

PROJECT3 REPORT – CLASSIFICATION USING NEURAL NETWORKS AND DEEP LEARNING

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 Submission Date: 19 Sep, 2023
 Class Name and Term: CSE575 Fall 2023

PROJECT RESULTS

Epochs	Train		Test	
	Accuracy	Loss	Accuracy	Loss
0	0.297	1.384	0.3	1.384
1	0.406	1.358	0.415	1.36
2	0.531	1.087	0.55	1.084
3	0.637	0.871	0.647	0.858
4	0.706	0.735	0.705	0.736
5	0.739	0.668	0.725	0.688
6	0.761	0.617	0.755	0.653
7	0.778	0.58	0.762	0.636
8	0.791	0.541	0.765	0.62
9	0.807	0.506	0.762	0.605

Training

- Accuracy: 0.807
- Loss: 0.506

Testing

- Accuracy: 0.762
- Loss: 0.605

EVALUATE FUNCTION

```
def evaluate(net, images, labels):
    acc = 0
    loss = 0
    batch_size = 1

    #pass
    for batch_index in range(0, images.shape[0], batch_size):

        x = images[batch_index]
        y = labels[batch_index]

        # forward pass calculation
        for layer in range(net.lay_num):
            output_layer = net.layers[l].forward(x)
            x = output_layer
            # Traverse through all layers
            # Compute output layer

        loss += cross_entropy(output_layer, y)
        # Calculate loss from output layer
        if np.argmax(output_layer) == np.argmax(y):
            # Calculate accuracy from output layer
            acc += 1

    acc_output = acc / images.shape[0]
    loss_output = loss / images.shape[0]
    return (acc_output), (loss_output)
```

PLOTS

