

# Sign Language Detection

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# Overview

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# Quick Recap



- We have used Deep Neural Network architectures and Transfer Learning.
- In the preliminary experimental results we achieved an accuracy of **98.45%** in 38 epochs for the Deep Neural Networks.
- For the Transfer Learning approach, we were successfully able to detect 5 words in real-time.

# Experimental Results - Transfer Learning

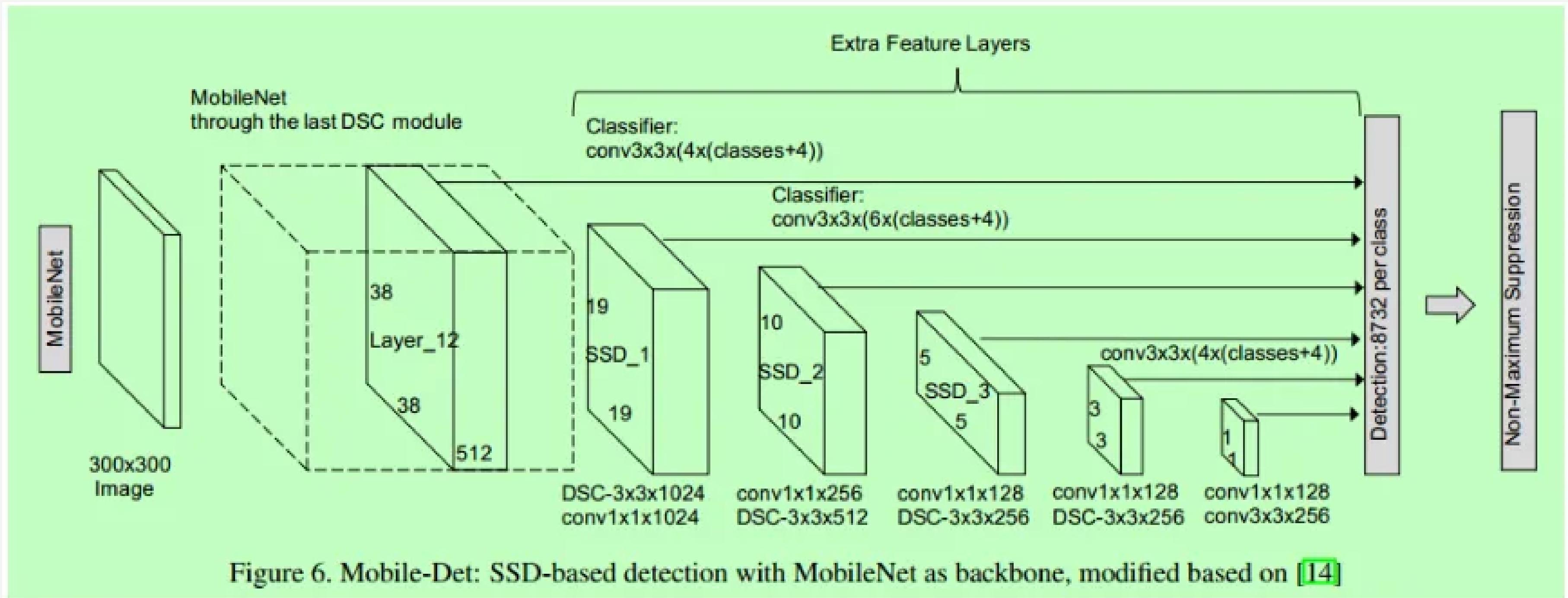
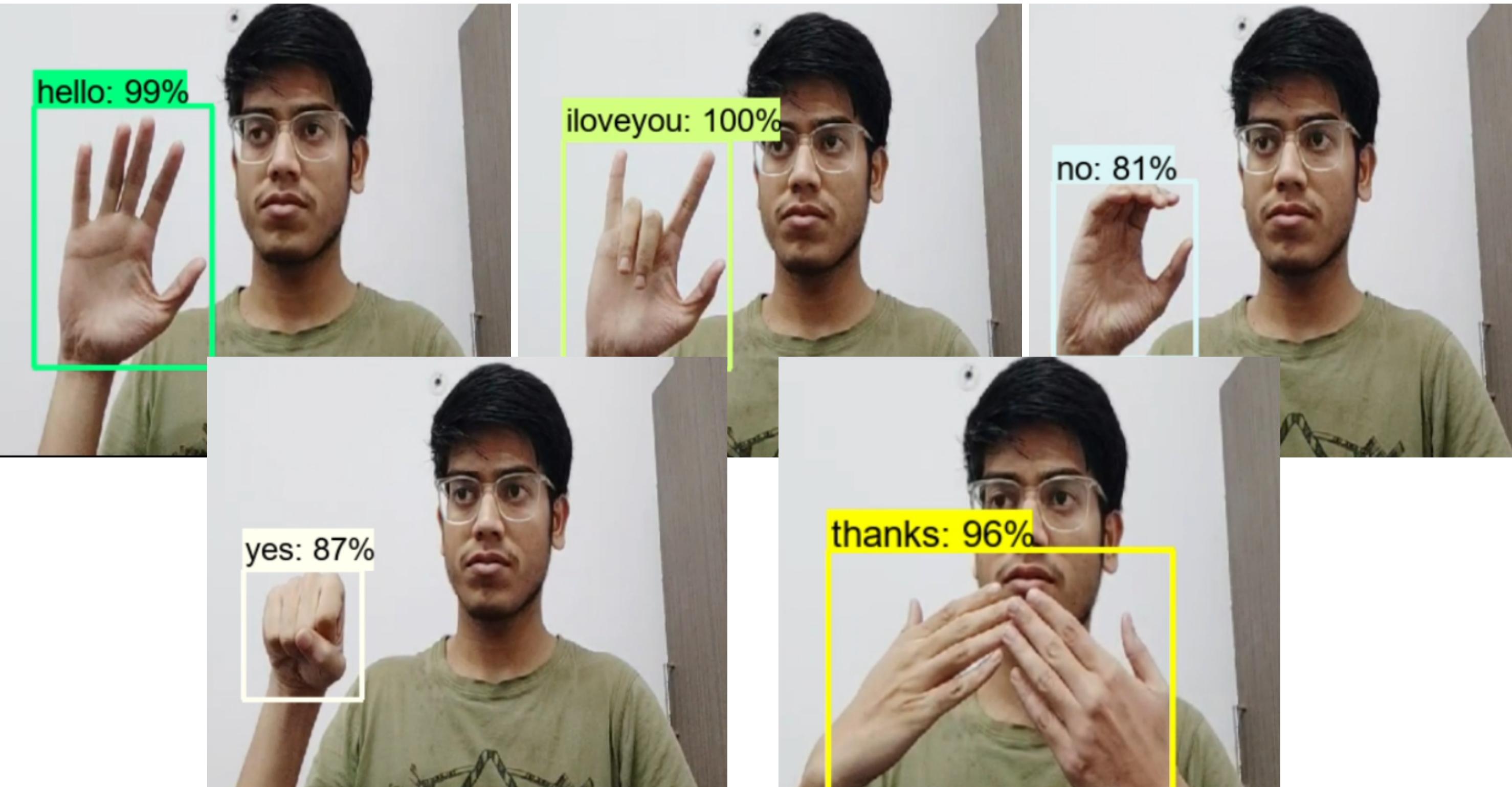


Figure 6. Mobile-Det: SSD-based detection with MobileNet as backbone, modified based on [14]

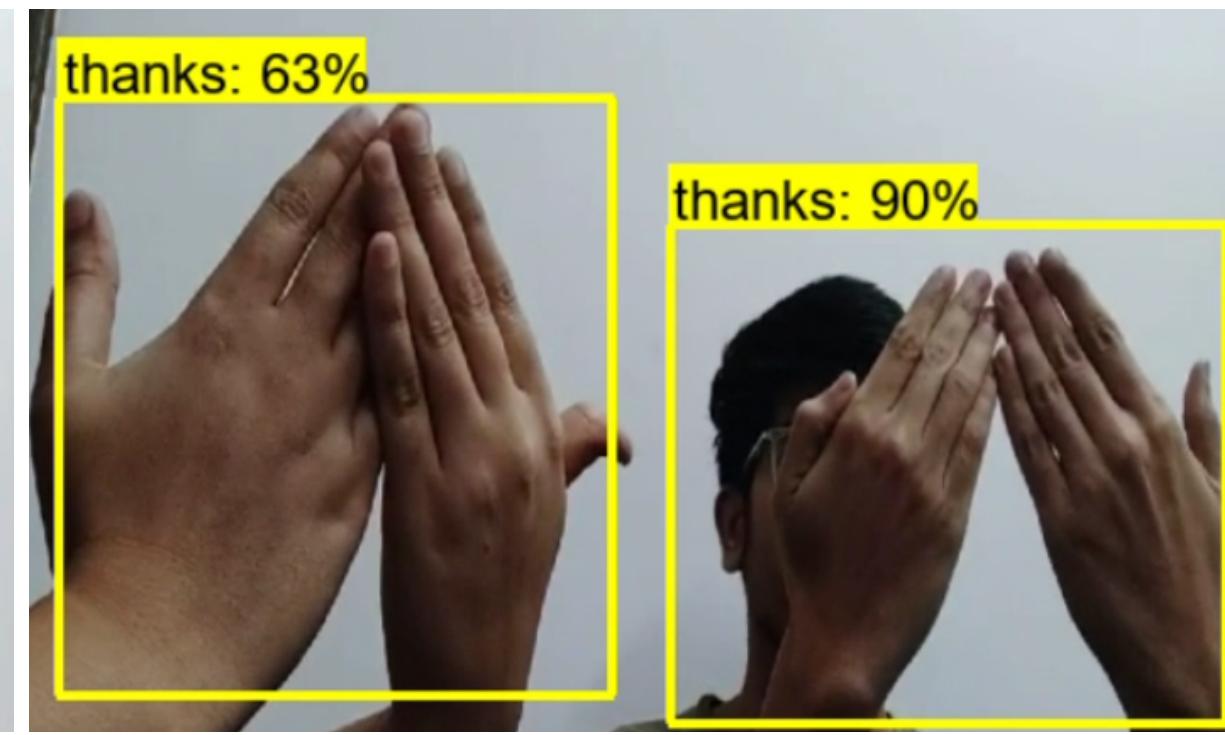
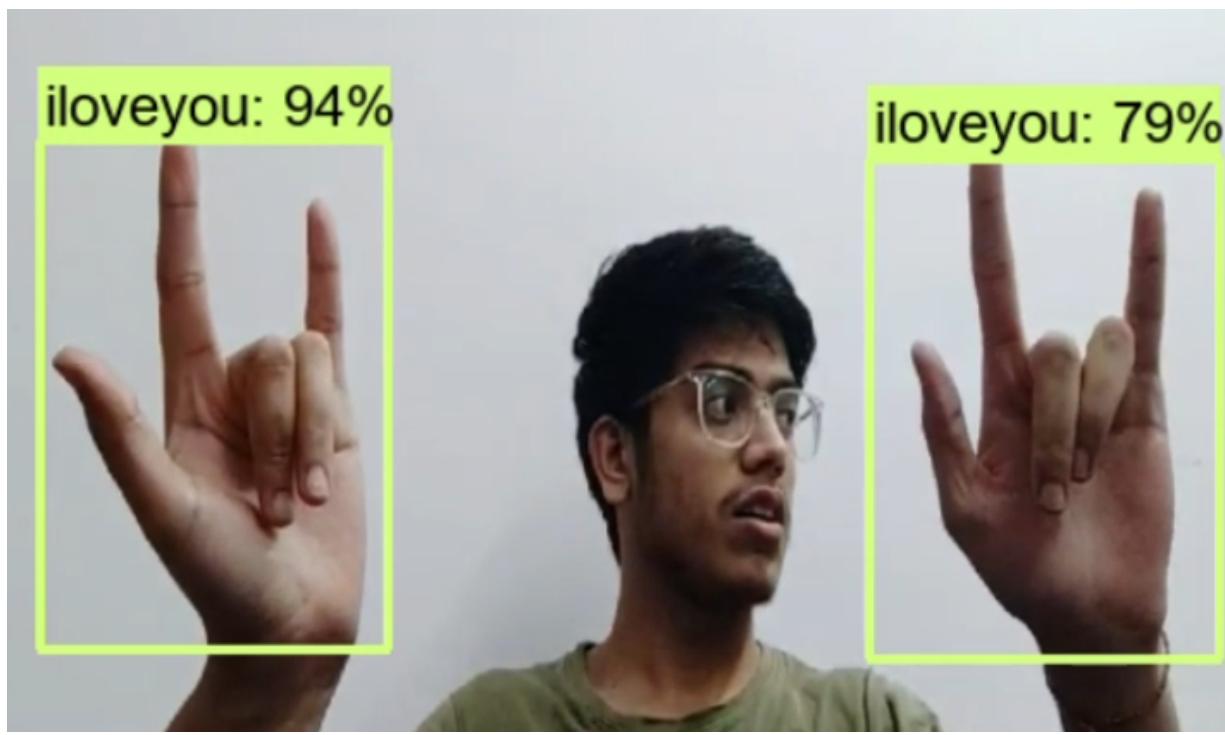
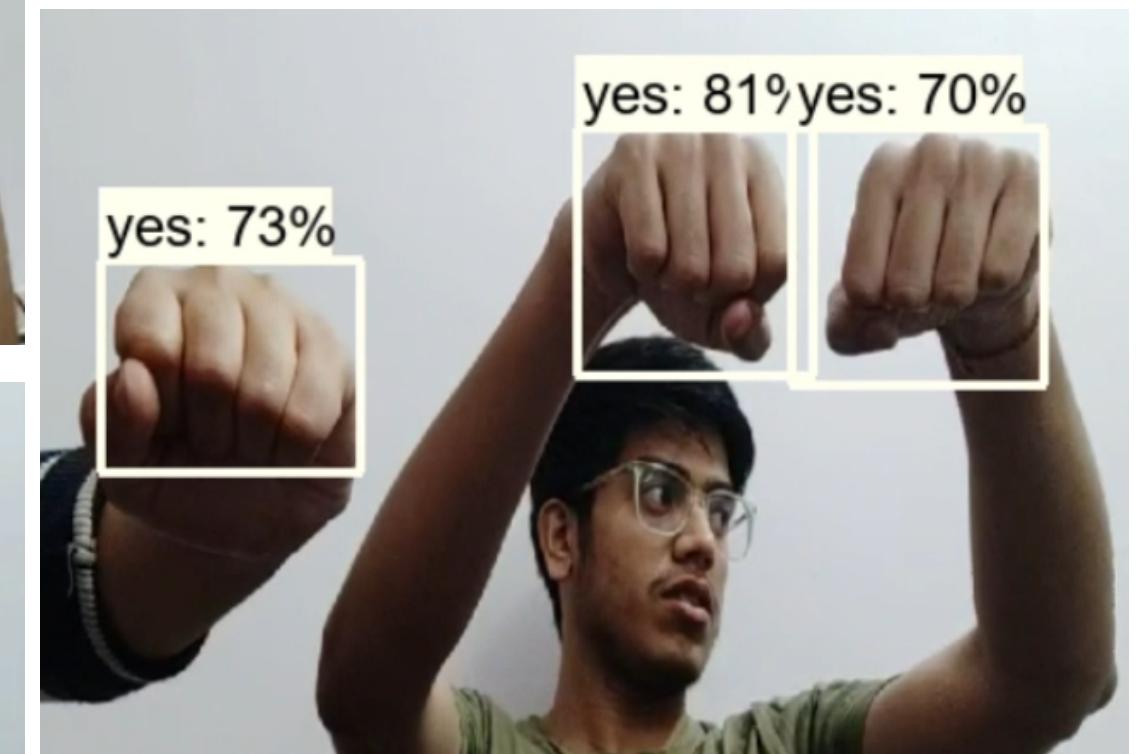
