Assignment-3 Report

Feed-forward Neural Network

CSE-472 : Machine Learning Sessional

Submitted By: Maneesha Rani Saha

Student ID: 1805076

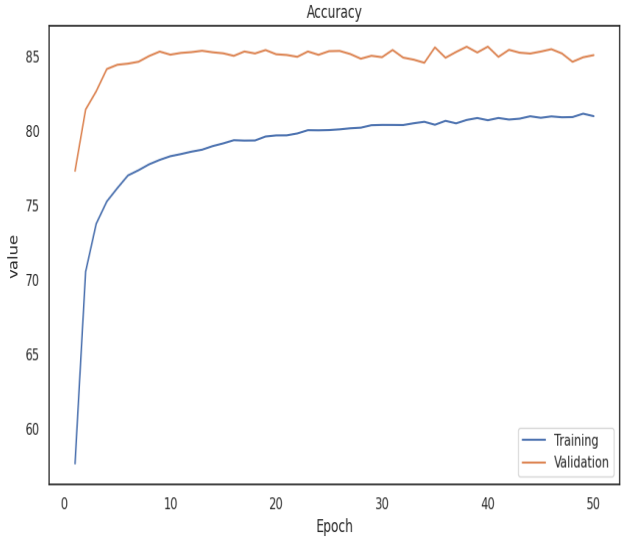
Section: B1

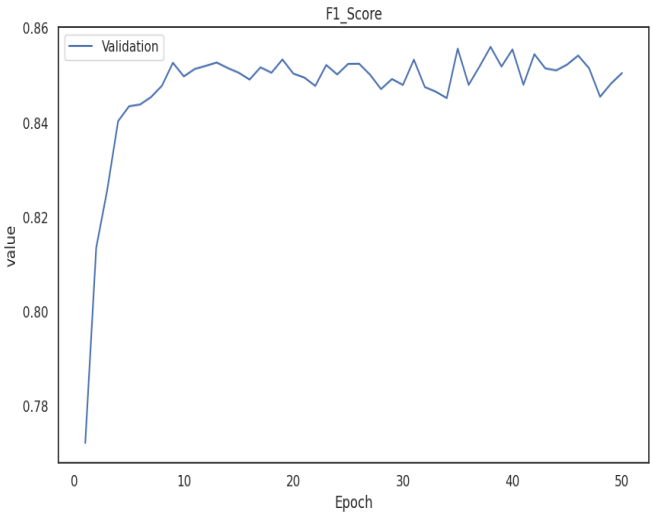
Model-1

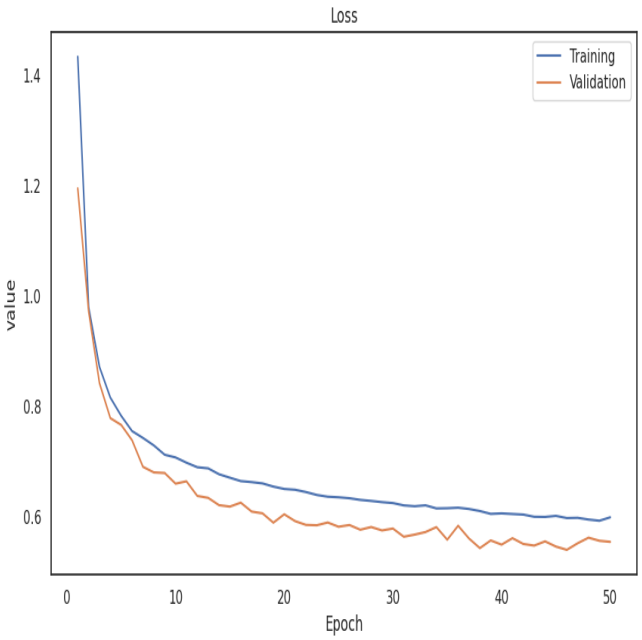
Test F1 Score = 0.869 Test Accuracy = 86.995%

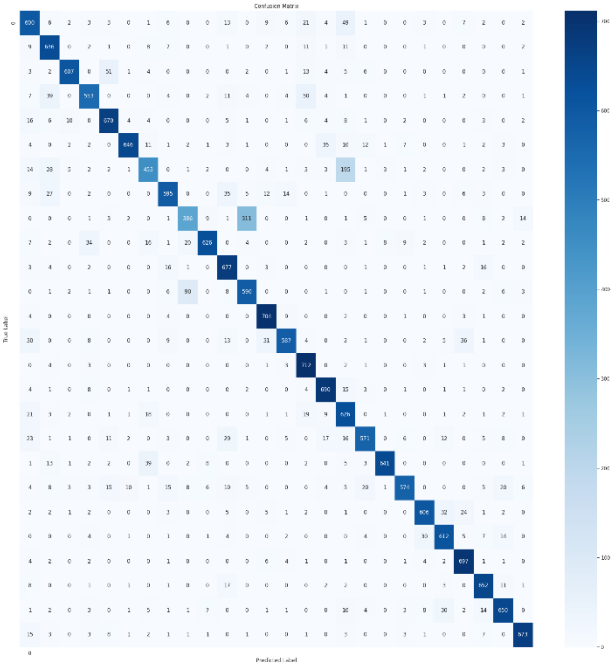
```
fnn1 = FNN([
    Dense(input_size=28*28, output_size=128),
    ReLU(),
    DropoutLayer(dropout_rate=0.5),
    Dense(input_size=128, output_size=26),  # Assuming 26 classes for letters
    Softmax()
], 'Model_1')
```

