Hand Gesture recognition

Problem statment can be found here

Classes used were

- Previous
- Next
- Stop

50 * 50 images were used to train the model.

Image examples that were used to train after background subtration, edge detection ...

File structre

```
├── collect_data.py
├── Data
│   ├── train
│   │   ├── next
│   │   │   ├── class1__0.png
│   │   │   └── ...
│   │   ├── previous
│   │   │   ├── class0_0.png
│   │   └── stop
│   │       ├── class2_0.png
│   └── val
│       ├── next
│       │   ├── class1__0.png
│       ├── previous
│       │   ├── class0_0.png
│       └── stop
│           ├── class2_0.png
├── inference.py
├── load.py
├── model1
├── model1_acc.png
├── model2
├── model2_accuracy.png
├── model2_loss.png
├── network.py
├── prepare_data.py
├── requirements.txt
└── slidingW_Inference.py
```

To run live demo (By default model2 gets run)

```
python inference.py
```

collect_data.py was used to make appropriate data load.py is the script where training occurs

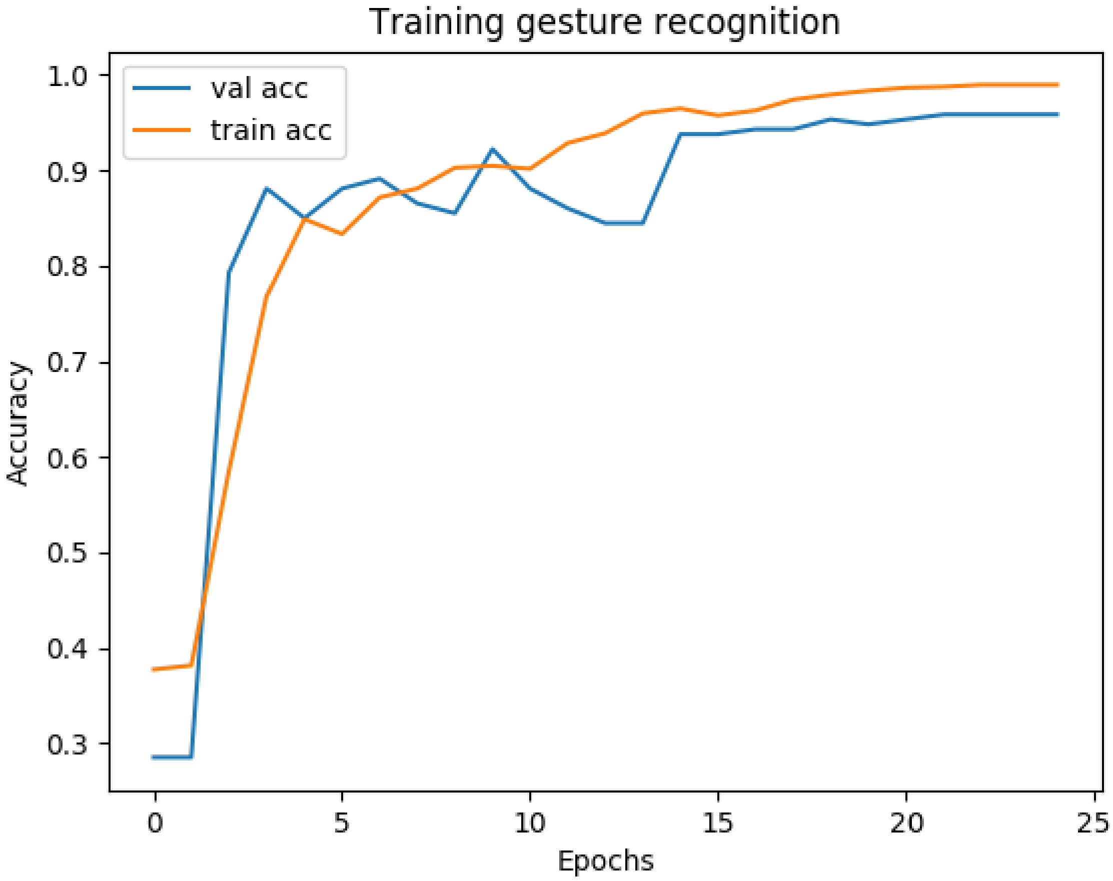
We have proposed two models

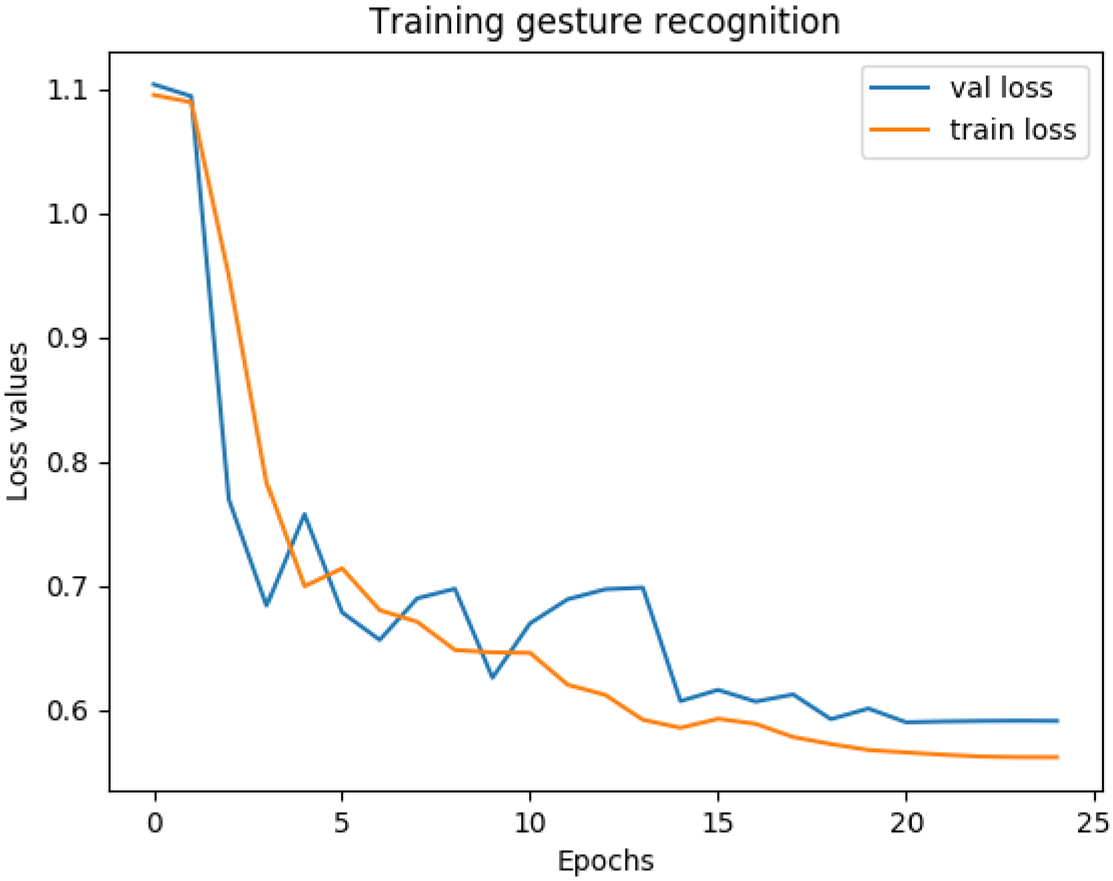
model1(4 layers) , model2 (5 layres)

