day52-random-forest-implementation

November 25, 2023

Day52 Random Forest Implementation   By: Loga Aswin

```
[43]: import numpy as np
      import pandas as pd
      import matplotlib.pyplot as plt
      import seaborn as sns
```

```
[44]: df = pd.read_csv('/content/car_evaluation.csv')
```

```
[45]: df.head()
```

```
[45]:    vhigh vhigh.1  2 2.1  small   low  unacc
      0  vhigh   vhigh  2   2  small   med  unacc
      1  vhigh   vhigh  2   2  small  high  unacc
      2  vhigh   vhigh  2   2    med   low  unacc
      3  vhigh   vhigh  2   2    med   med  unacc
      4  vhigh   vhigh  2   2    med  high  unacc
```

```
[46]: df.shape
```

```
[46]: (1727, 7)
```

```
[47]: col_names = ['paint', 'break', 'alloy', 'wheel', 'headlight', 'gear', 'engine']
      df.columns = col_names
      col_names
```

```
[47]: ['paint', 'break', 'alloy', 'wheel', 'headlight', 'gear', 'engine']
```

```
[48]: df.head()
```

```
[48]:    paint  break alloy wheel headlight  gear engine
      0  vhigh  vhigh     2     2     small   med  unacc
      1  vhigh  vhigh     2     2     small  high  unacc
      2  vhigh  vhigh     2     2       med   low  unacc
      3  vhigh  vhigh     2     2       med   med  unacc
      4  vhigh  vhigh     2     2       med  high  unacc
```

```
[49]: df.info
```

```
[49]: <bound method DataFrame.info of        paint  break  alloy wheel headlight  gear
      engine
      0     vhigh  vhigh      2     2     small   med  unacc
      1     vhigh  vhigh      2     2     small  high  unacc
      2     vhigh  vhigh      2     2       med   low  unacc
      3     vhigh  vhigh      2     2       med   med  unacc
      4     vhigh  vhigh      2     2       med  high  unacc
      …      …     …     …     …       …   …      …
      1722    low    low  5more  more       med   med   good
      1723    low    low  5more  more       med  high  vgood
      1724    low    low  5more  more       big   low  unacc
      1725    low    low  5more  more       big   med   good
      1726    low    low  5more  more       big  high  vgood

      [1727 rows x 7 columns]>
```

```
[50]: col_names = ['paint', 'break', 'alloy', 'wheel', 'headlight', 'gear', 'engine']

      for col in col_names:
        print(df[col].value_counts())
```

```
high     432
med      432
low      432
vhigh    431
Name: paint, dtype: int64
high     432
med      432
low      432
vhigh    431
Name: break, dtype: int64
3        432
4        432
5more    432
2        431
Name: alloy, dtype: int64
4       576
more    576
2       575
Name: wheel, dtype: int64
med      576
big      576
small    575
Name: headlight, dtype: int64
med     576
high    576
low     575
```

```
Name: gear, dtype: int64
unacc    1209
acc       384
good       69
vgood      65
Name: engine, dtype: int64
```

```
[51]: df['engine'].value_counts()
```

```
[51]: unacc    1209
      acc       384
      good       69
      vgood      65
      Name: engine, dtype: int64
```

```
[52]: df.isnull().sum()
```

```
[52]: paint        0
      break        0
      alloy        0
      wheel        0
      headlight    0
      gear         0
      engine       0
      dtype: int64
```

```
[53]: X = df.drop(['engine'],axis=1)
      y = df['engine']
```

```
[54]: from sklearn.model_selection import train_test_split

      X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2,␣
       ↪random_state=42)
```

```
[55]: X_train.shape, X_test.shape
```

```
[55]: ((1381, 6), (346, 6))
```

```
[56]: import category_encoders as ce

      encoder = ce.OrdinalEncoder(cols=['paint', 'break', 'alloy', 'wheel',␣
       ↪'headlight', 'gear'])

      X_train = encoder.fit_transform(X_train)
      X_test = encoder.transform(X_test)
```

```
[57]: X_train.head()
```

[57]:
```
      paint  break  alloy  wheel  headlight  gear
107       1      1      1      1          1     1
900       2      2      2      2          1     2
1708      3      3      3      1          2     3
705       4      4      4      1          3     2
678       4      4      2      1          3     2
```

[58]:
```python
from sklearn.ensemble import RandomForestClassifier

# instantiate the classifier

model = RandomForestClassifier(random_state=0)

# fit the model

model.fit(X_train, y_train)

# Predict the Test set results

y_pred = model.predict(X_test)
```

[59]:
```python
from sklearn.metrics import accuracy_score, classification_report,␣
 ↪confusion_matrix

accuracy = accuracy_score(y_test, y_pred)
print(accuracy)
```

```
0.9479768786127167
```