Learning Rate = 0.005

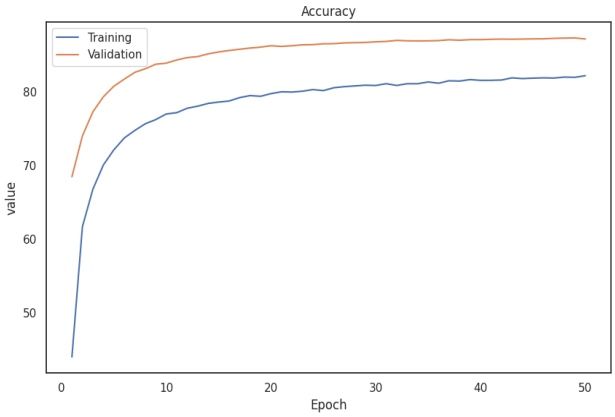


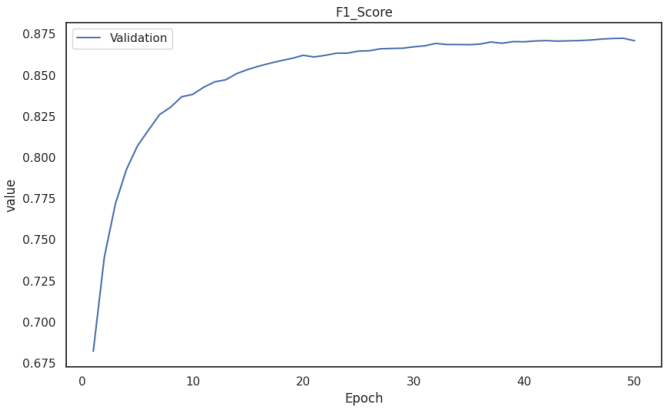


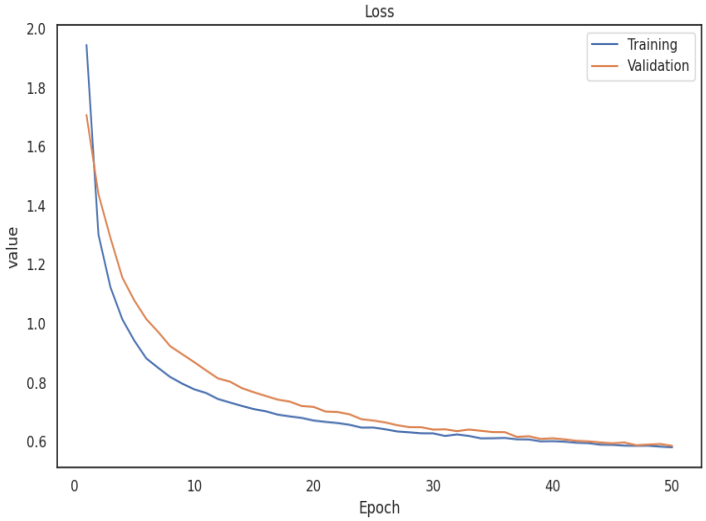


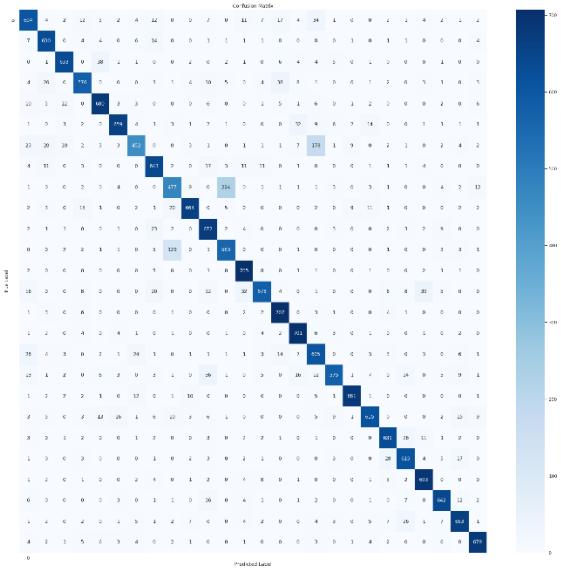


Learning Rate = 0.001

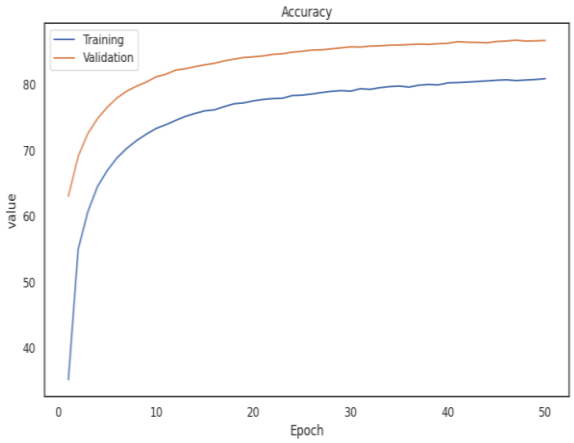


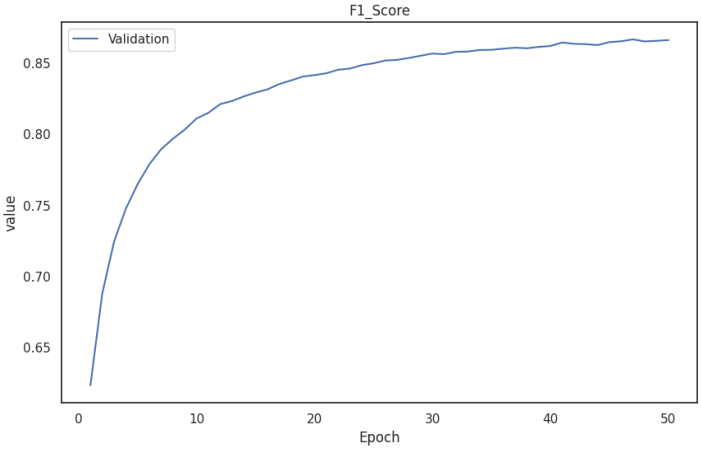


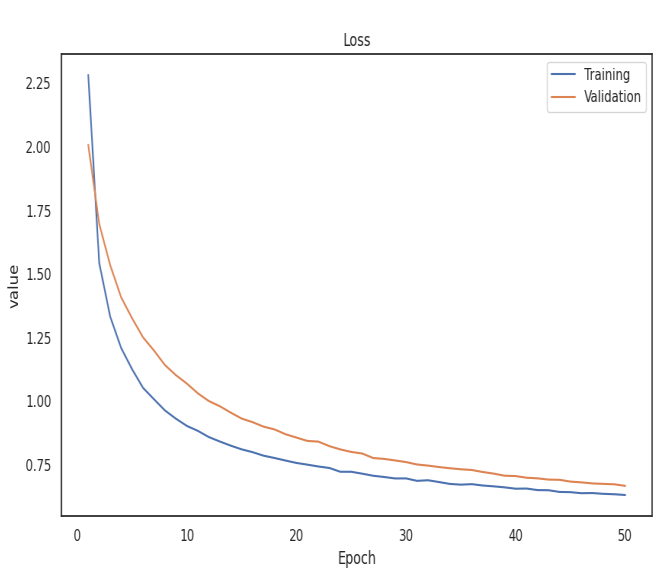


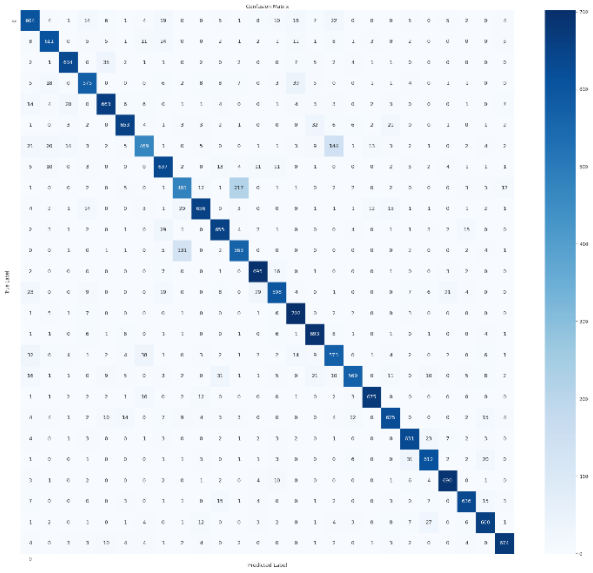


