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CSCI496

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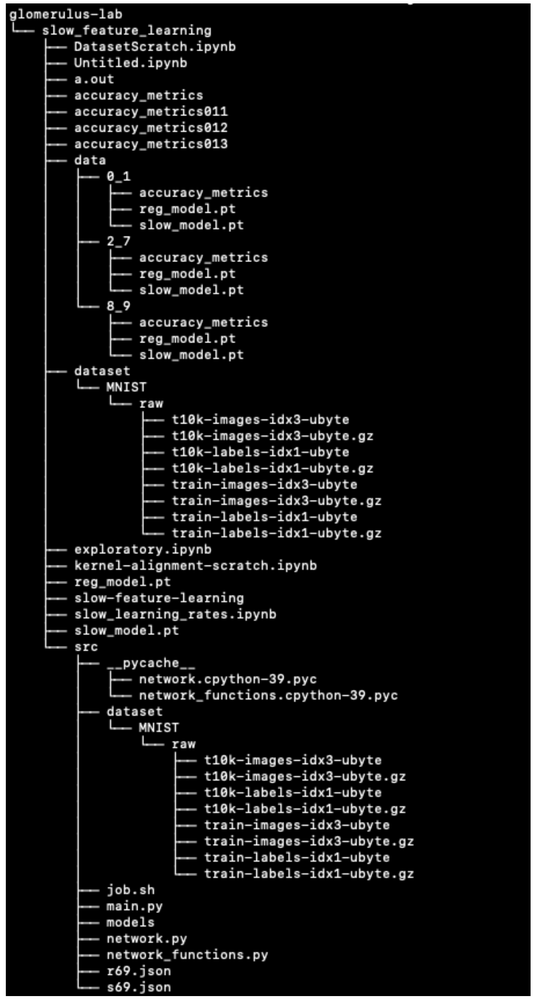
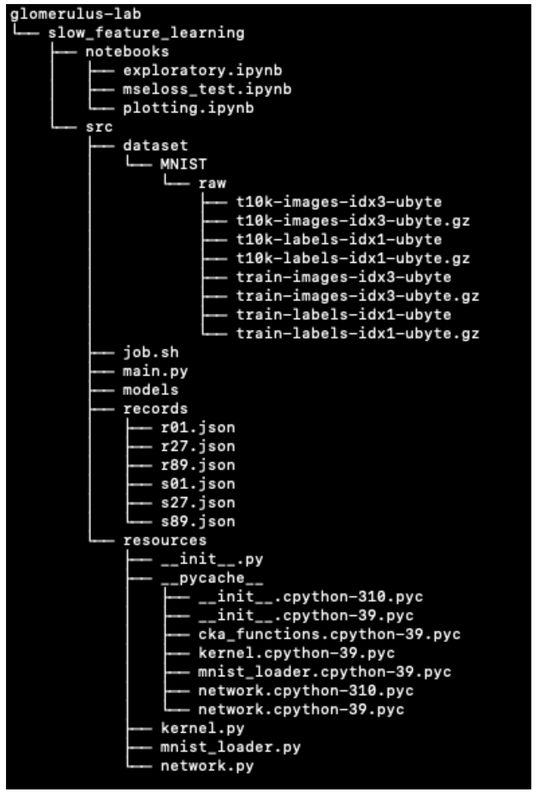
Code Changes

Major updates to program architecture

- functions -> ‘Resources’
- notebooks dir.
- reports dir.
- bash script
- tossed scrap