model2 is as follows

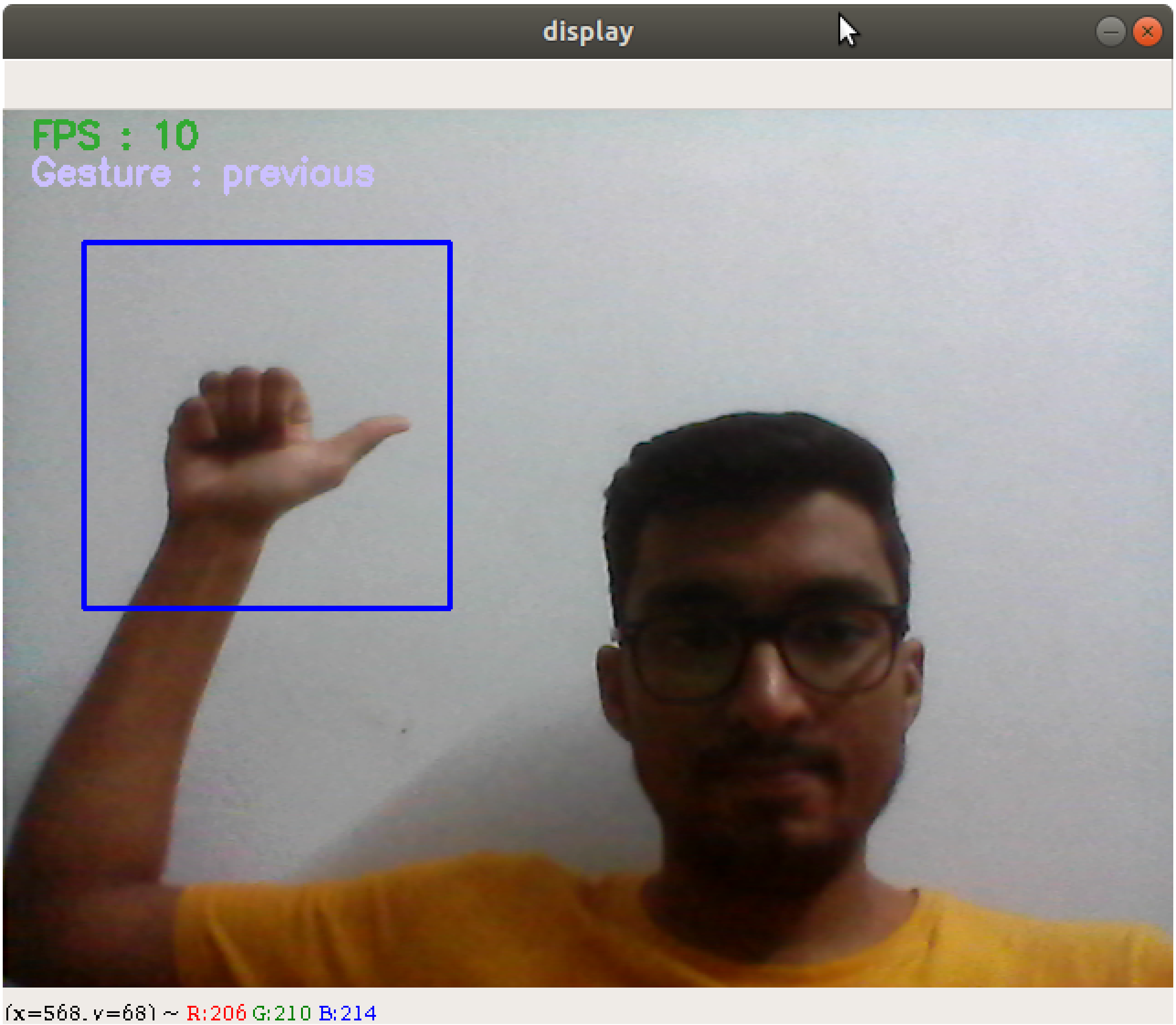
```
    def __init__(self):
        super(Net, self).__init__()
        # 3 input image channel, 6 output channels, 3x3 square convolution
        self.conv1 = nn.Conv2d(3, 32, 5)
        self.conv2 = nn.Conv2d(32, 32, 3)
        self.conv3 = nn.Conv2d(32, 64, 3 )
        self.fc1 = nn.Linear(64*4*4, 64)
        self.fc2 = nn.Linear(64, 3)
        self.softmax = nn.Softmax(dim=1)


    def forward(self, x):
        x = F.max_pool2d(F.relu(self.conv1(x)), (2, 2))
        x = F.max_pool2d(F.relu(self.conv2(x)), 2)
        x = F.max_pool2d(F.relu(self.conv3(x)), 2)
        x = x.view(-1, self.num_flat_features(x))
        x = F.relu(self.fc1(x))
        x = self.fc2(x)
        x = self.softmax(x) # check this
        return x
```

Some of the training plots are


Training gesture recognition
val acc
train acc
Accuracy
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
5
10
15
20
25
Epochs


Training gesture recognition
val loss
train loss
Loss values
1.1
1.0
0.9
0.8
0.7
0.6
0
5
10
15
20
25
Epochs

Real Time demo :



The dataset of hands were made with the help of Kartik, Kailash, Vignesh, Apaar, Nipun, Madhav, Anup and myself from Karakoram hostel.