Learning Rate = 0.0005

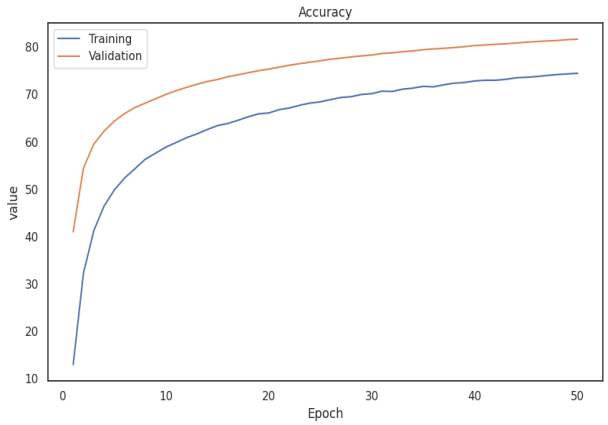


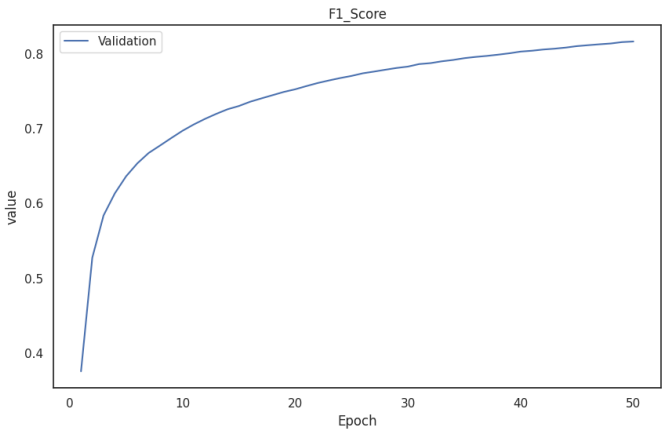


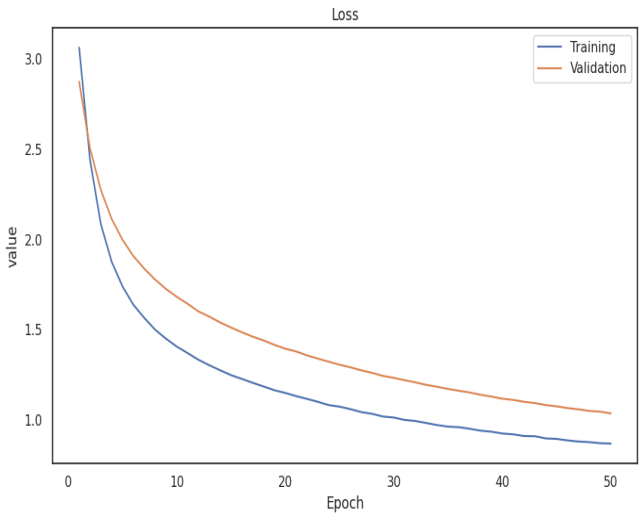


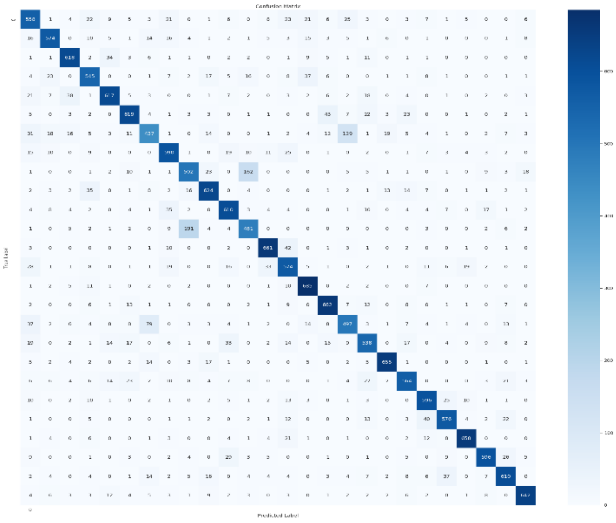


Learning Rate = 0.0001







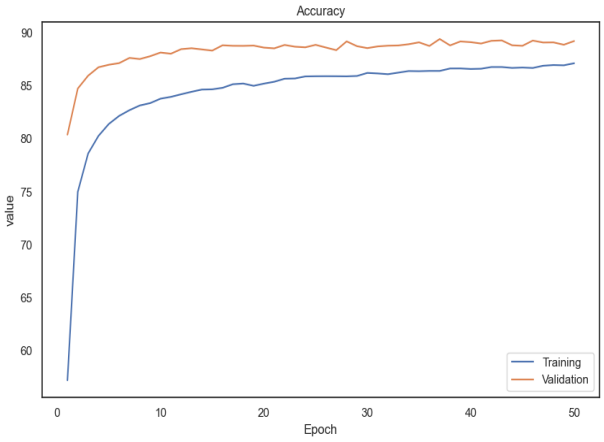


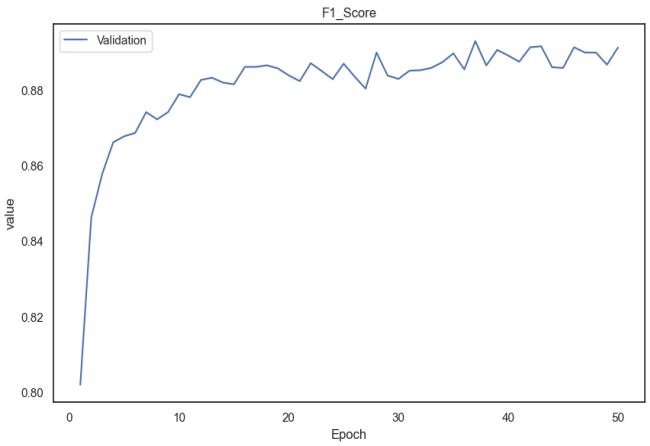
Model-2 (BEST PERFORMING MODEL)

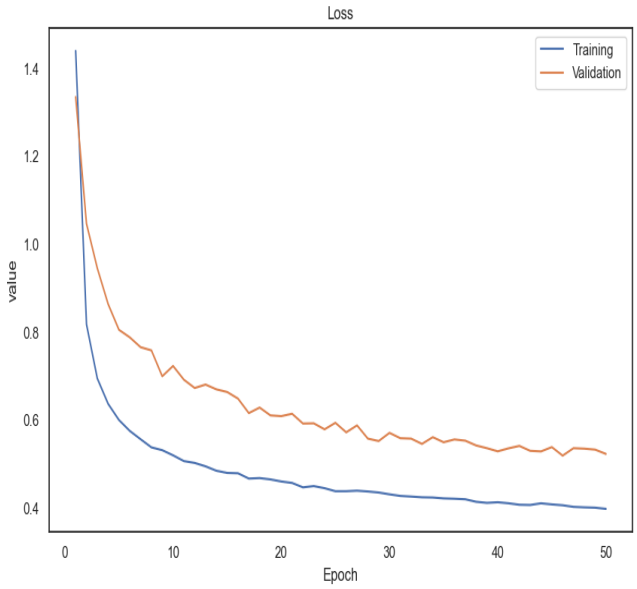
