CSE 472 : Bangla Character Recognition Challenge

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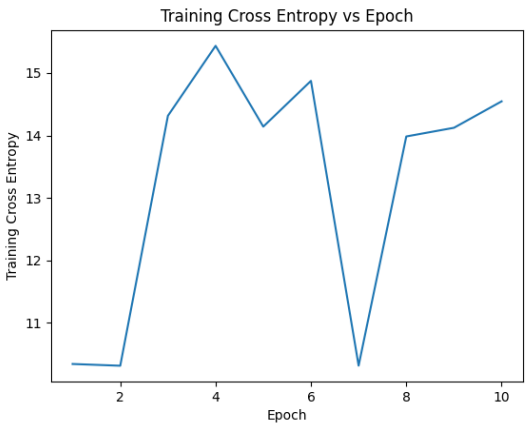
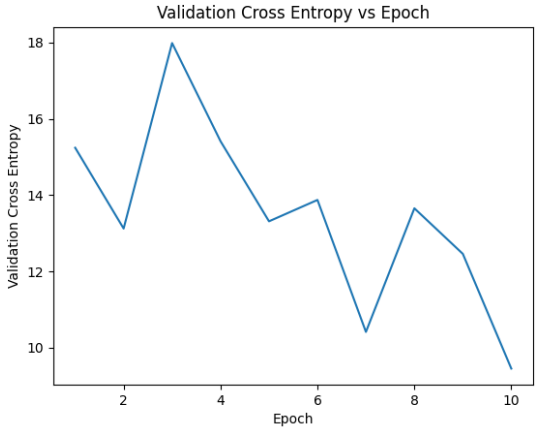
Section: A2

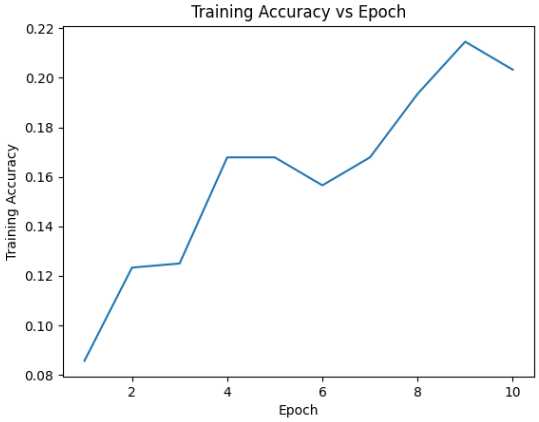
1.For learning rate = 0.001:

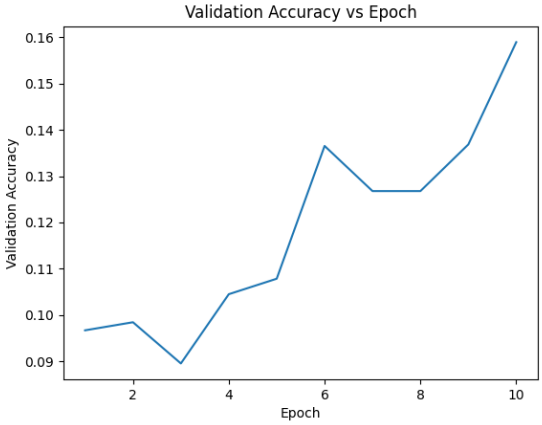
Cross entropy loss:



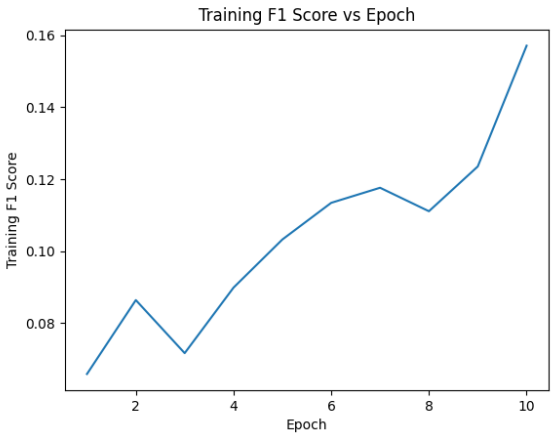


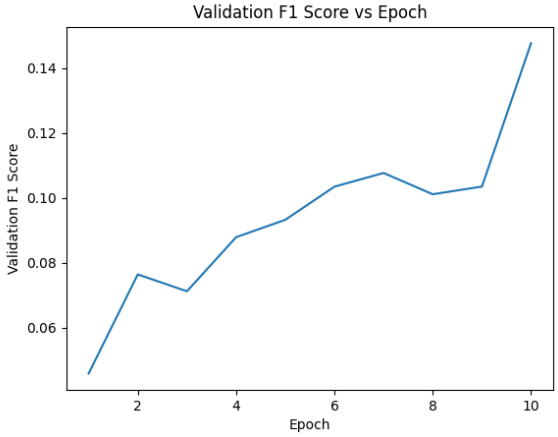
Accuracy:





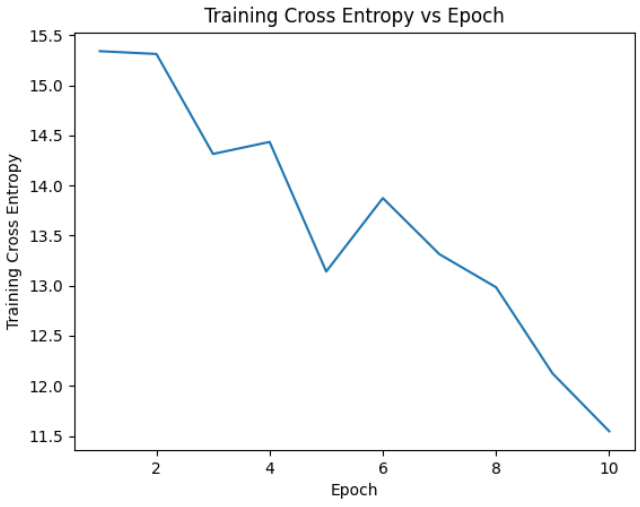
F1-score:

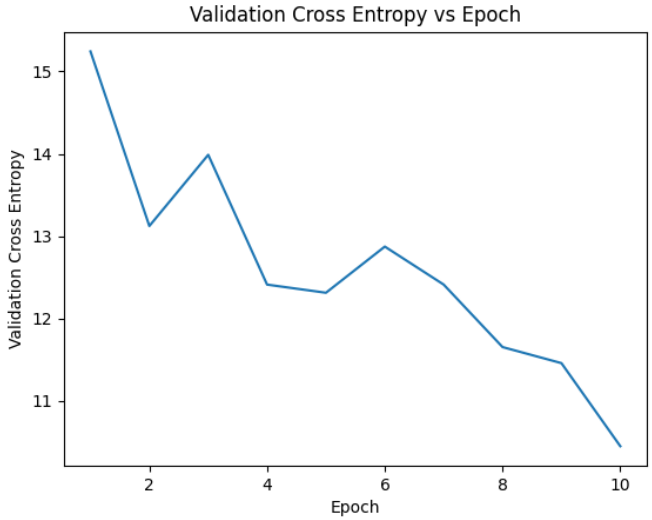




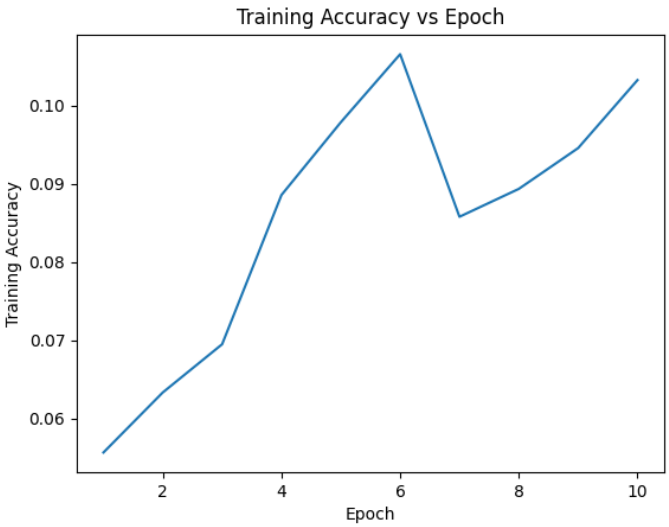
2.For learning rate = 0.0001:

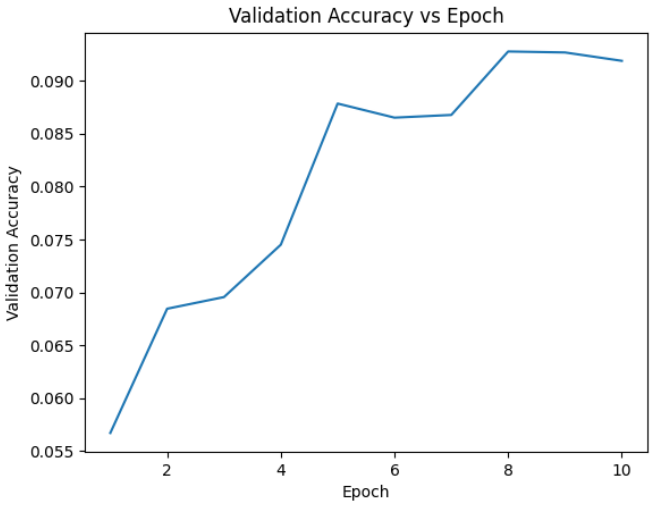
Cross Entropy loss:



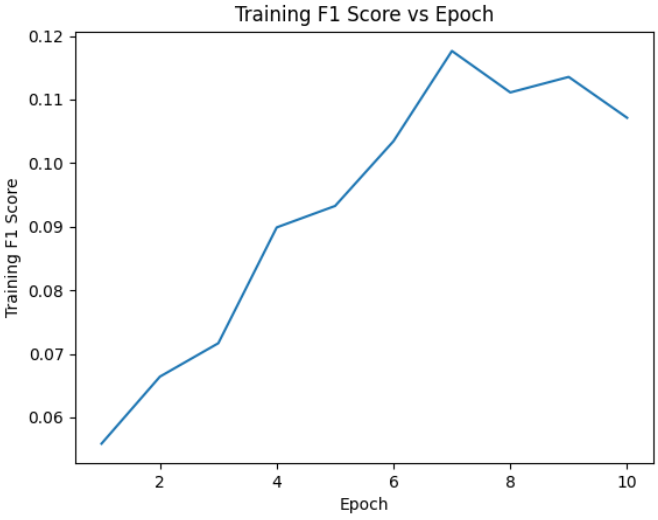


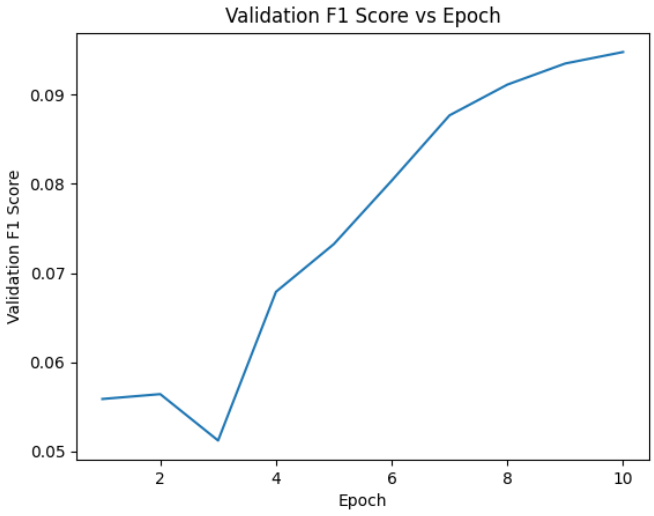
Accuracy:





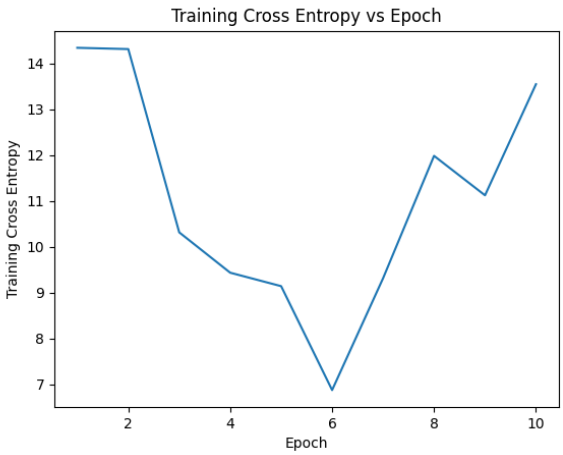
F1-score:

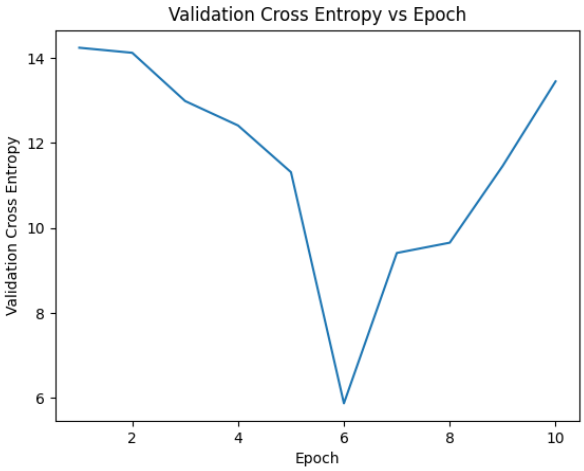




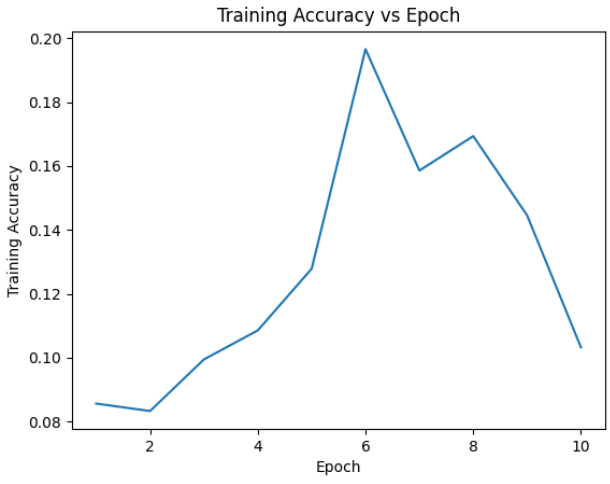
3.For learning rate = 0.005:

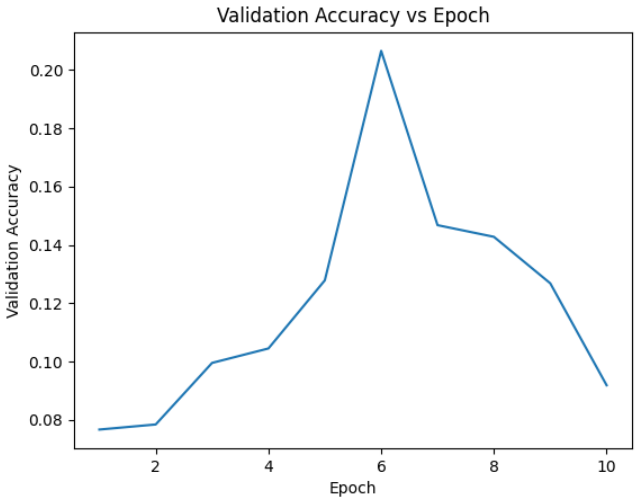
Cross entropy loss:



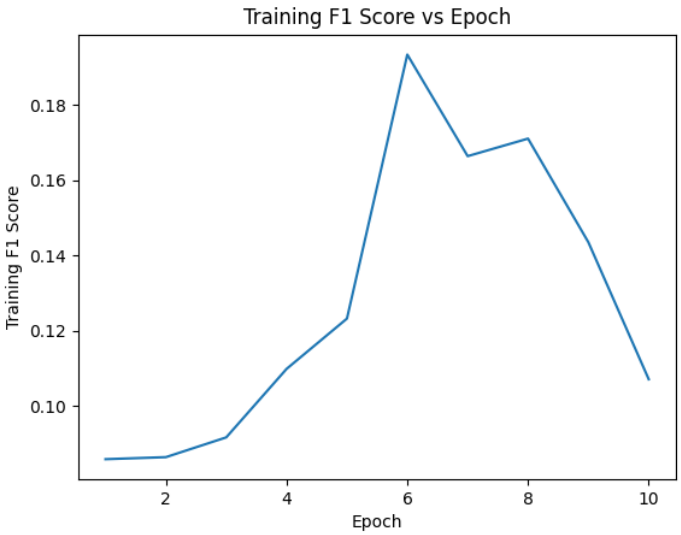


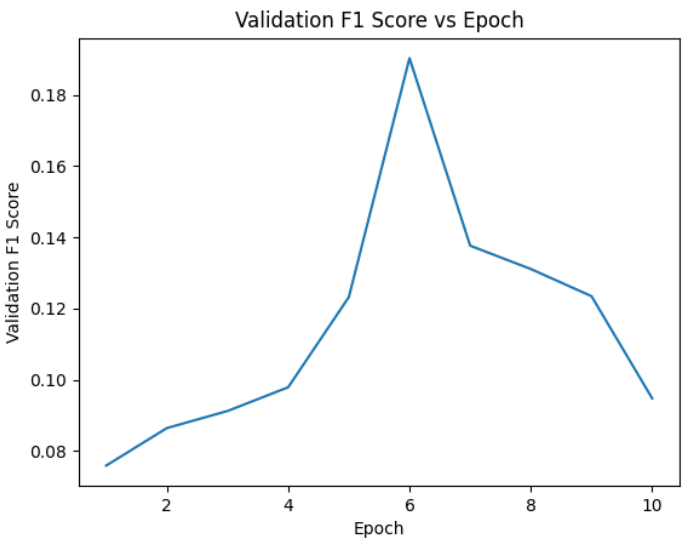
Accuracy:





F1-score:





4.Statistics of best learning rate:

The model used in this CNN is:

- One Convolution Layer
- One ReLU activation Layer
- One Max Pooling Layer
- One Fully Connected Layer
- One Flattening Layer
- One SoftMax Layer

I used other architecture like lanet-5 but it didn't give better prediction so instead I use one layer of each which give me highest 20% accuracy.

