




INDIAN SIGN LANGUAGE RECOGNITION USING COMPUTER VISION AND CONVOLUTIONAL NEURAL NETWORK

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OUTLINE

- PROBLEM STATEMENT
- INTRODUCTION
- USE CASE DIAGRAM
- SOFTWARE
- METHODOLOGY
- CNN MODULE
- WIRE FRAME
- RESULT
- CONCLUSION
- FUTURE SCOPE

P R O B L E M S T A T E M E N T

- Inorder to convey feelings or information within the hearing impaired community.
- Aims to create a computer application and train a model which when shown a real time video of hand gestures of Indian Sign Language shows the output for that particular sign in text format on the screen.
- For static isolated two-handed signs using Python platform and CNN

I N T R O D U C T I O N

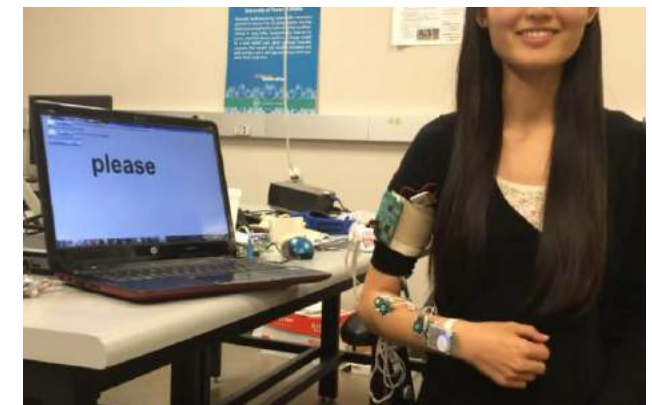
- Indian Sign Language system contains standard hand-based gestures used by speech impaired people for communication purposes in India.
- Sign Language Recognition (SLR) - Developing algorithms and techniques to correctly recognize a sequence of produced signs and understand their meaning.