Test F1 Score = 0.902 Test Accuracy = 90.302%

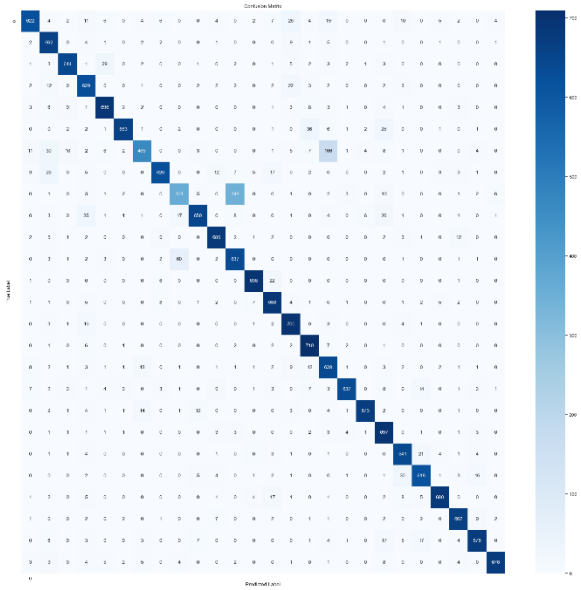
```
fnn2 = FNN([
    Dense(input_size=28*28, output_size=256),
    ReLU(),
    DropoutLayer(dropout_rate=0.3),
    Dense(input_size=256, output_size=128),
    ReLU(),
    DropoutLayer(dropout_rate=0.5),
    Dense(input_size=128, output_size=26),  # Assuming 26 classes for letters
    Softmax()
], 'Model_2')
```