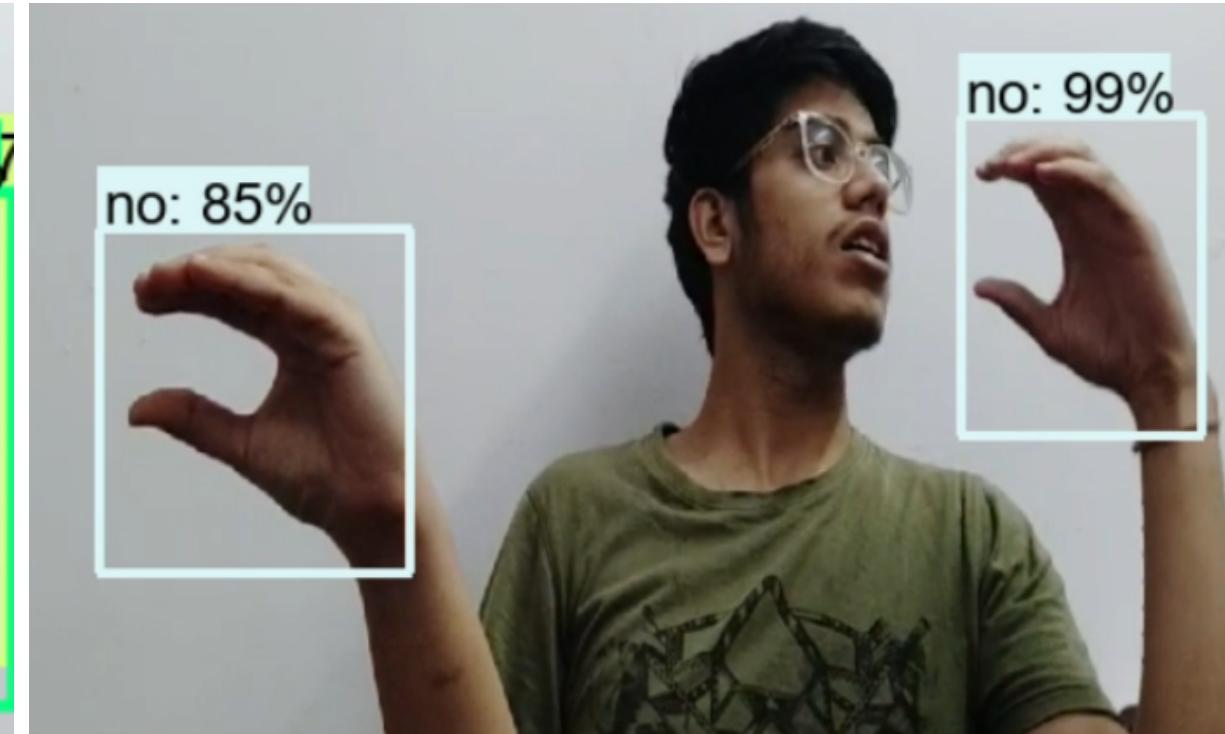
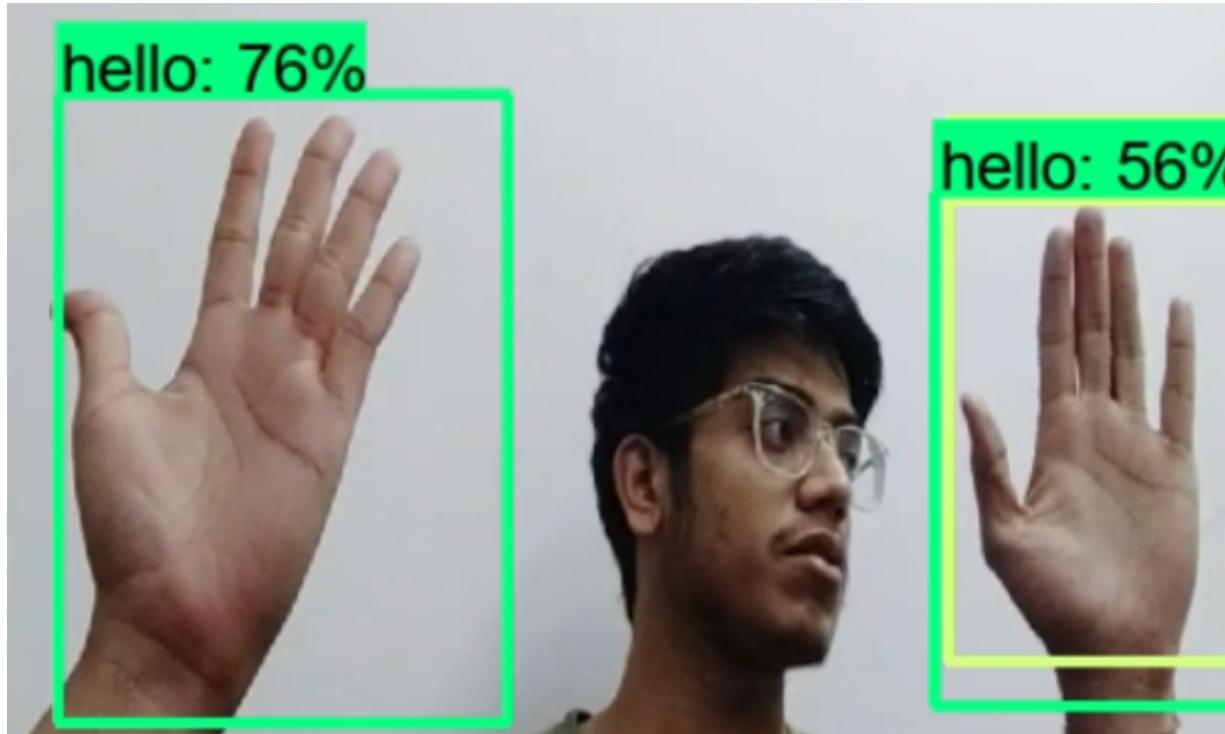
# Seen Data