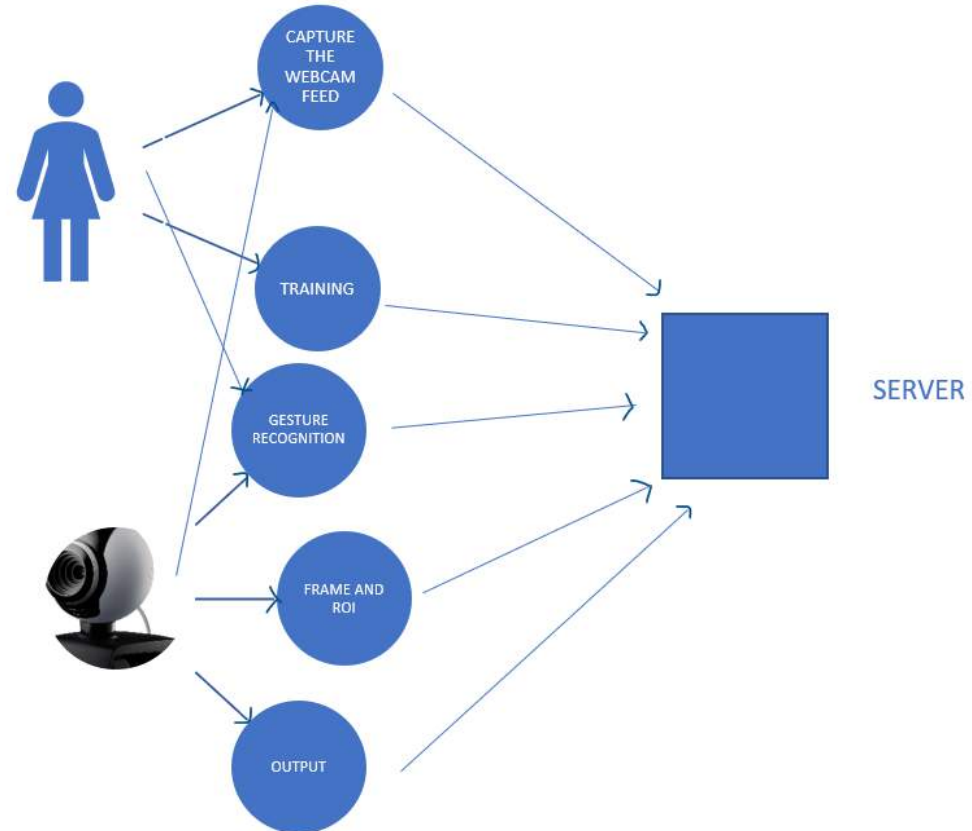
Fig. 1: ISL Alphabets



- A hybrid research area involving pattern recognition, natural language processing, computer vision and linguistics.
- Used as an interface between human being and computer systems.
- Convolutional Neural Network (CNN) - A type of neural network with a unique architecture applied for deep learning. CNN can directly learn the image, good for recognition of results and can be easily re-trained for new recognition purposes.
- 2 approaches
 - i. Computer vision based method
 - ii. Sensor-based technique