Learning Rate = 0.005

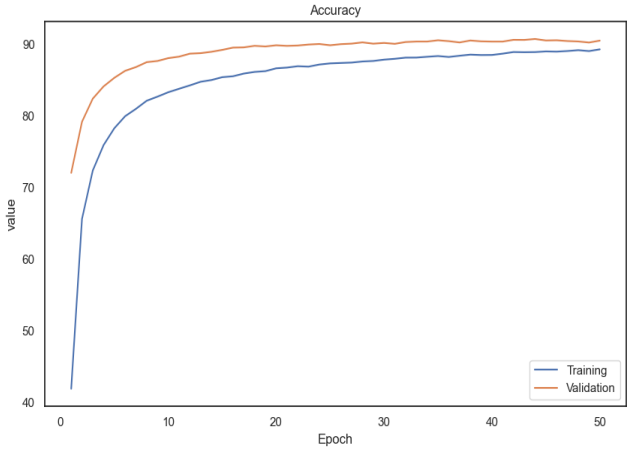


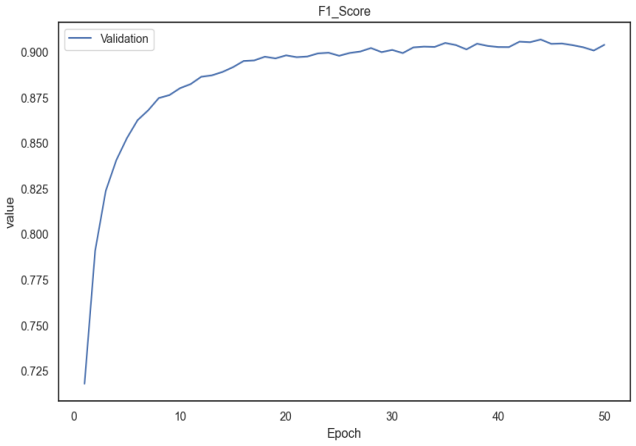


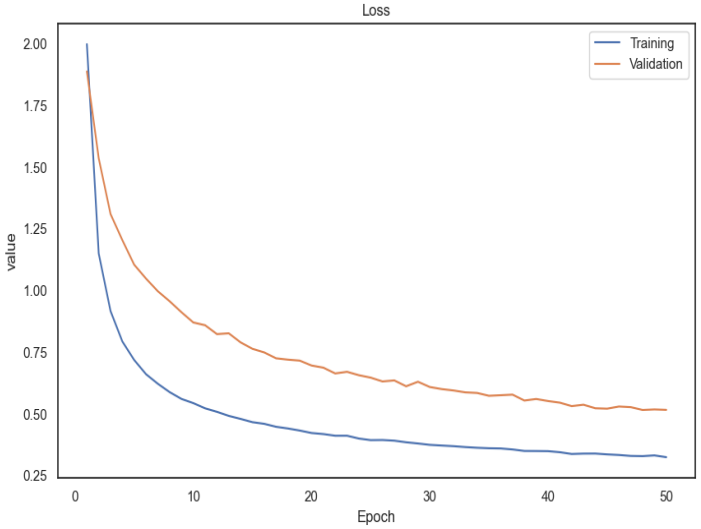


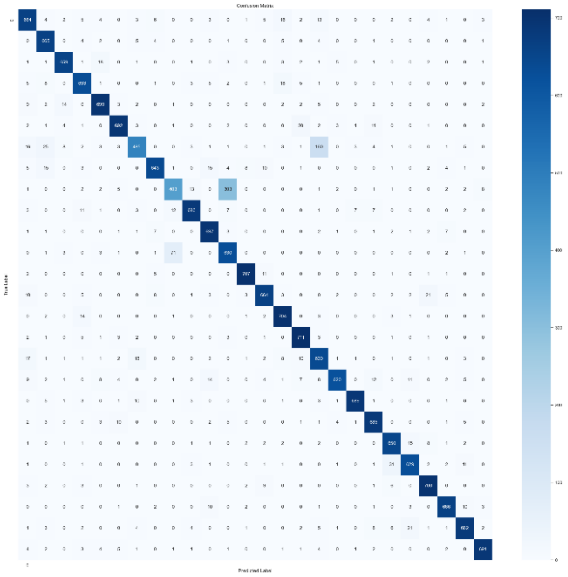


Learning Rate = 0.001

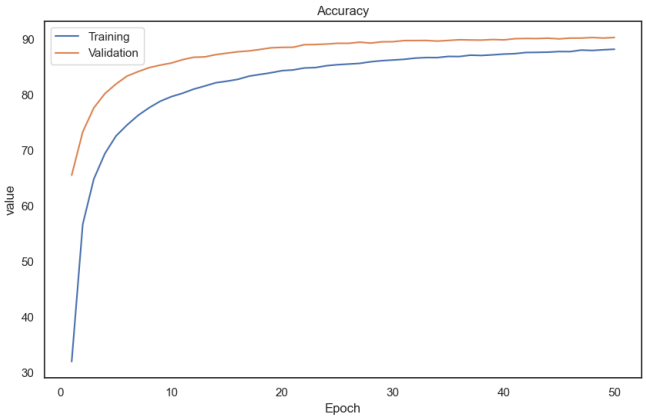


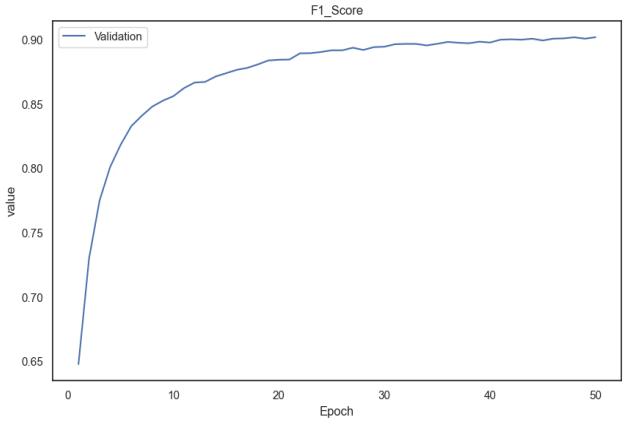


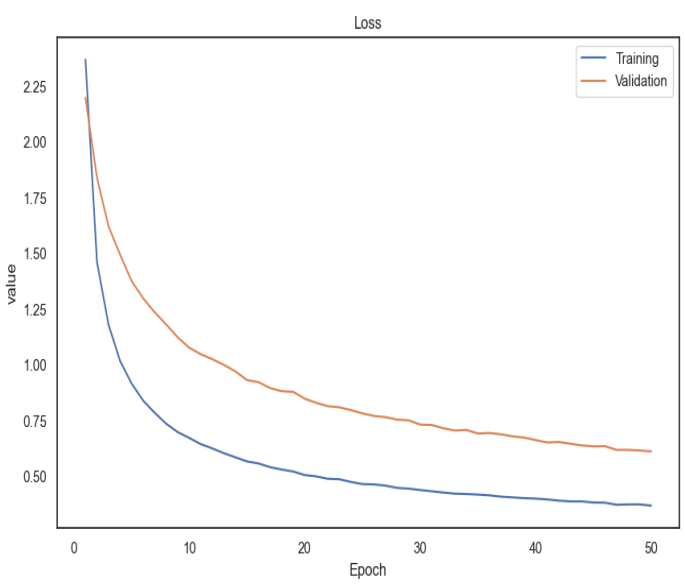


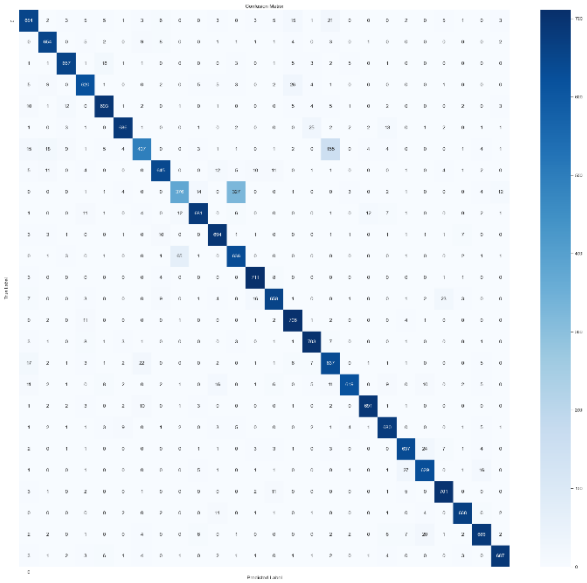