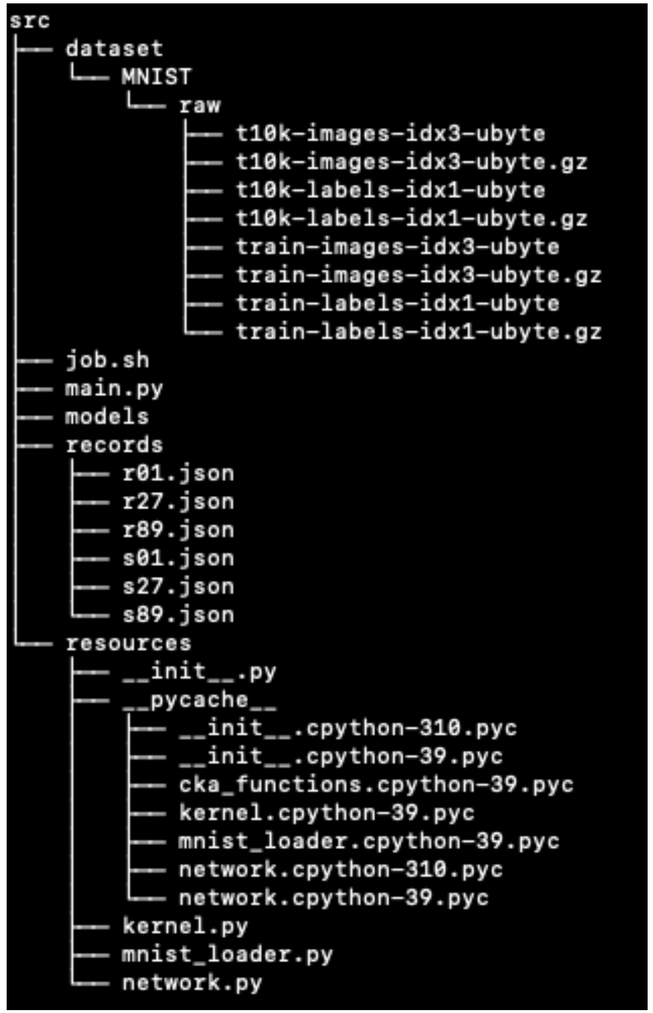




Code Changes

src

- ‘dataset’ contains MNIST data
- ‘job.sh’ -> bash-script for running multi. models
- ‘records’ contains past models data
- ‘resources’ contains functions used in main.py