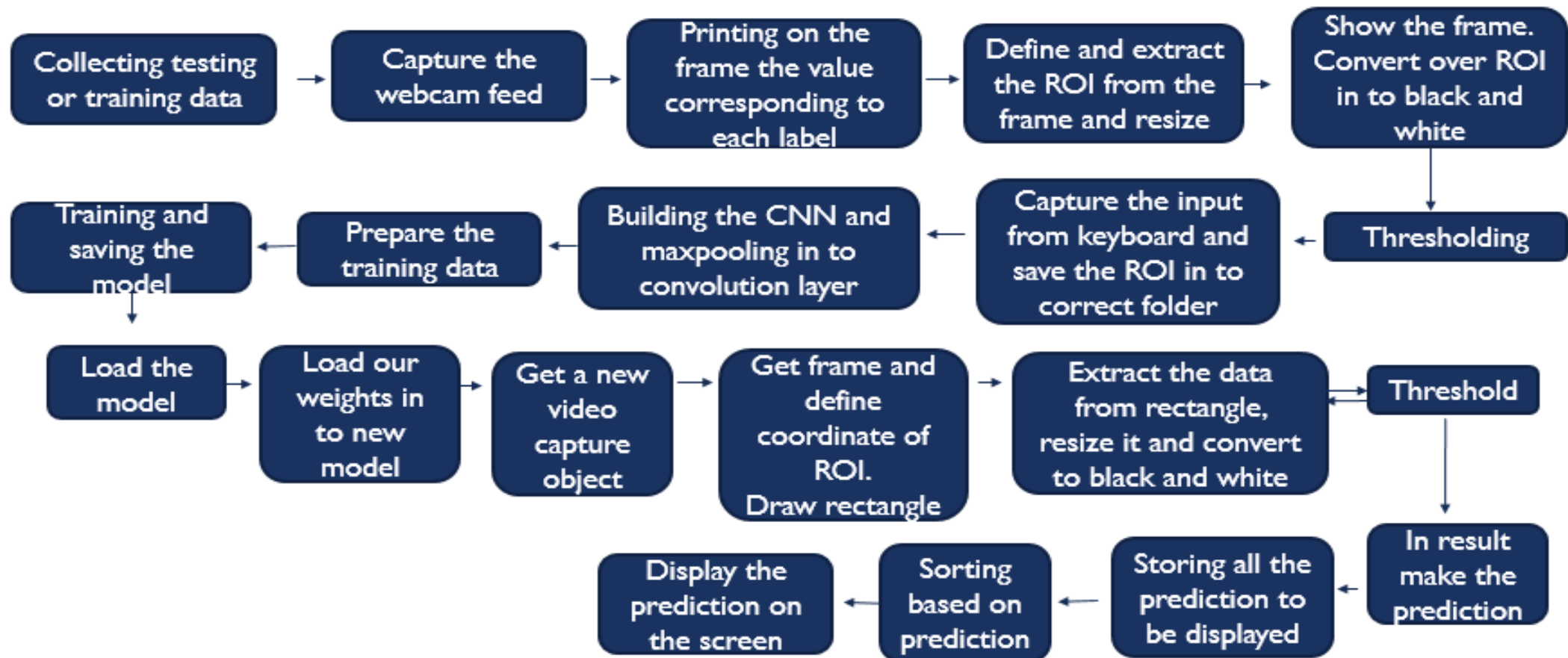
USE CASE DIAGRAM



S O F T W A R E

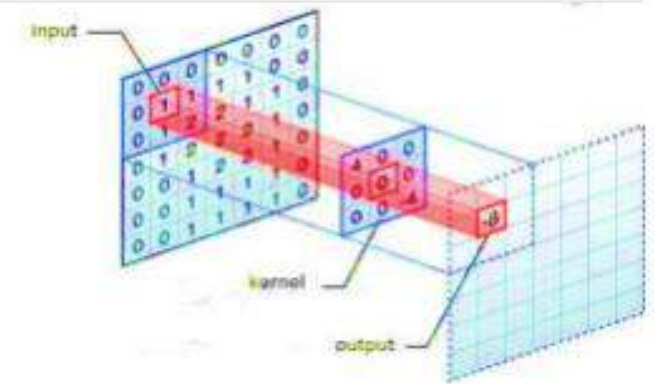
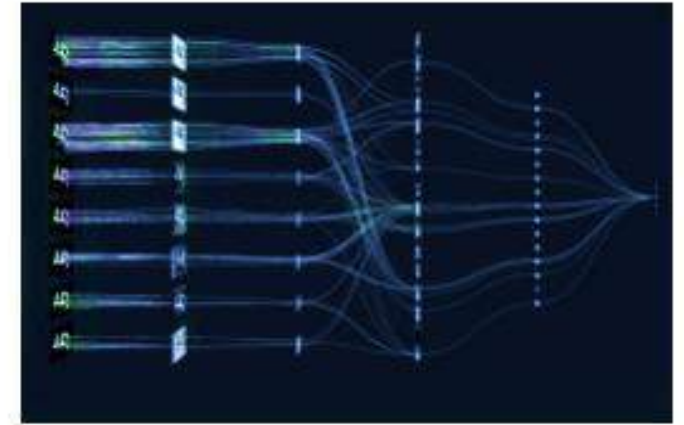
- Python 3.6.6
- OpenCV 3.4.3.18
- TensorFlow 1.11.0
- NumPy 1.15.3
- Matplotlib 3.0.0
- Keras 2.2.1

M E T H O D O L O G Y



CONVOLUTIONAL NEURAL NETWORK (CNN OR CONVNET)

- A class of deep neural network most commonly applied to analysing visual imagery in deep learning.
- Very effective in areas such as image recognition and classification.
- Compares the images piece by piece.
- Four main operations
 - i. Convolution layer
 - ii. Non-Linearity ReLU layer
 - iii. Pooling or Sub Sampling
 - iv. Fully Connected Layer



