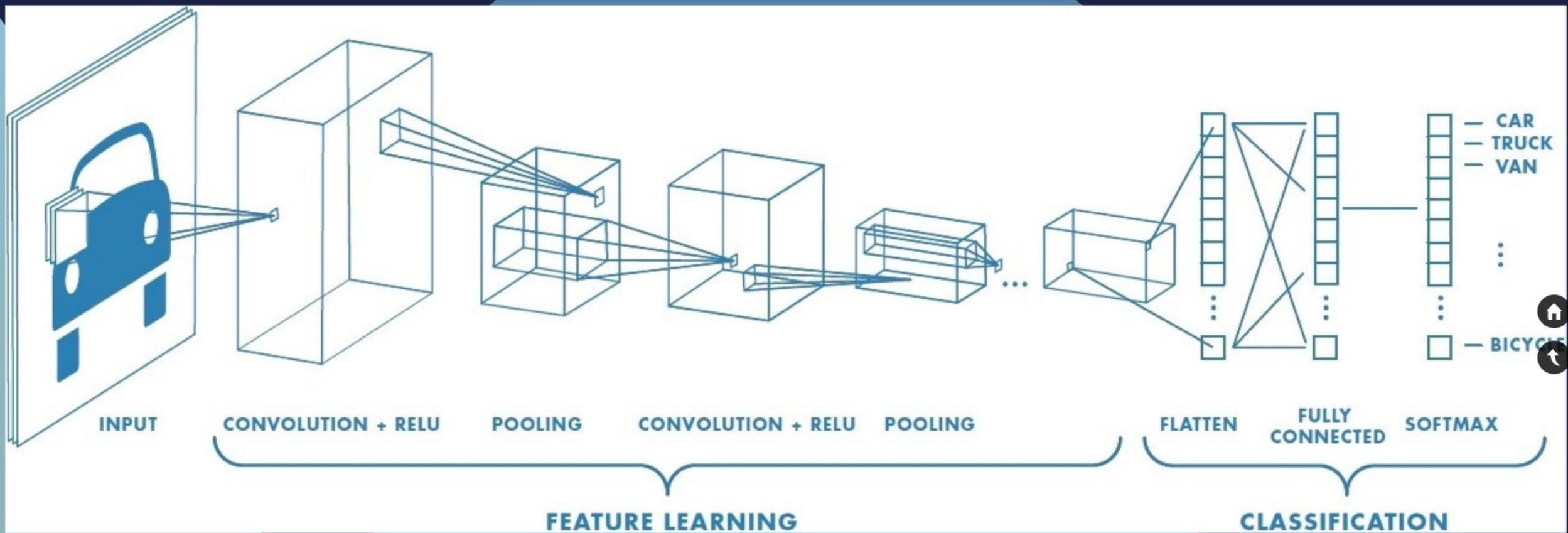


CNN

Tools



Prezi



Neural network with many  
convolutional layers



# Hardware

- Arduino UNO
- ESP 32 WiFi Camera Module
- 2.4 inch TFT Display
- DC power supply

# Software

- TensorFlow
- OpenCV 3.x
- Python
- Arduino IDE



# Data Set

- Kaggle MNSIT
- BoltOn ASL LVD
- MRD Gesture 3D



# Conclusion

- In this project, we proposed an idea for feasible communication between hearing impaired and normal person with the help of deep learning and machine learning approach.
- There is ever the sounding challenge to develop a sign language system in which data the collection remains invariant of the constraint environment

Future  
Work

Reference

Thank you



# Future Work

- This model can be implemented on mobile app using app development as a portable sign to text converter device analogous to google translate.
- Sign Language can be used as a gesture for smart home system.

# References

- [1] EA Kalsh, NS Garewal Sign Language Recognition System International Journal of Computational Engineering Research, 03 (6) (2013), pp. 15-21
- [2] ER.Kanika Goyal, Amitoj Singh Indian Sign Language Recognition System for Deaf People. Journal on Today's Ideas - Tomorrow's Technologies, 2 (2) (2014 December)
- [3]A Krizhevsky, I Skutskever, GE Hinton ImageNet Classification with Deep Convolutional Neural Networks Advances In Neural Information Processing Systems. (2012), pp. 1-9

Thank You

Any Questions?