# Unseen Data



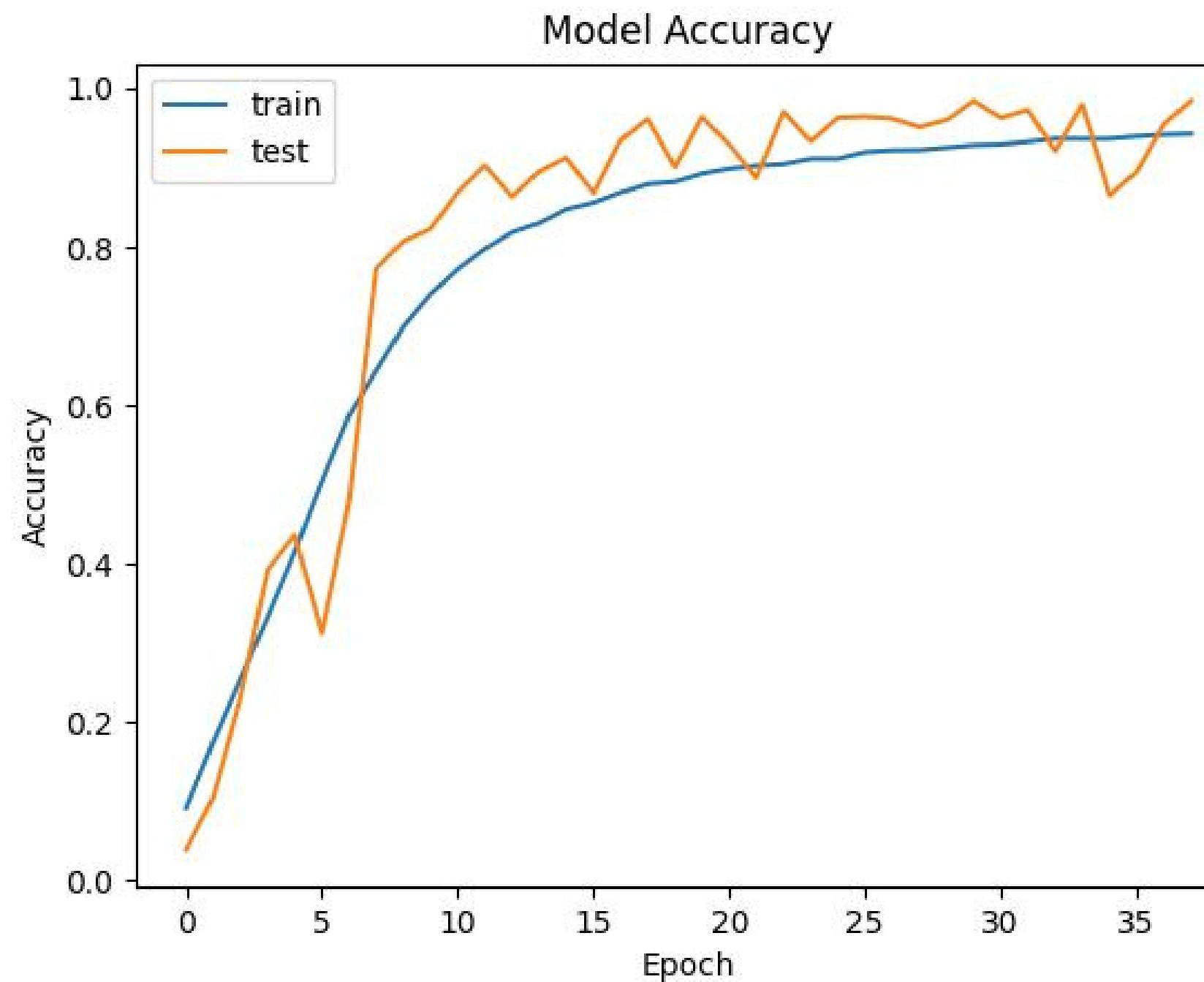
# Seen + Unseen Data



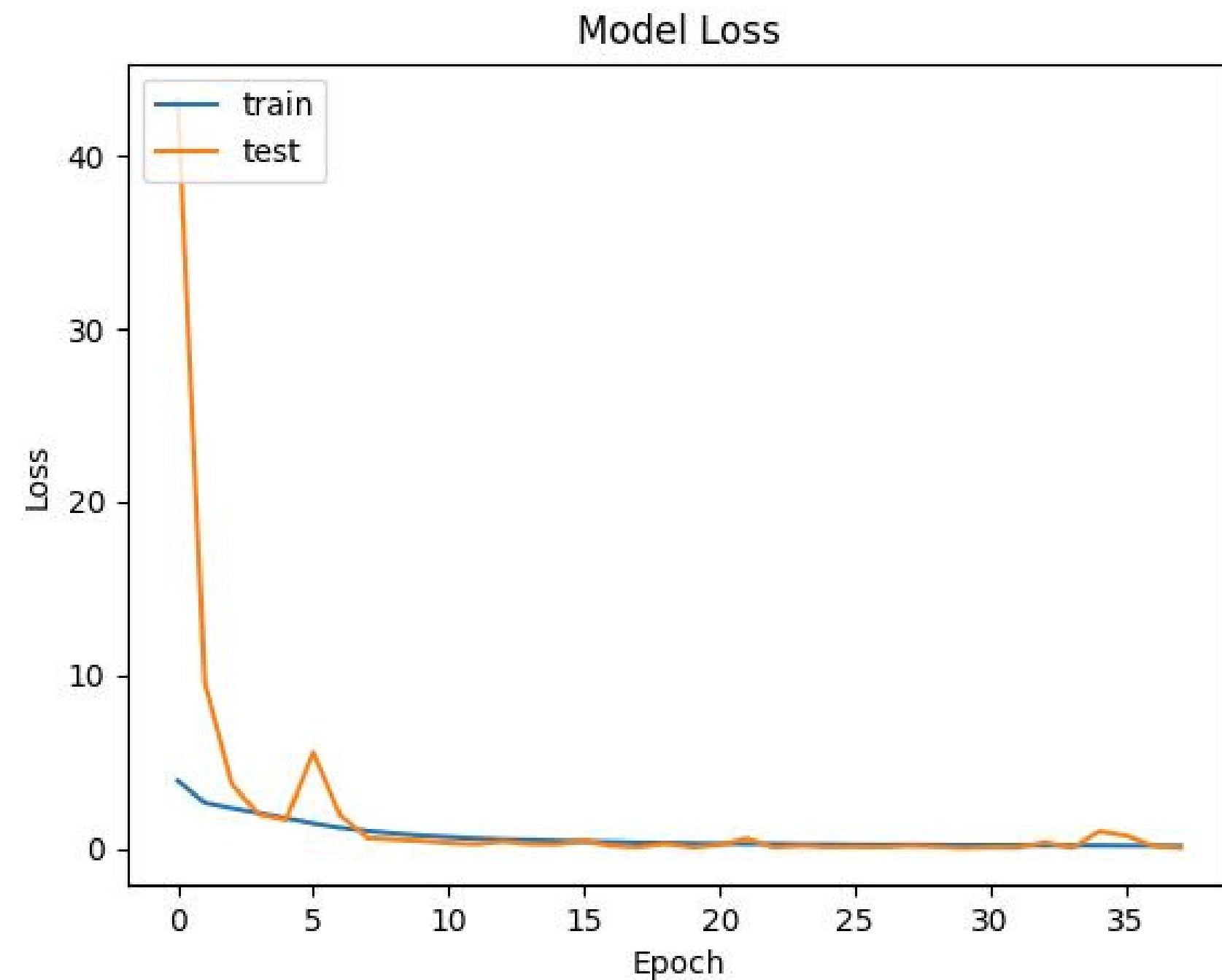
# Drawbacks

1. Could'nt detect Signs with other backgrounds except White.
2. Sometimes Confuses among 2 Signs.
3. Sometimes merges the result of two into one.
4. Is space to improve the Confidence/ Accuracy.

