

PA-II-1:

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jupyter CNN Last Checkpoint: Last Friday at 10:07 PM (unsaved changes)
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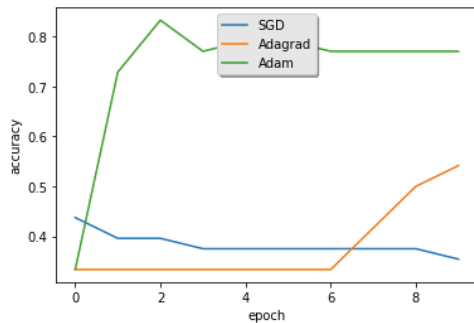
```
File Edit View Insert Cell Kernel Widgets Help
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softmax = torch.exp(output)
prob = list(softmax.numpy())
y_test_predictions = np.argmax(prob, axis=1)

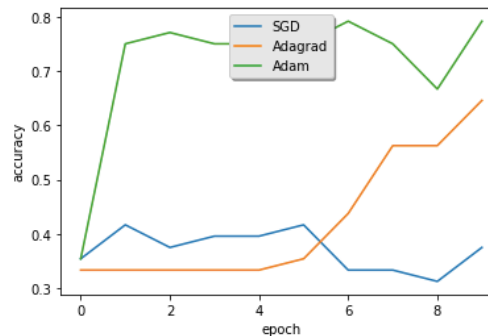
print("Test_accuracy:", accuracy_score(test_data_y.T, y_test_predictions))
```

```
Epoch : 0      loss : tensor(0.6941, grad_fn=<NllLossBackward>)
Epoch : 10     loss : tensor(0.8002, grad_fn=<NllLossBackward>)
Epoch : 20     loss : tensor(0.8841, grad_fn=<NllLossBackward>)
Epoch : 30     loss : tensor(0.7973, grad_fn=<NllLossBackward>)
Epoch : 40     loss : tensor(0.7743, grad_fn=<NllLossBackward>)
Epoch : 50     loss : tensor(0.7592, grad_fn=<NllLossBackward>)
Epoch : 60     loss : tensor(0.7293, grad_fn=<NllLossBackward>)
Epoch : 70     loss : tensor(0.6916, grad_fn=<NllLossBackward>)
Epoch : 80     loss : tensor(0.6529, grad_fn=<NllLossBackward>)
Epoch : 90     loss : tensor(0.6421, grad_fn=<NllLossBackward>)
Epoch : 100    loss : tensor(0.6529, grad_fn=<NllLossBackward>)
Epoch : 110    loss : tensor(0.6106, grad_fn=<NllLossBackward>)
Epoch : 120    loss : tensor(0.5841, grad_fn=<NllLossBackward>)
Epoch : 130    loss : tensor(0.4916, grad_fn=<NllLossBackward>)
Epoch : 140    loss : tensor(0.5096, grad_fn=<NllLossBackward>)
Epoch : 150    loss : tensor(0.5293, grad_fn=<NllLossBackward>)
Epoch : 160    loss : tensor(0.4893, grad_fn=<NllLossBackward>)
Epoch : 170    loss : tensor(0.4740, grad_fn=<NllLossBackward>)
Epoch : 180    loss : tensor(0.4783, grad_fn=<NllLossBackward>)
Epoch : 190    loss : tensor(0.4841, grad_fn=<NllLossBackward>)
Train_accuracy: 0.9658536585365853
Test_accuracy: 0.8125
```

PA-II-2:



PA-II-3:



PB-II-1:

```
print("Test_accuracy:", accuracy_score(test_data_y.T, test_predictions))
```

Epoch :	0	loss :	tensor(0.6948, grad_fn=<NllLossBackward>)
Epoch :	10	loss :	tensor(0.8099, grad_fn=<NllLossBackward>)
Epoch :	20	loss :	tensor(0.8842, grad_fn=<NllLossBackward>)
Epoch :	30	loss :	tensor(0.8226, grad_fn=<NllLossBackward>)
Epoch :	40	loss :	tensor(0.8489, grad_fn=<NllLossBackward>)
Epoch :	50	loss :	tensor(0.8452, grad_fn=<NllLossBackward>)
Epoch :	60	loss :	tensor(0.8325, grad_fn=<NllLossBackward>)
Epoch :	70	loss :	tensor(0.8336, grad_fn=<NllLossBackward>)
Epoch :	80	loss :	tensor(0.8282, grad_fn=<NllLossBackward>)
Epoch :	90	loss :	tensor(0.8046, grad_fn=<NllLossBackward>)
Epoch :	100	loss :	tensor(0.7311, grad_fn=<NllLossBackward>)
Epoch :	110	loss :	tensor(0.6995, grad_fn=<NllLossBackward>)
Epoch :	120	loss :	tensor(0.6423, grad_fn=<NllLossBackward>)
Epoch :	130	loss :	tensor(0.5583, grad_fn=<NllLossBackward>)
Epoch :	140	loss :	tensor(0.4613, grad_fn=<NllLossBackward>)
Epoch :	150	loss :	tensor(0.4529, grad_fn=<NllLossBackward>)
Epoch :	160	loss :	tensor(0.4680, grad_fn=<NllLossBackward>)
Epoch :	170	loss :	tensor(0.4578, grad_fn=<NllLossBackward>)
Epoch :	180	loss :	tensor(0.4495, grad_fn=<NllLossBackward>)
Epoch :	190	loss :	tensor(0.4539, grad_fn=<NllLossBackward>)
Train_accuracy: 0.8829268292682927			
Test_accuracy: 0.8541666666666666			

PB-II-2:

