Assignment Name

MNIST Digit Classification Machine Learning Project

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PROJECT: MINOR

Code with Comments:

```
// fetching all the datasets…

from sklearn.datasets import fetch_openml
import matplotlib import
matplotlib.pyplot as plt import
numpy as np
from sklearn.linear_model import LogisticRegression from
sklearn.model_selection import cross_val_score


mnist = fetch_openml('mnist_784')
x, y = mnist['data'], mnist['target']

dg = x.to_numpy()[25000]

// reshaping to 28 by 28 pixels…
dg_image = dg.reshape(28, 28)

plt.imshow(dg_image, cmap=matplotlib.cm.binary,
interpolation='nearest')
plt.axis("off")
plt.show()
```

```
In [12]: plt.imshow(dg_image,cmap=matplotlib.cm.binary,interpolation='nearest')
         plt.axis("off")
         plt.show()
```

// Slicing the numpy array for training and testing…

x_train, x_test = x[0:60000], x[6000:70000]
y_train, y_test = y[0:60000], y[6000:70000]

// shuffling the data for better results…

shuffle_index = np.random.permutation(60000)
x_train, y_train = x_train.[shuffle_index], y_train.[shuffle_index]

// Creating a 3-detector

y_train = y_train.astype(np.int8)
y_test = y_test.astype(np.int8)
y_train_3 = (y_train == '3')
y_test_3 = (y_test == '3')

// Training a logistic regression classifier

clf = LogisticRegression(tol=0.1)

// using fit 'module' from classifier and 'predict' attribute to predict the data is correct or not (previously which we checked on dg)…

```
clf.fit(x_train, y_train_3)
res=       clf.predict([dg])
print(res)
```

// Cross Validation for better accuracy

```
mn = cross_val_score(clf, x_train, y_train_5, cv=3,
scoring="accuracy")
print(mn.mean())
```

// End of code.