6 Support vector machine (svm). classify handwritten digits using the MNIST dataset.

```
from sklearn import datasets
from sklearn.model_selection import
   train_test_split
from sklearn.preprocessing import Standard
 Scaler
from sklearn.svm, import SVC
from sklearn.metrics import classification_
report, confusion_matrix
import matplotlib.pyplot as plt

digits = datasets.load_digits()
X = digits.data
y = digits.target
X_train, X_test, Y_train, y_test = train_
test_split(x, y, test_size=0.2, random_
State=42, Stratify=y)

Scaler = StandardScaler()
X_train_Scaled = scaler.fit_transform(X_train
X_test_scaled = Scaler.transform(X_test)

y_pred = svm_model.predict(x_test_scaled)

Print("classification Report:\n", classification
    _report(y_test, y_pred))
Print("Confusion Matrix:\n", confusion_
    matrix(y_test, y_pred))

plt.figure(figsize=(10,4))
for index, (image, predictions) in
```

```
enumerate(zip(x_test[:8], y_pred
                   [:8])):
plt.subplot(2,4, index+1)
plt.imshow(image.reshape(8,8),
         cmap=plt.cm.gray_r)
plt.title(f"pred:{prediction}")
plt.axis('off')
plt.tight_layout()
plt.show()
```

OUTPUT:

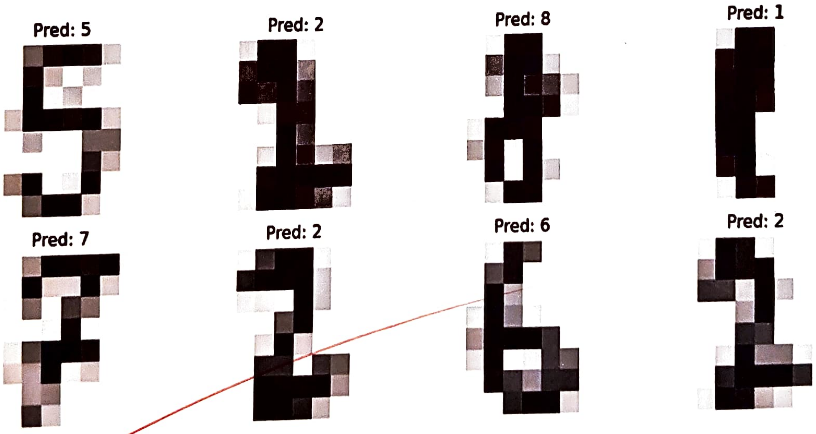
classification Report:

```
     precision   recall   f1-score   support
0      1.00       1.00      1.00        36
1      0.95       0.97      0.96        36
2      1.00       1.00      1.00        35
3      1.00       1.00      1.00        37
4      0.97       1.00      0.99        36
5      1.00       1.00      1.00        37
6      1.00       1.00      1.00        36
7      0.97       1.00      0.99        36
8      1.00       0.94      0.97        35
9      1.00       0.97      0.99        36

accuracy
                                0.99       360
macro avg   0.99      0.99      0.99       360
weight avg   0.99      0.99      0.99       360
```

Confusion Matrix :

```
[[36  0  0  0  0  0  0  0  0  0].
 [ 0 35  0  0  1  0  0  0  0  0]
 [ 0  0 35  0  0  0  0  0  0  0].
 [ 0  0 37  0  0  0  0  0  0  0]
 [ 0  0  0 36  0  0  0  0  0  0]
 [ 0  0  0  0 37  0  0  0  0  0]
 [ 0  0  0  0  0 36  0  0  0  0]
 [ 0  0  0  0  0  0 36  0  0  0]
 [ 0  2  0  0  0  0  0 33  0  0]
 [ 0  0  0  0  0  0  0  1  0 35]].
```


Pred: 5
Pred: 2
Pred: 8
Pred: 1
Pred: 7
Pred: 2
Pred: 6
Pred: 2