WIRE FRAME

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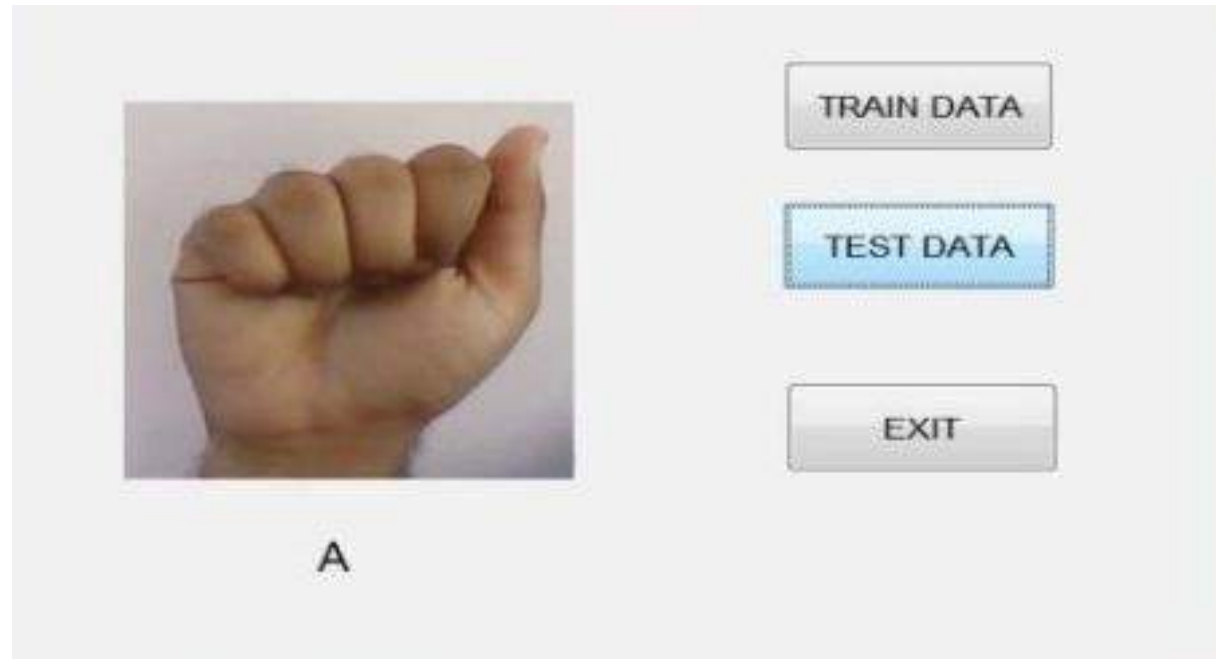
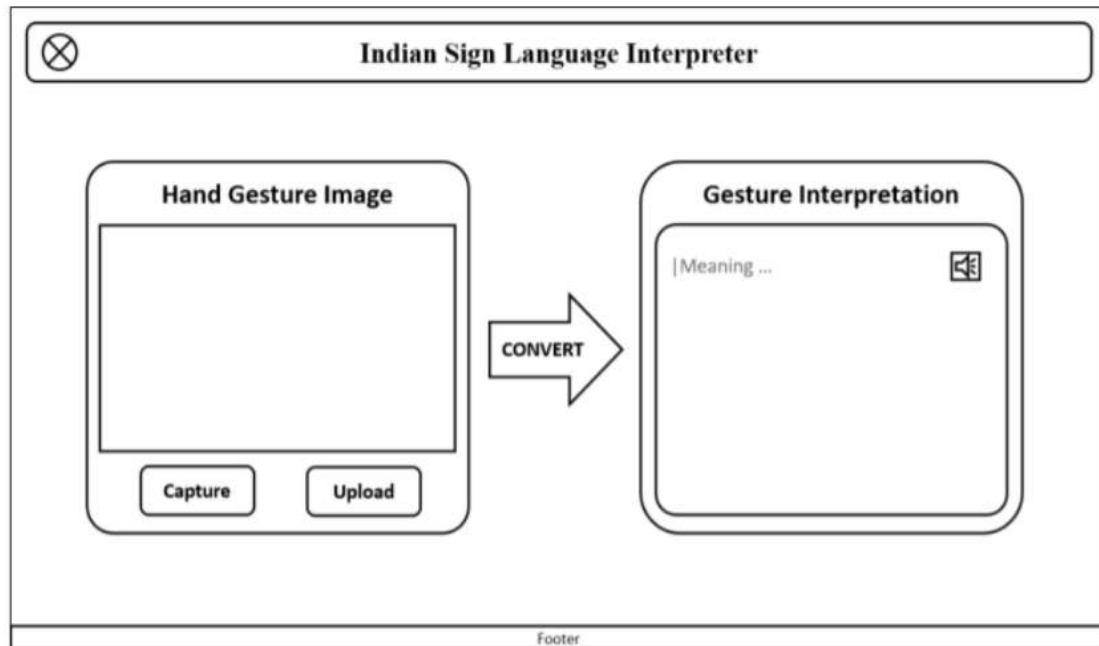
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