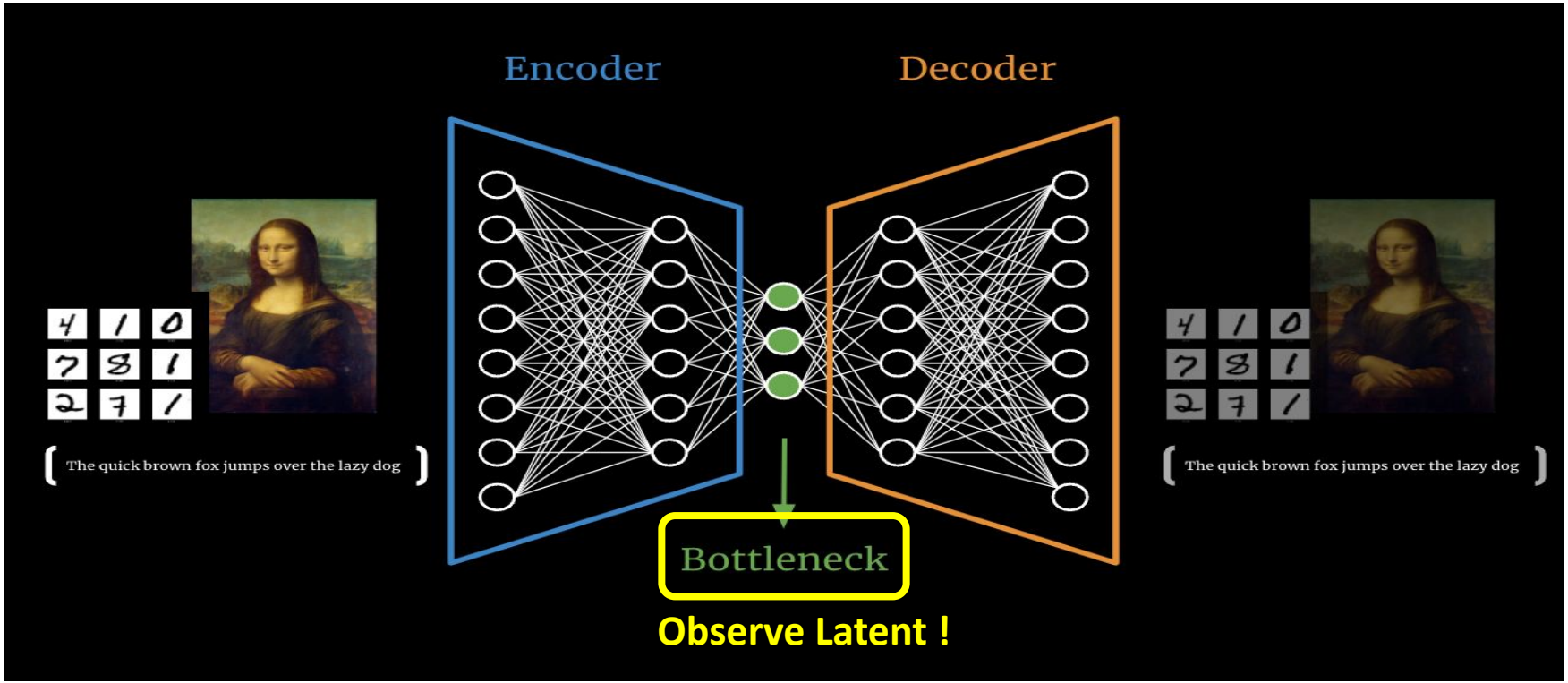
ML TA hours

HW8

Colab experiment : MNIST image reconstruction

2024.11.19

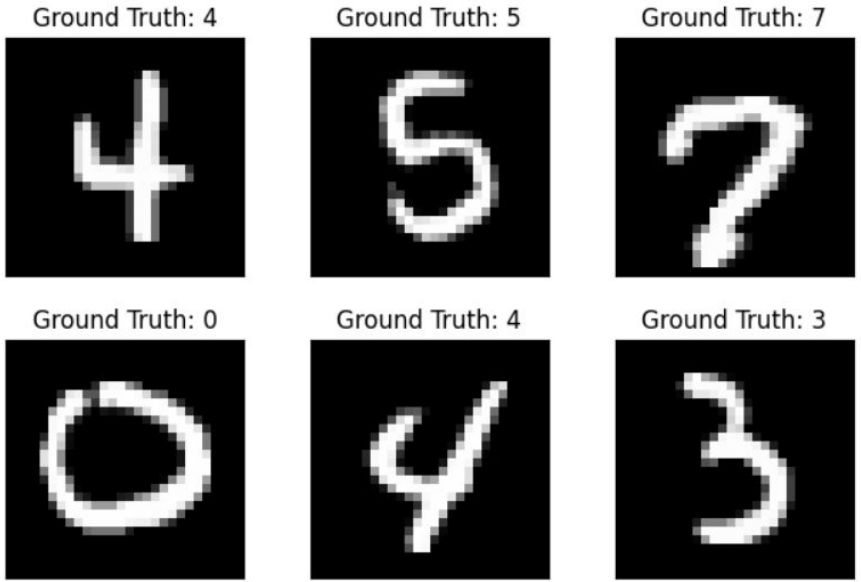
Task description - AutoEncoder



Task description - Dataset

MNIST dataset

- **Image size**: 28x28 pixels (grayscale)
- **Classes**: Digits from 0 to 9



TODO part

1. **Finish the Autoencoder model.**
2. Finish the training steps.

TODO - Finish the Autoencoder model

```
# TODO : Finish the Model
class LAutoencoder(nn.Module):
    def __init__(self):
        super().__init__()
        self.encoder = nn.Sequential(
            # TODO
            # The encoder at least 3 hidden layers, each with 128, 64, and 2 hidden units respectively


            )
        self.decoder = nn.Sequential(
            # TODO
            # The decoder also has at least 3 layers with the same number of hidden units in reversed order


            )

    def forward(self, x):
        # TODO

        return x,latent
```

To enable subsequent visualization, the final layer must have 2 units

1. **latent** should be the output of encoder