Learning Rate = 0.0005

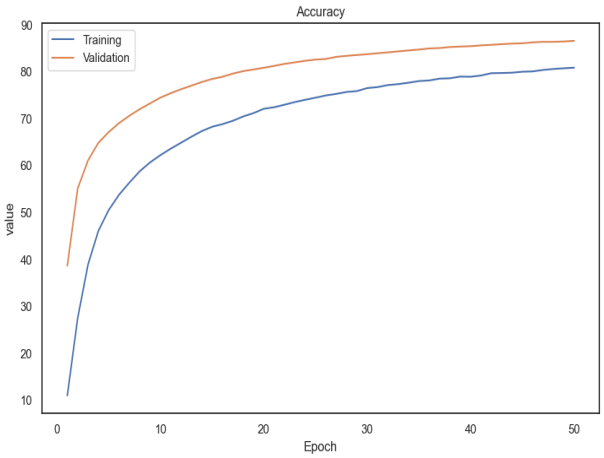


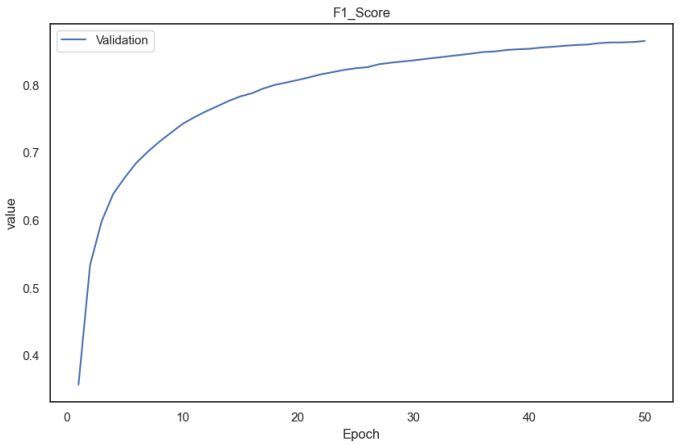


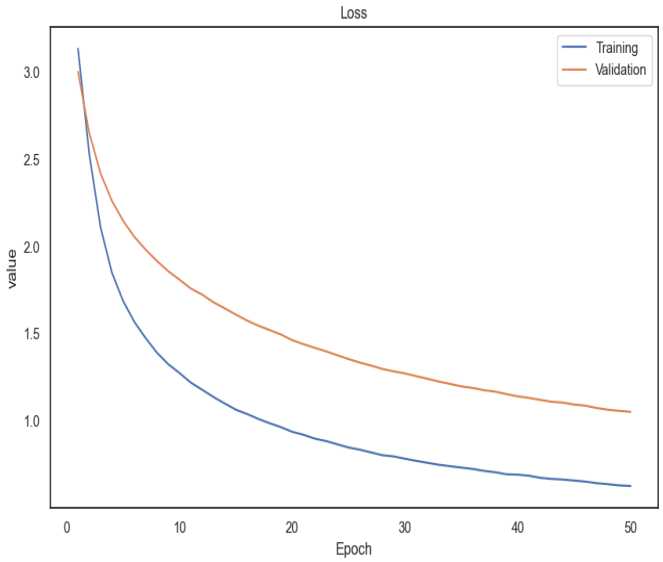


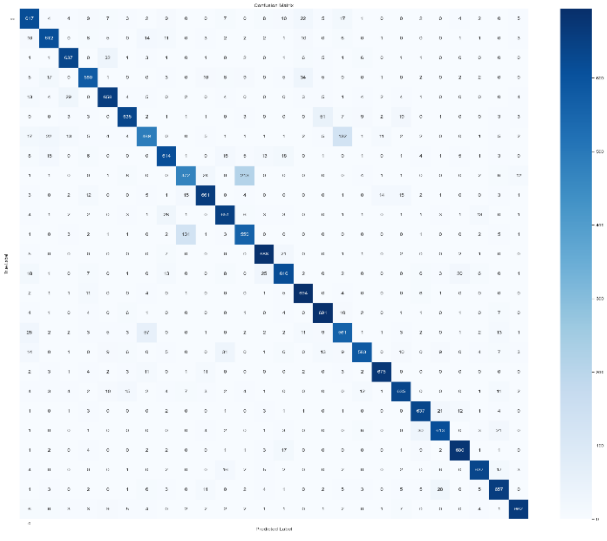


Learning Rate = 0.0001







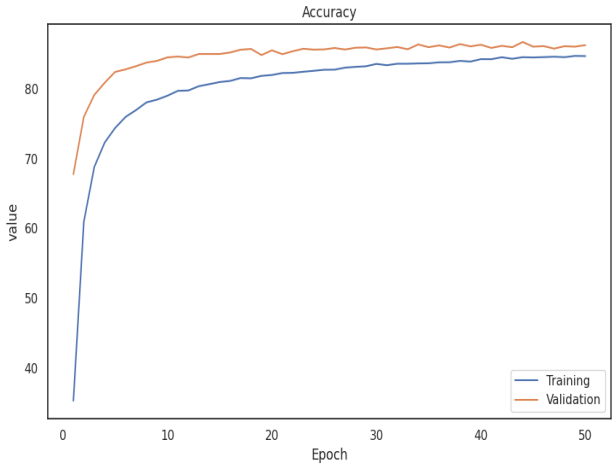


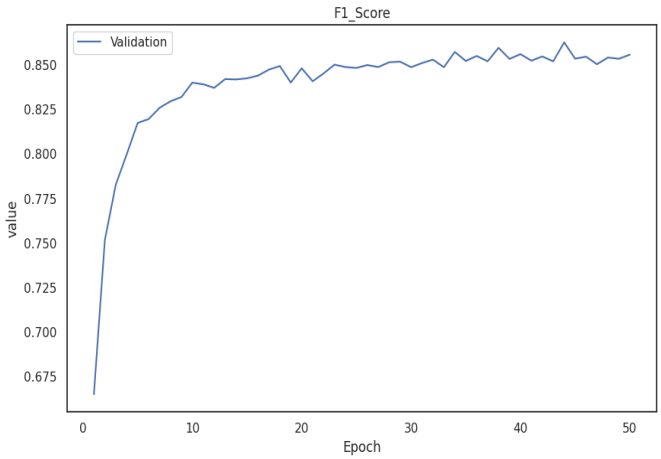
Model-3

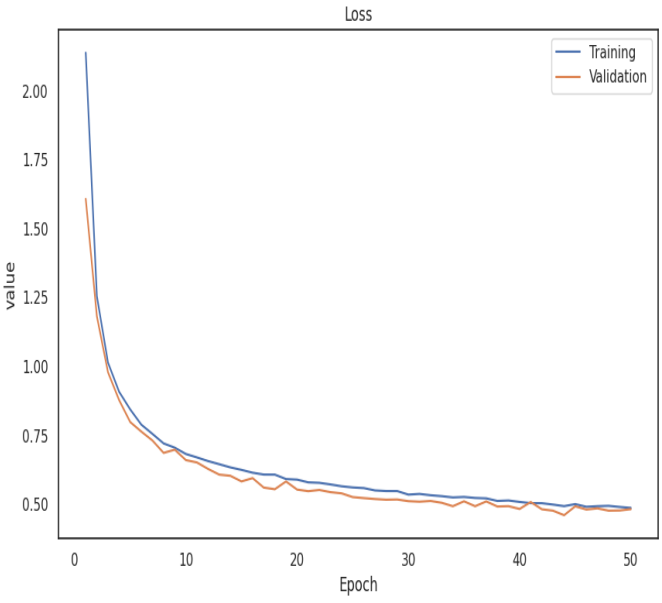
Test F1 Score = 0.877 Test Accuracy = 87.793%