[60]:
```python
matrix = confusion_matrix(y_test, y_pred)
print(matrix)
```

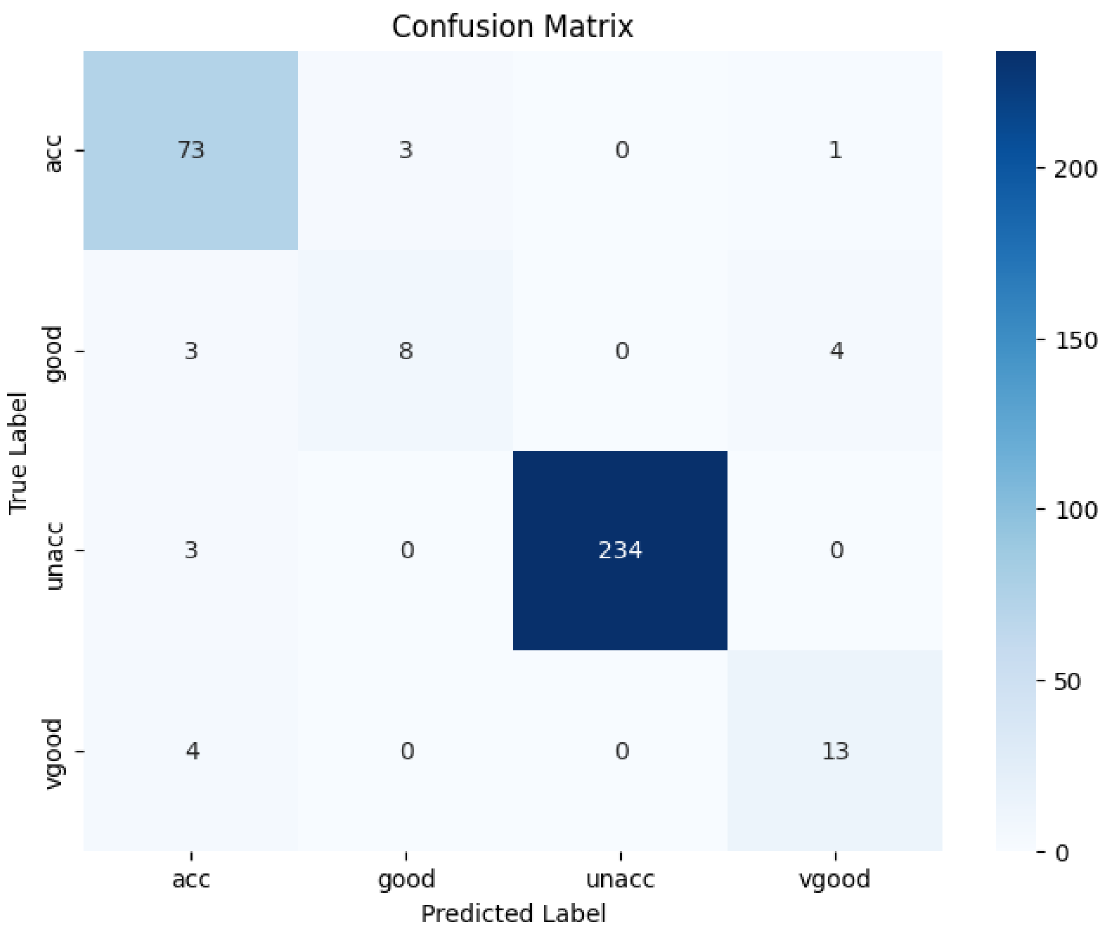
```
[[ 73   3   0   1]
 [  3   8   0   4]
 [  3   0 234   0]
 [  4   0   0  13]]
```

[61]:
```python
report = classification_report(y_test, y_pred)
print(report)
```

```
              precision    recall  f1-score   support

         acc       0.88      0.95      0.91        77
        good       0.73      0.53      0.62        15
       unacc       1.00      0.99      0.99       237
       vgood       0.72      0.76      0.74        17

    accuracy                           0.95       346
```

```
   macro avg       0.83      0.81      0.82       346
weighted avg       0.95      0.95      0.95       346
```

[62]:
```python
import seaborn as sns

plt.figure(figsize=(8, 6))
sns.heatmap(matrix, annot=True, fmt="d", cmap="Blues", xticklabels=model.
 ↪classes_, yticklabels=model.classes_)
plt.xlabel('Predicted Label')
plt.ylabel('True Label')
plt.title('Confusion Matrix')
plt.show()
```


Confusion Matrix
True Label
acc
good
unacc
vgood
acc
good
unacc
vgood
Predicted Label