2. **x** should be the output of decoder

TODO part

1. Finish the Autoencoder model.
2. **Finish the training steps.**

TODO - Finish the training steps

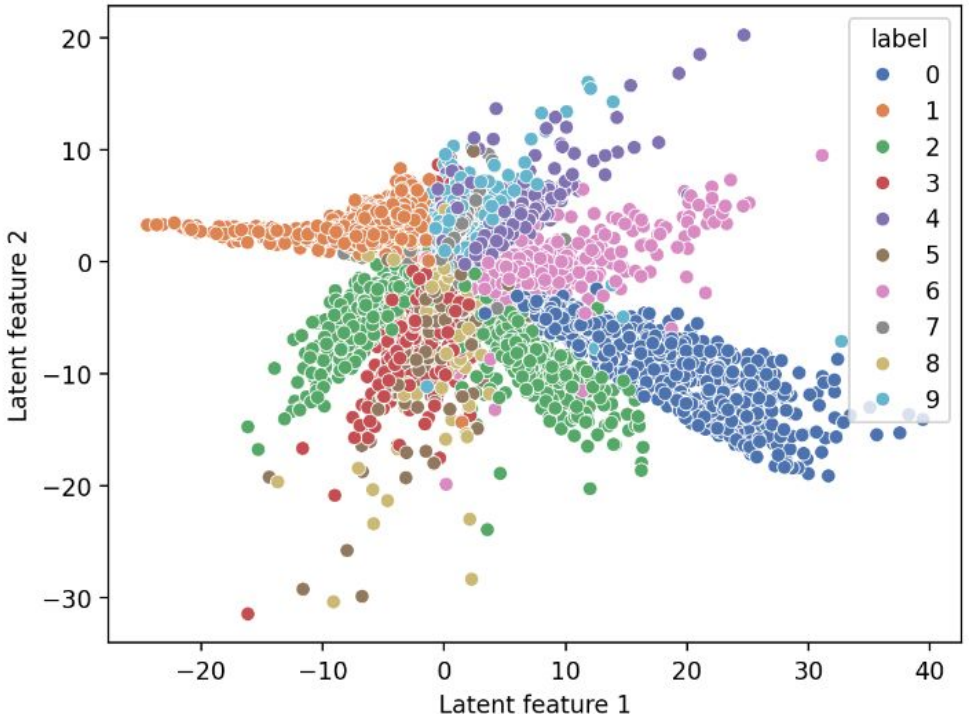
```
num_epochs = 10
learning_rate = 2e-3


model = LAutoencoder()
criterion = nn.MSELoss()
optimizer = torch.optim.AdamW(
        model.parameters(), lr=learning_rate)

# TODO : Finish the training steps
for epoch in range(num_epochs):
        for data in train_loader:
                #   TODO


        print(f'epoch [{epoch + 1}/{num_epochs}], loss:{loss.data.item()}')
```

The result will be like



Summarize what you need to do

1. Finish the Autoencoder model.
2. Finish the training steps.
3. Description of the methodology
4. Conclusions and discussions

Submission

- After executing your code, download the .ipynb file and submit it to NTU COOL
- Submitted file name: student ID_week12_colab_homework.ipynb
- HW3 Deadline : 2024/11/25 23:59 (Monday night)
- No late submission

- If there are any questions

  Email: r12945048@ntu.edu.tw (add “[ML HW8]” to the beginning of the title.)