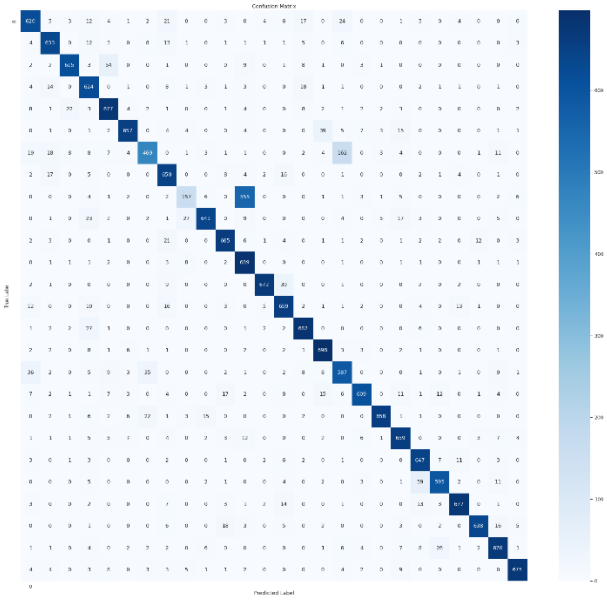
```
fnn3 = FNN([
    Dense(input_size=28*28, output_size=128),
    ReLU(),
    Dense(input_size=128, output_size=64),
    ReLU(),
    DropoutLayer(dropout_rate=0.4),
    Dense(input_size=64, output_size=32),
    ReLU(),
    DropoutLayer(dropout_rate=0.3),
    Dense(input_size=32, output_size=26),  # Assuming 26 classes for letters
    Softmax()
], 'Model_3')
```

