# load-digits

June 20, 2024

[1]:
```
# Import necessary libraries
from sklearn.datasets import load_digits
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import classification_report

# Load dataset
digits = load_digits()
X, y = digits.data, digits.target

# Explore the dataset
# 1. Display dataset shape and target names
print(f"Dataset shape: {X.shape}")
print(f"Target names: {digits.target_names}")

# 2. Display sample images
plt.figure(figsize=(12, 6))
for i in range(10):  # Displaying first 10 images
    plt.subplot(2, 5, i + 1)
    plt.imshow(np.reshape(X[i], (8, 8)), cmap='gray')
    plt.title(f"Digit: {y[i]}")
    plt.axis('off')
plt.suptitle("Sample Images from Digits Dataset", y=1.05)
plt.tight_layout()
plt.show()

# 3. Visualize class distribution
plt.figure(figsize=(8, 5))
sns.countplot(x=y)
plt.title('Class Distribution')
plt.xlabel('Digit')
plt.ylabel('Count')
plt.show()
```

```python
# Train-test split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
↪random_state=42)

# Train model
svm = SVC()
svm.fit(X_train, y_train)

# Predict and evaluate
y_pred = svm.predict(X_test)
print(classification_report(y_test, y_pred))
```

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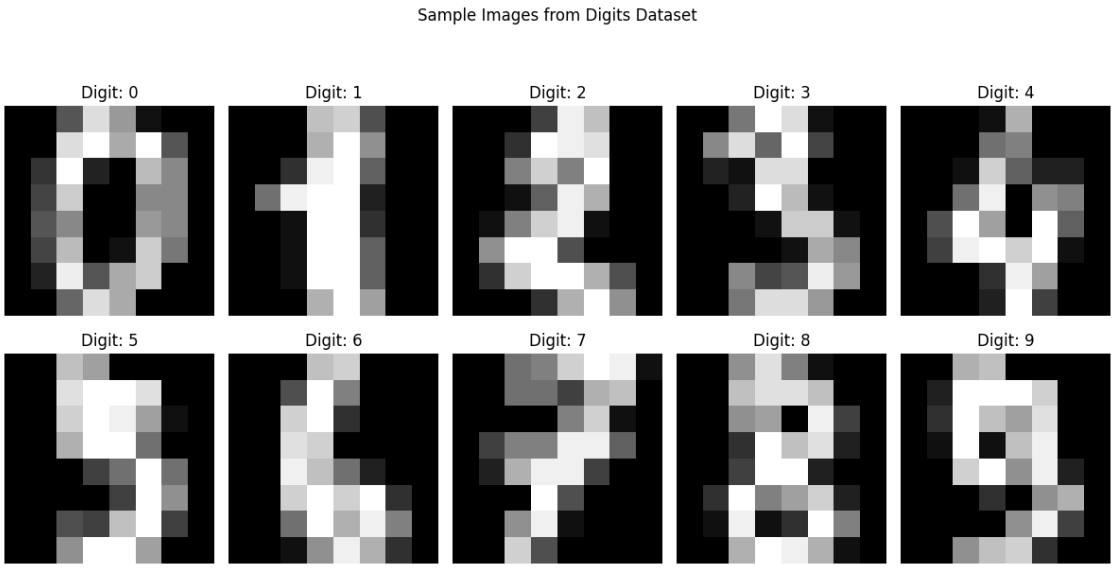
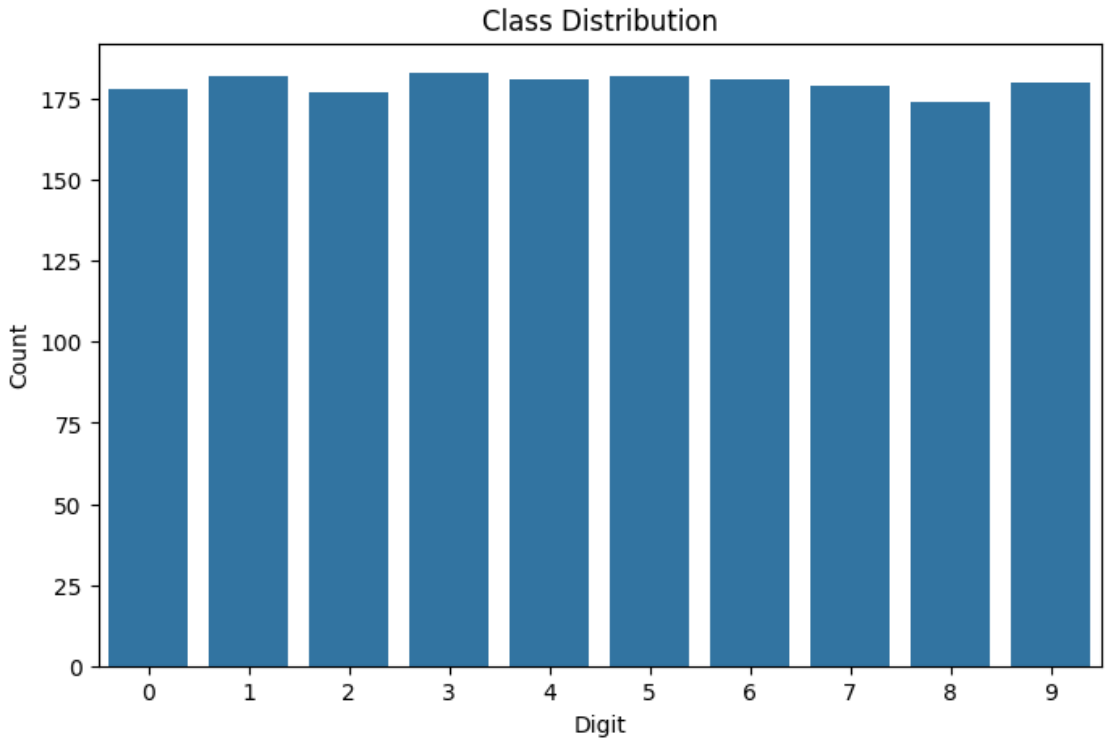
Dataset shape: (1797, 64)
Target names: [0 1 2 3 4 5 6 7 8 9]
```






| | precision | recall | f1-score | support |
|---|---|---|---|---|
| 0 | 1.00 | 1.00 | 1.00 | 33 |
| 1 | 1.00 | 1.00 | 1.00 | 28 |
| 2 | 1.00 | 1.00 | 1.00 | 33 |
| 3 | 1.00 | 1.00 | 1.00 | 34 |
| 4 | 1.00 | 1.00 | 1.00 | 46 |
| 5 | 0.98 | 0.98 | 0.98 | 47 |
| 6 | 0.97 | 1.00 | 0.99 | 35 |
| 7 | 0.97 | 0.97 | 0.97 | 34 |
| 8 | 1.00 | 0.97 | 0.98 | 30 |
| 9 | 0.95 | 0.95 | 0.95 | 40 |
| accuracy | | | 0.99 | 360 |
| macro avg | 0.99 | 0.99 | 0.99 | 360 |
| weighted avg | 0.99 | 0.99 | 0.99 | 360 |