Code Changes

MSE implementation

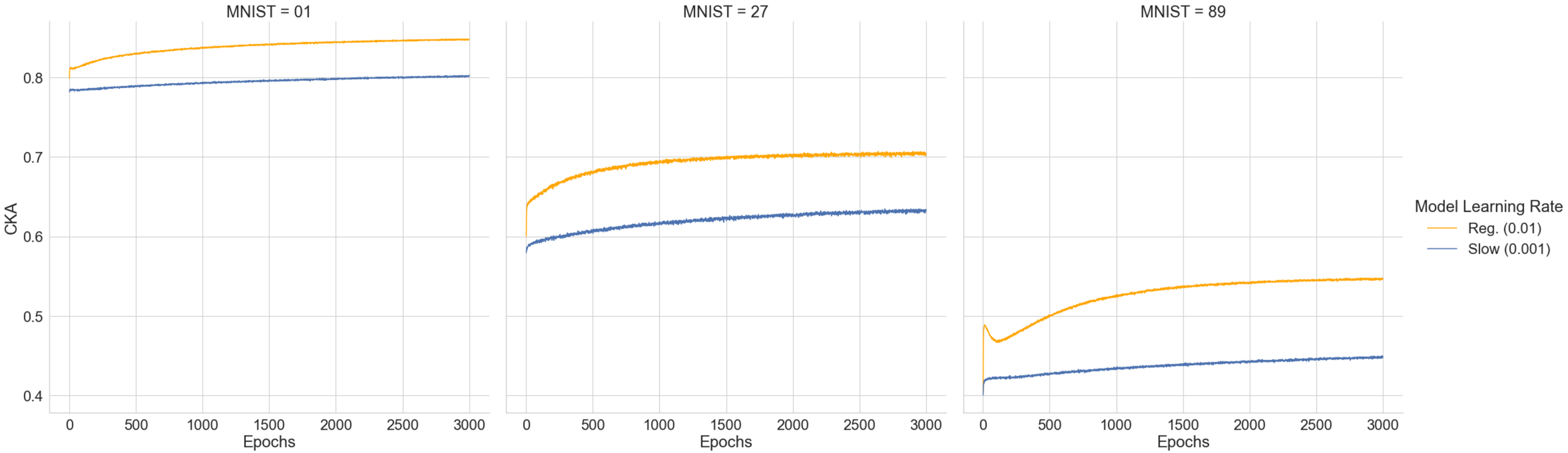
changed previous

‘classify_targets’ to

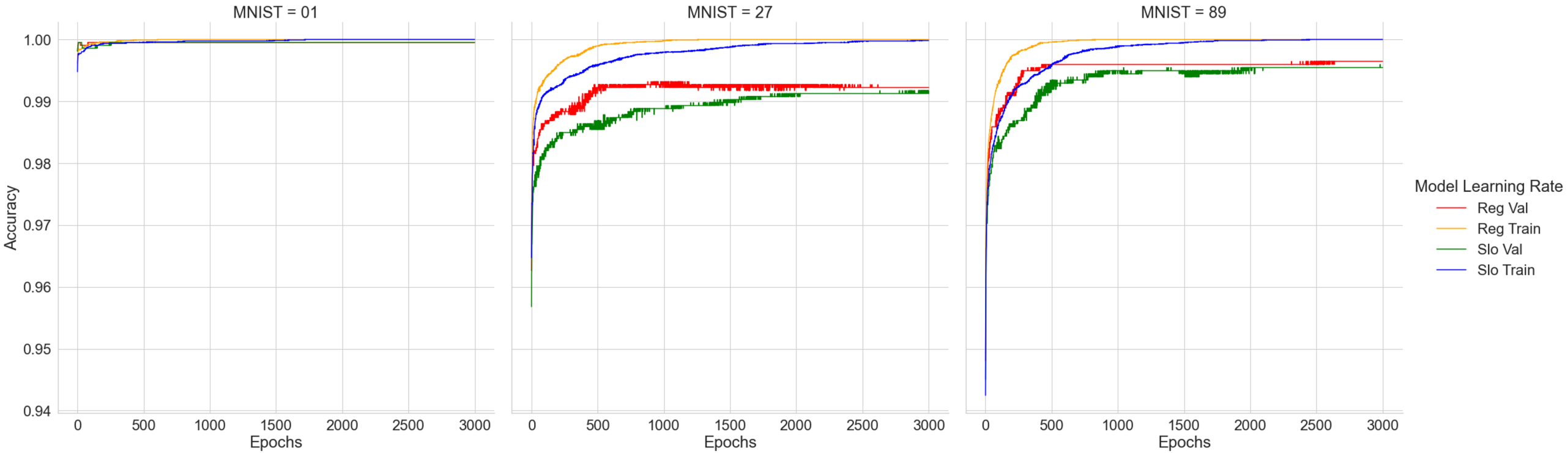
‘one_hot’.

```
40
41      def train_one_epoch(self, loader, loss_function, optimizer, record=True):
42
43          # Array of centered kernal analysis.
44          cka = torch.zeros(len(loader))
45
46          for i, (data, targets) in enumerate(loader):
47              data = data.reshape(data.shape[0], -1).to(device=self.device)
48              targets = targets.to(torch.float32).to(device=self.device)
49
50              # Forwards pass.
51              scores = self(data)
52
53              labels = one_hot(targets.long() % len(self.values)).to(torch.float32)
54              output = loss_function(scores, labels)
55
56              # Backwards Pass.
57              optimizer.zero_grad()
58              output.backward()
59
60              # Step.
61              optimizer.step()
62
63              # Recording the C.K.A. for the batch index.
64              if record:
65                  cka[i] = kernel_calc(self.device, targets, self.features(data).to(device=self.device))
66
67          # Returning the C.K.A. if the option to record was chosen.
68          if record:
69              return cka
```

Plots



- 89 has hardest time achieving high CKA, followed by 27 then 01.
- Slow learning achieves lower CKA/epoch and converges slower.
- 01 grows the least but follows a similar pattern to 27
- 89 drops for 100 Epochs before CKA starts to increase then follows same pattern.



- 01 appears the be the easiest to predict, while 27 is the hardest.
- 01 also achieves near perfect accuracy very fast