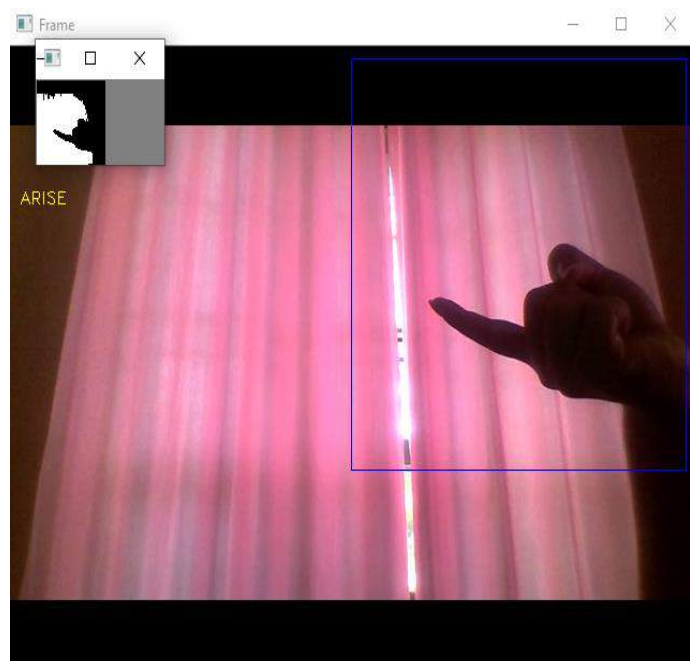
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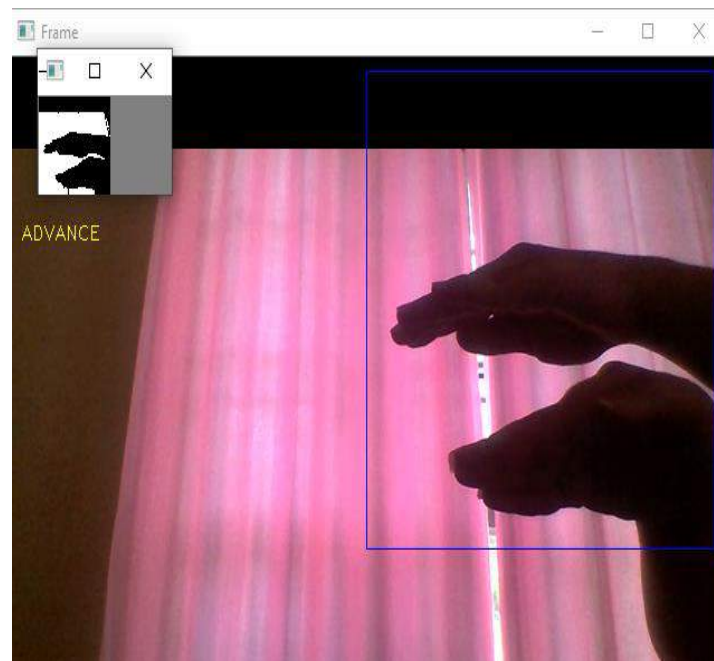
WIRE FRAME