# Experimental Results - CNNs

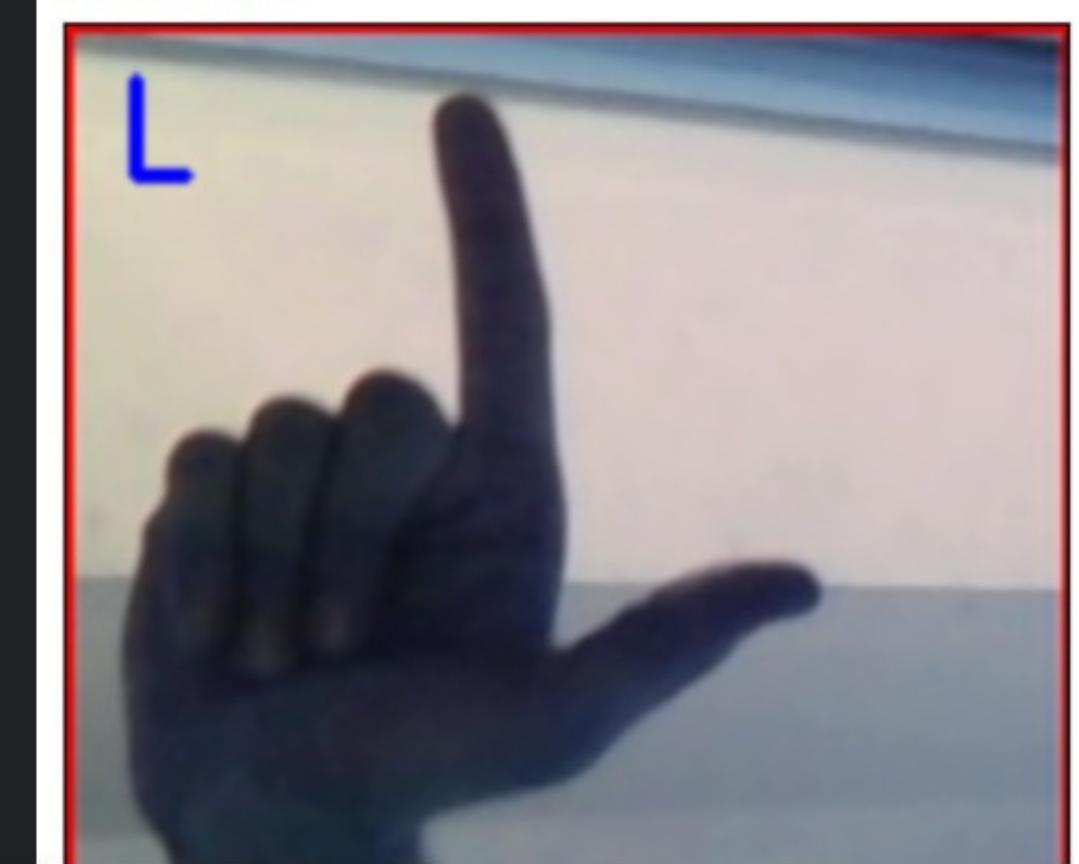


# Experimental Results - CNNs



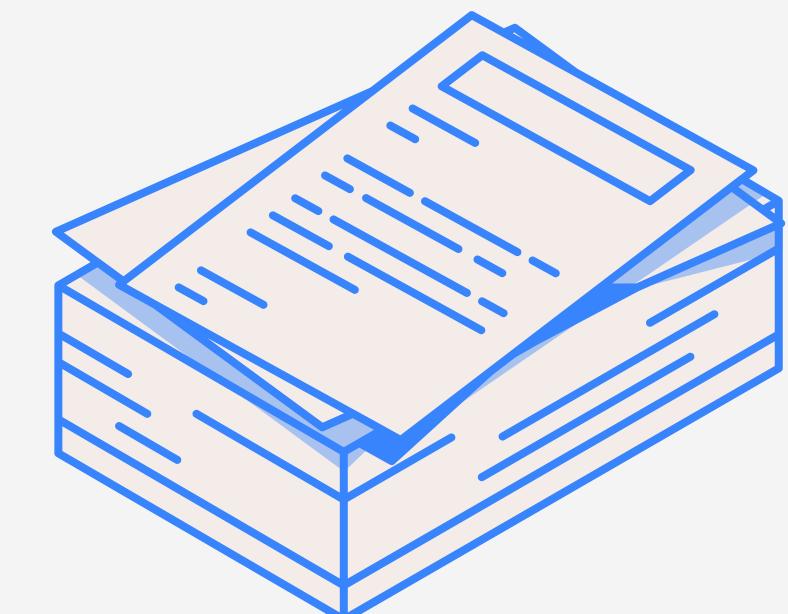
# Experimental Results - CNNs

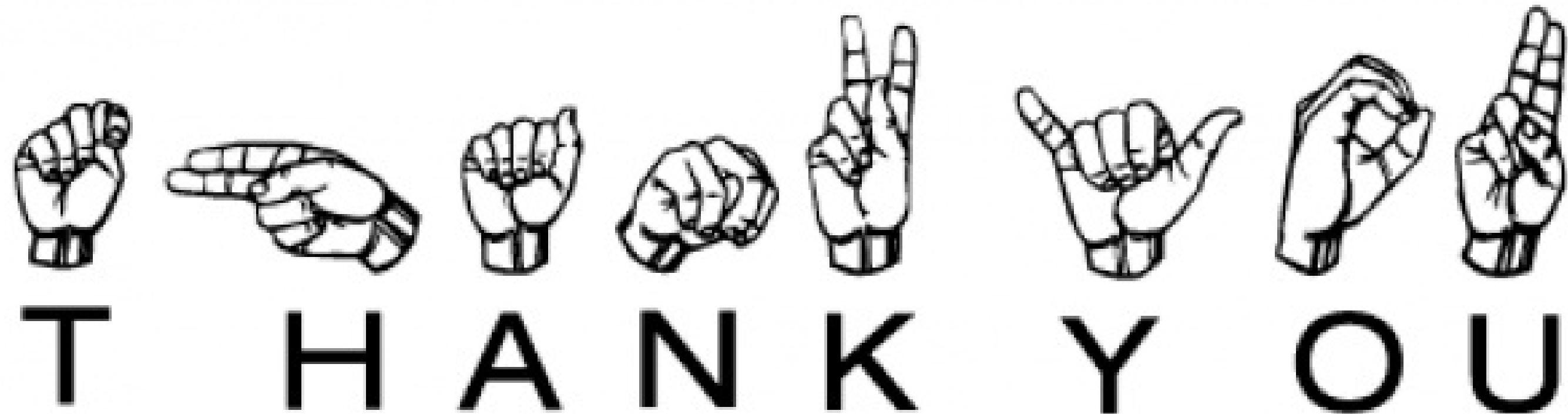
```
Enter the path of test image : /kaggle/input/asl-alphabet/asl_alphabet_test/asl_alphabet_test/L_test.jpg
CustomCNN(
    (conv1): Conv2d(3, 16, kernel_size=(5, 5), stride=(1, 1))
    (conv2): Conv2d(16, 32, kernel_size=(5, 5), stride=(1, 1))
    (conv3): Conv2d(32, 64, kernel_size=(3, 3), stride=(1, 1))
    (conv4): Conv2d(64, 128, kernel_size=(5, 5), stride=(1, 1))
    (fc1): Linear(in_features=128, out_features=256, bias=True)
    (fc2): Linear(in_features=256, out_features=29, bias=True)
    (pool): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
)
Model loaded
torch.Size([1, 3, 224, 224])
PREDS tensor([11])
Predicted output: L
0.014 seconds
```