Learning Rate = 0.005

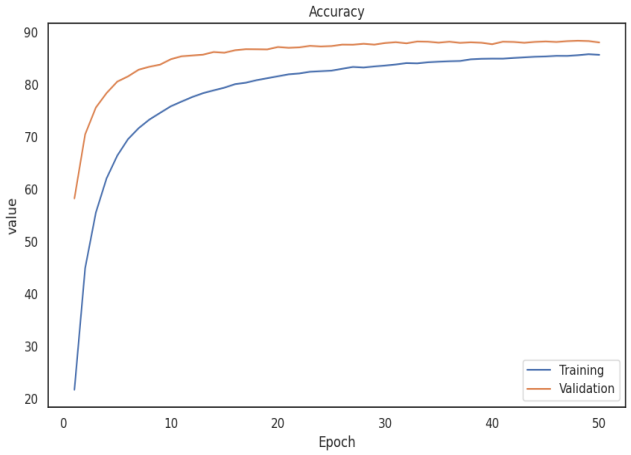


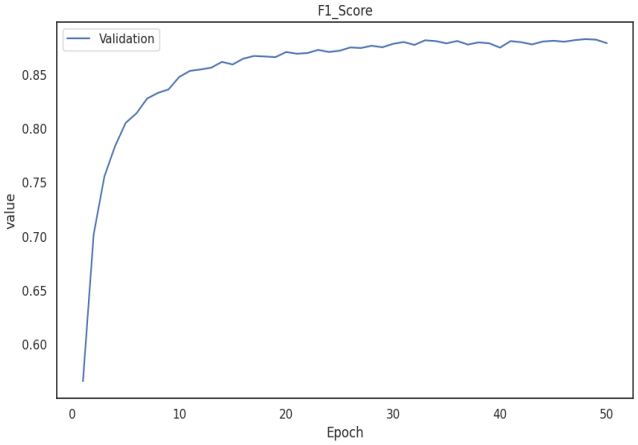


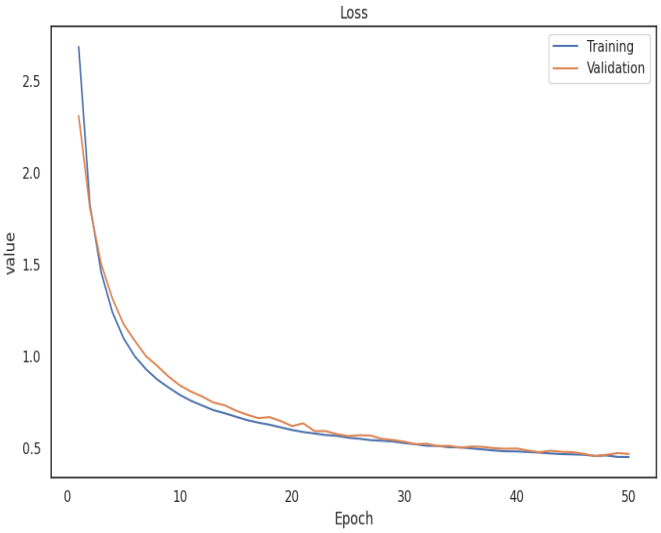


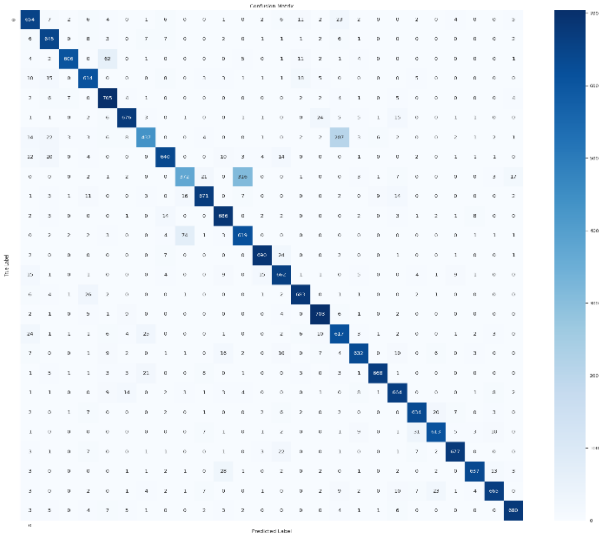


Learning Rate = 0.001

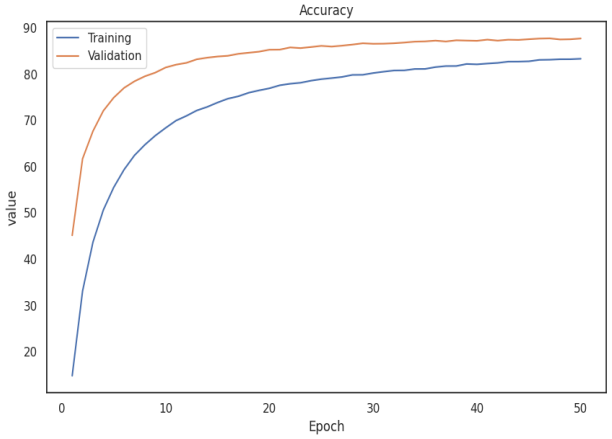


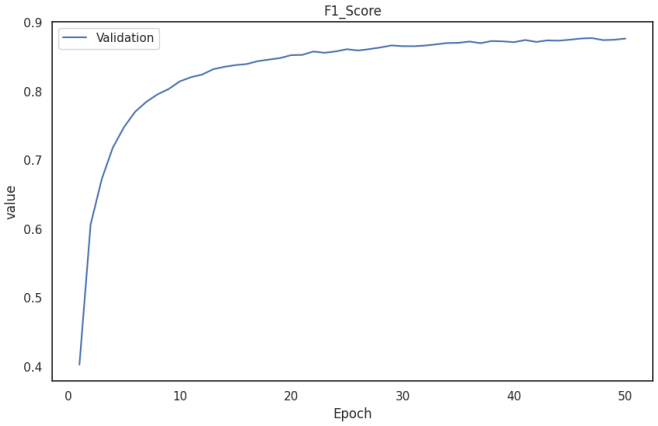


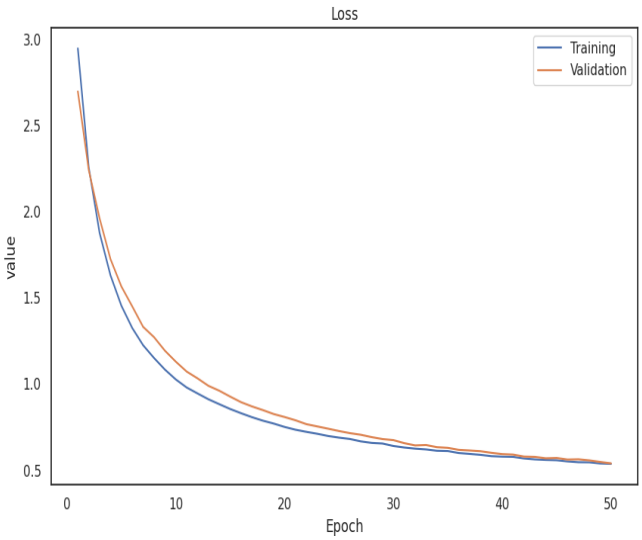


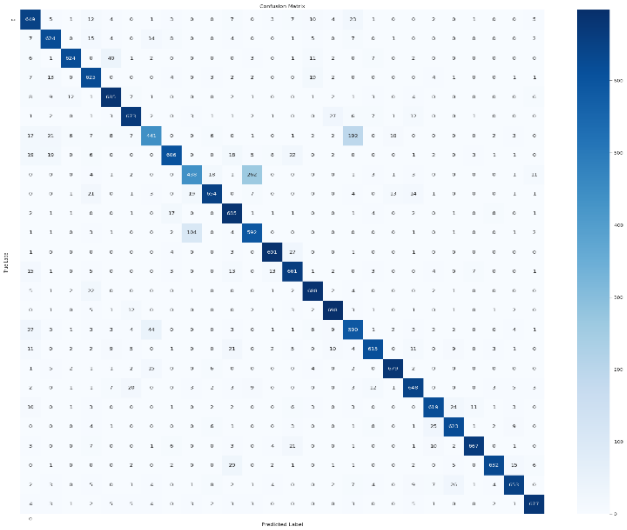


Learning Rate = 0.0005









Learning Rate = 0.0001