R E S U L T



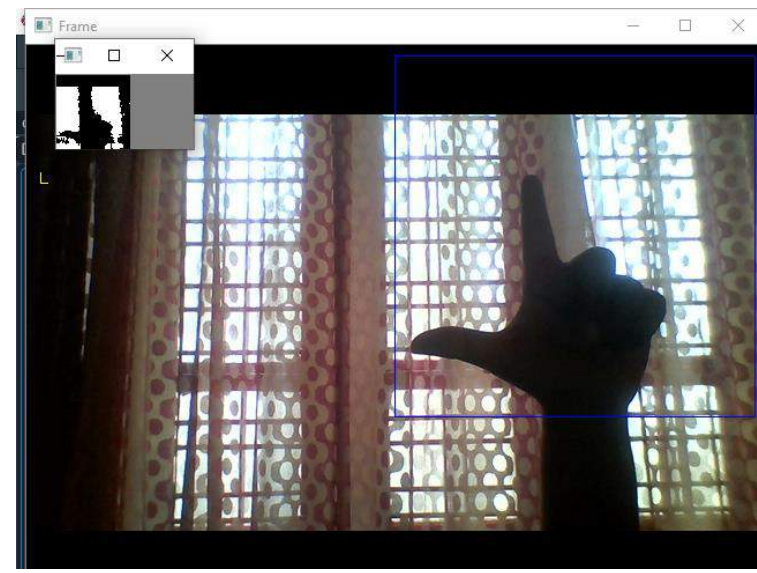
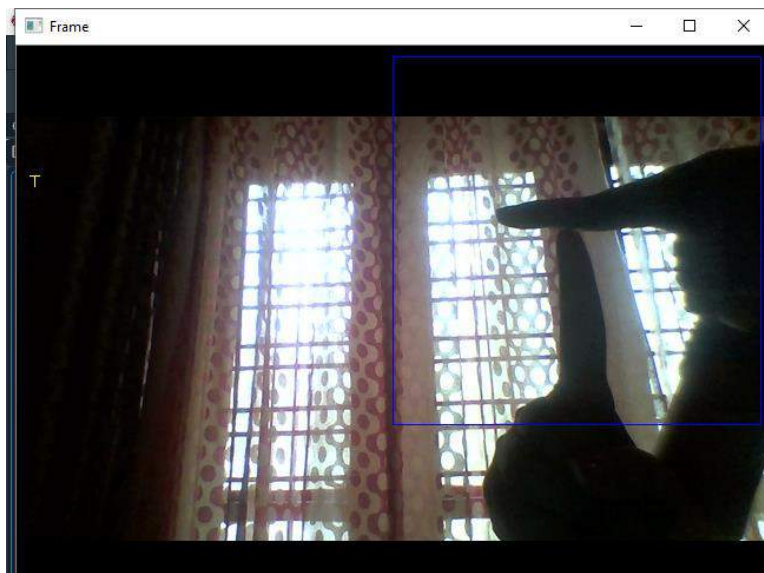
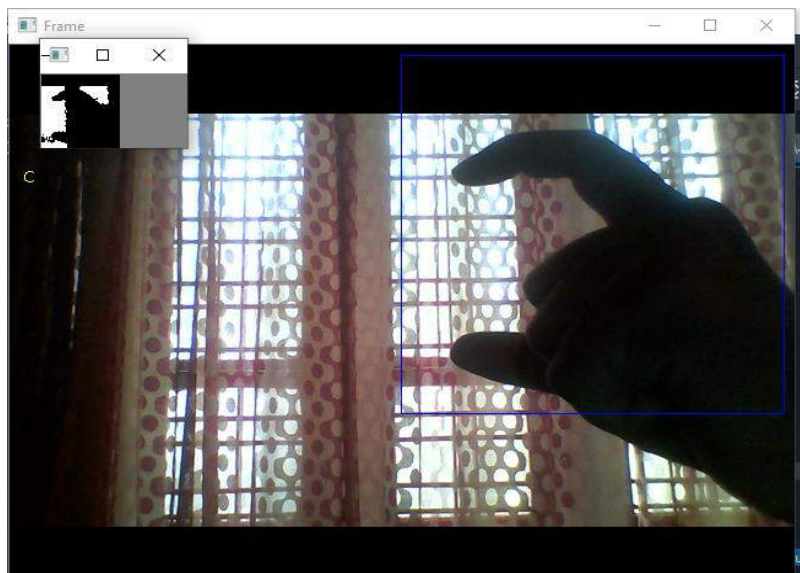
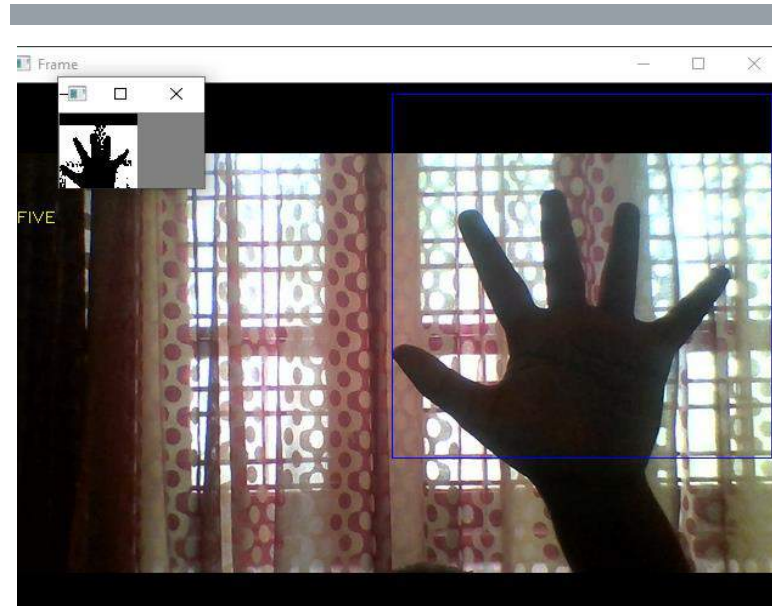
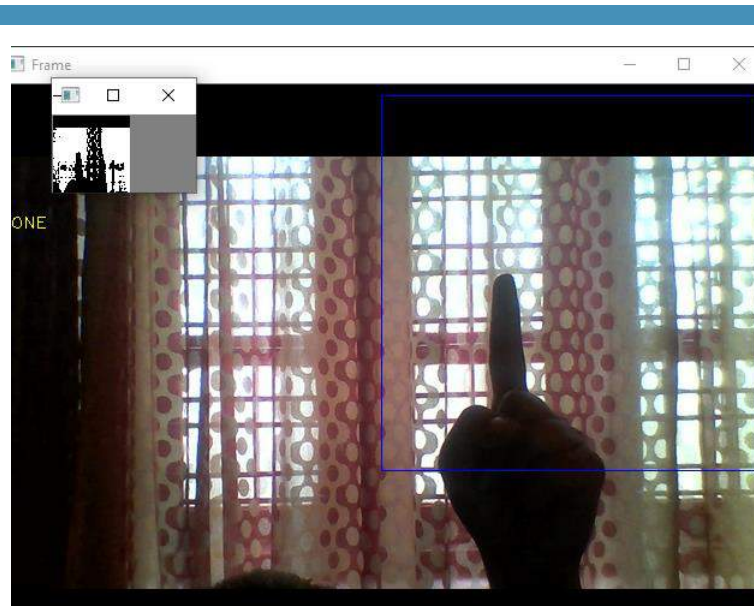
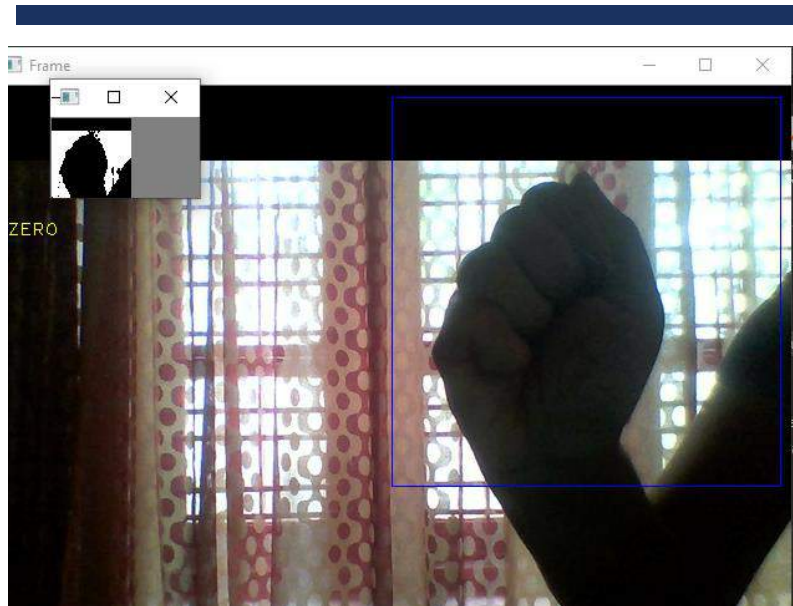
ARISE



ADVANCE



BRING



C O N C L U S I O N

- A functional real time vision based Indian sign language recognition for Deaf and mute people have been developed.
- This work with convolutional neural networks helps to accurately recognize different signs.
- Alphabets, numbers and words – advance, arise, bring were recognized.

FUTURE SCOPE

- More words and gestures.
- Dynamic recognition of gestures using advanced 3-D imaging camera.
- Audio output also.



THANK YOU