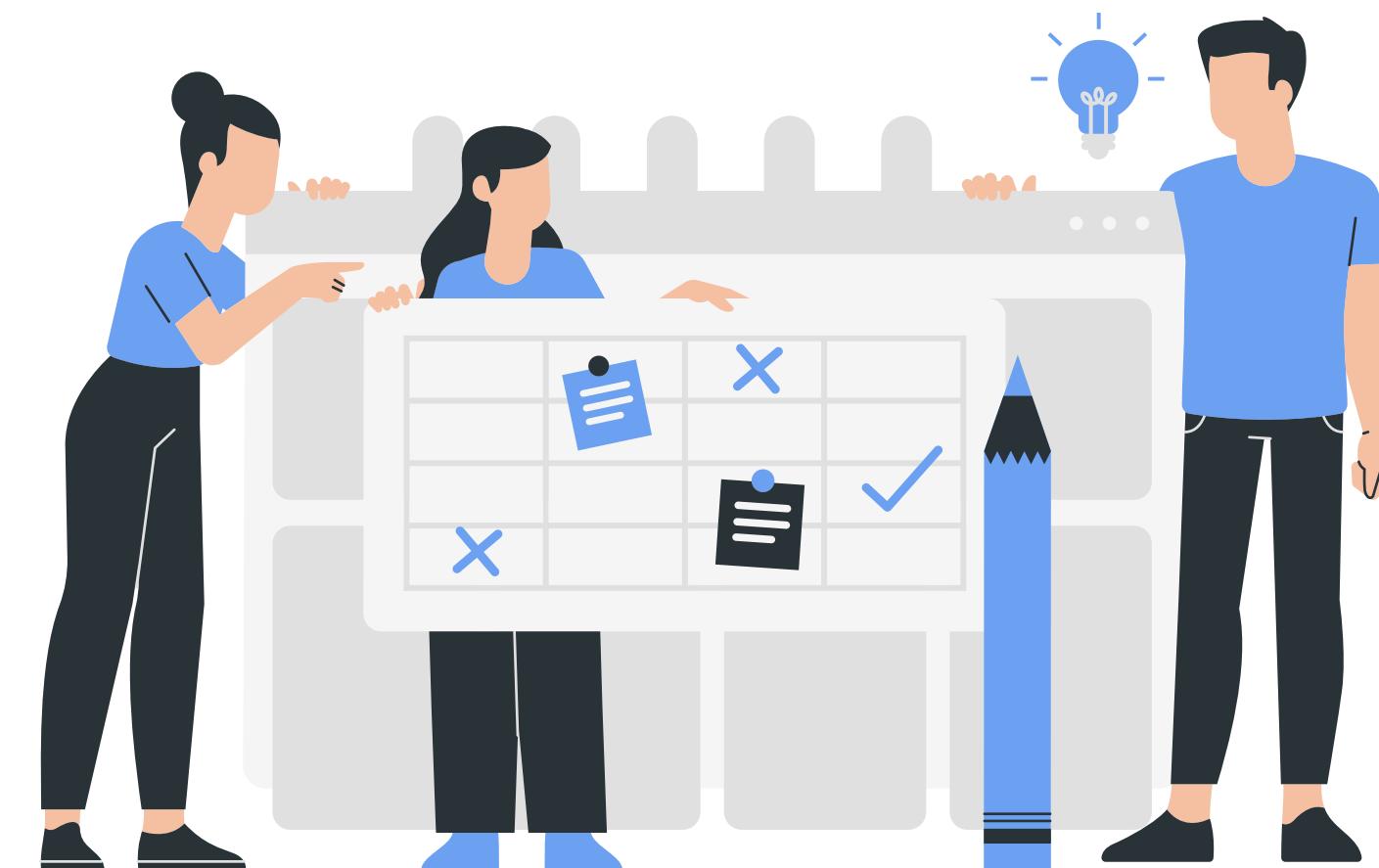
# References

- American sign language (ASL) recognition based on Hough Transform and Neural Networks. Qutaishat Munib, 2007.
- MacMaster, Gordon, "Sign Language Translation Using Machine Learning and Computer Vision" (2020).UVM Honors College Senior Theses. 480.
- [https://www.youtube.com/watch?v=V0Pk\\_dPU2IY&t=4228s](https://www.youtube.com/watch?v=V0Pk_dPU2IY&t=4228s)
- [https://youtube.com/playlist=PLZoTAELRMXVNvTfHyJxPRcQkpV8ubBwH o&si=Nrrug5F3zotxGSkZ](https://youtube.com/playlist=PLZoTAELRMXVNvTfHyJxPRcQkpV8ubBwHo&si=Nrrug5F3zotxGSkZ)
- <https://www.kaggle.com/datasets/debashishsau/aslamerican-sign-language-aplhabet-dataset>





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