loadDataset MNIST

October 5, 2025

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[1]: from torchvision import datasets
     from torchvision.transforms import ToTensor,transforms
     import matplotlib.pyplot as plt
     import matplotlib
     from torch.utils.data import DataLoader
     import torch
     import random
     from torch import nn
```

```
[2]: # model without softmax because nn.CrossEntropyLoss() have included
     class ImageClassificationModel2 (nn.Module):
         def __init__(self,input_shape,output_shape):
             super().__init__()
             self.layer_stack = nn.Sequential(
                 nn.Flatten(start_dim = 1, end_dim = -1),  # x_first_batch.shape =␣
      ↪torch.Size([32, 3, 32, 32]) should pick(3,32,32). Thus, change start_dim to 1
                 nn.Linear(in_features = input_shape, out_features = output_shape)
                 # ,nn.Softmax(dim = 1) # model(x_first_batch).shape = torch.
      ↪Size([32, 10]), should pick 10. Thus, change to dim = 1
             )

         def forward(self, x):
             return self.layer_stack(x)
```

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[3]: torch.manual_seed(87)
     model2 = ImageClassificationModel2(784,10)
```

```
[4]: #load train result
     state_dict = torch.load("image_classification_weights.pth", weights_only=True)
     model2.load_state_dict(state_dict)
```

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[4]: <All keys matched successfully>
```

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[5]: model2.state_dict()
```

```
[5]: OrderedDict([('layer_stack.1.weight',
                   tensor([[-0.0353,  0.0279, -0.0032,  …, -0.0251,  0.0327,
     -0.0172],
                      [-0.0107, -0.0177,  0.0131,  …,  0.0322, -0.0352,
0.0179],
                      [-0.0196,  0.0092,  0.0163,  …, -0.0203,  0.0294,
-0.0308],
                      …,
                      [ 0.0022,  0.0249, -0.0205,  …,  0.0311,  0.0052,
-0.0214],
                      [ 0.0281,  0.0322,  0.0321,  …,  0.0145, -0.0040,
0.0085],
                      [ 0.0242,  0.0077, -0.0030,  …,  0.0064,  0.0204,
0.0201]])),
             ('layer_stack.1.bias',
              tensor([-0.0864,  0.2267, -0.0180, -0.1125,  0.0773,  0.2201,
-0.0384,  0.1551,
                      -0.3890, -0.0361]))])
```

[7]:

```
from PIL import Image
```

[8]:

```
# Define the same transform used during training
transform = transforms.Compose([
    transforms.Grayscale(num_output_channels=1),  # For grayscale MNIST-like␣
 ↪data
    transforms.ToTensor()
])

# Load and preprocess the image
img_path = "archive/MNIST_dataset/test/6/18.png" #this is image '6'
image = Image.open(img_path)
input_tensor = transform(image).unsqueeze(0)  # Add batch dimension

#img = transform(image)  shape: [1, 28, 28]  (C, H, W)
#input_tensor = img.unsqueeze(0) shape: [1, 1, 28, 28] (B, C, H, W)


#Expected input of size [batch, channels, height, width]
#without batch, it will prompt error, Add a fake "batch" dimension to make it␣
 ↪valid. [batch, channels, height, width]
```

[10]:

```
with torch.no_grad():
    outputs = model2(input_tensor)
    _, predicted = torch.max(outputs, 1)
    pred_class = predicted.item()
```

[11]:

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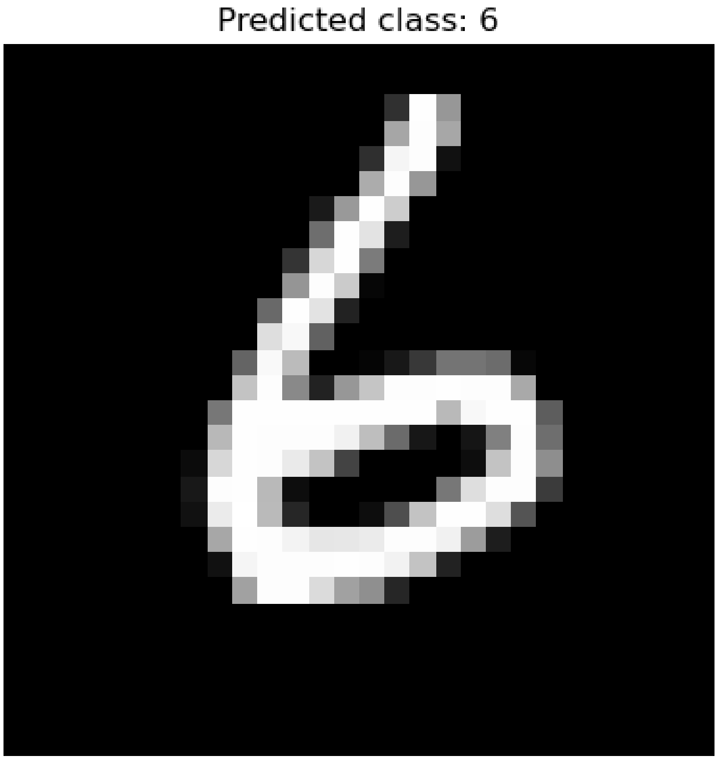
plt.imshow(image, cmap="gray")
plt.title(f"Predicted class: {pred_class}")
plt.axis("off")
plt.show()
```


Predicted class: 6

```
[ ]:
```