Best Learning rate = 0.001

Accuracy = .2145

Macro f1-score = 0.123

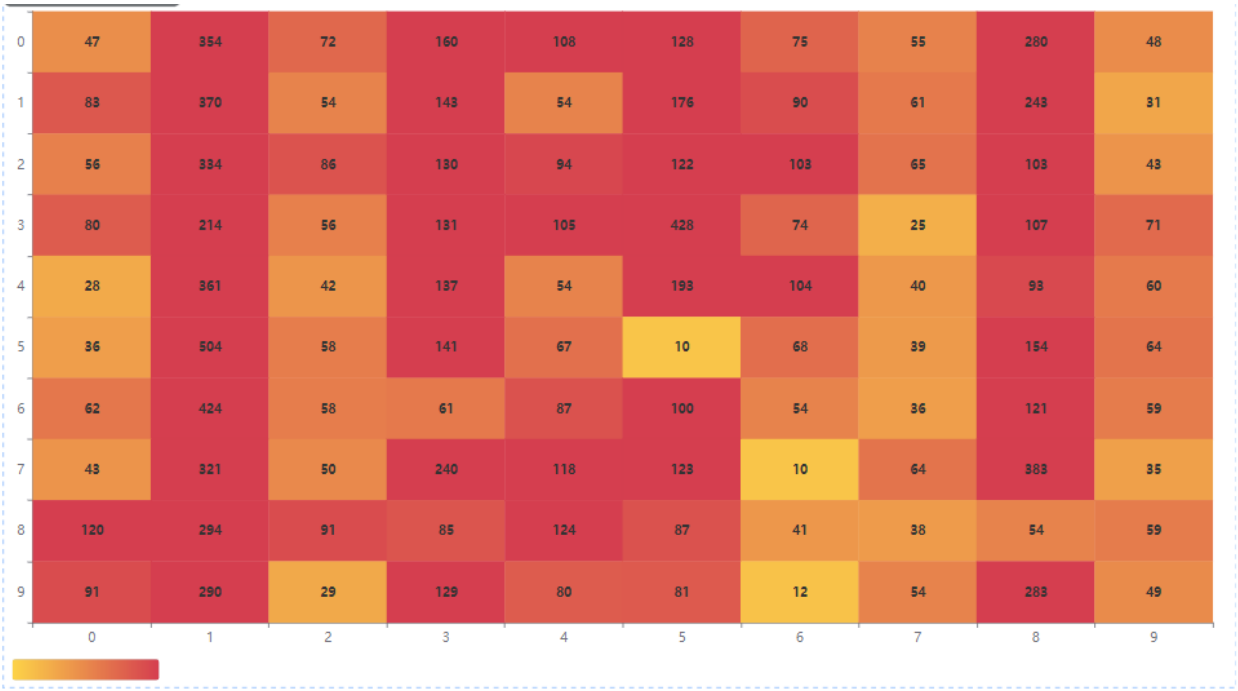
```python
def __init__(self, learning_rate=0.001, batch_size=32):
    self.input_channels = 1
    self.output_channels = 6
    self.filter_dim = 5
    self.stride = 1
    self.padding = 1
    self.learning_rate = learning_rate
    self.batch_size = batch_size

    self.convolutionLayer = ConvolutionLayer(self.input_channels, self.output_channels, self.filter_dim,
                                             self.stride, self.padding)
    self.reluLayer = ReLULayer()
    self.maxPoolingLayer = MaxPoolingLayer(filter_shape=2, stride=2)
    self.flattenLayer = FlattenLayer()
    self.fullyConnectedLayer1 = FullyConnectedLayer(output_size=10, learning_rate=0.001)
    self.sigmoidLayer = SigmoidLayer()
    # self.fullyConnectedLayer2 = FullyConnectedLayer(output_size=10, learning_rate=0.001)
    # self.fullyConnectedLayer3 = FullyConnectedLayer(output_size=10, learning_rate=0.0001)

    self.softMaxLayer = SoftMaxLayer()
```

5.Confusion Matrix :

True label vs Predicted label



6.Test performance of training D data:

Test Accuracy : 15.65%