Predicting Mobile Phone Prices with Random Forest

This presentation demonstrates the process of building a machine learning model to predict mobile phone prices using the Random Forest algorithm.

Problem Statement :

The project is to build a predictive model that can accurately classify mobile phones into predefined price

ranges based on various attributes such as battery power, camera features, memory, connectivity options,

and more. The dataset provided contains information about several mobile phones, including their

specifications and corresponding price ranges.

Data Preprocessing

Correlation Between The Features
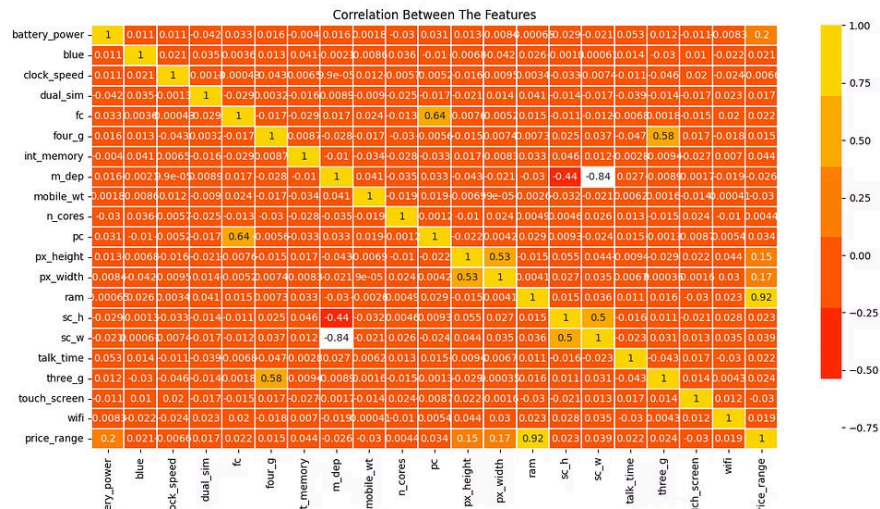
1 ——— Clean Data

The data is cleaned by adjusting the smallest height, width, and depth values.

2 ——— Visualize Correlations

Correlation between features is visualized using a heatmap.

Model Building

Random Forest Classifier

A Random Forest classifier is trained on the preprocessed data to predict the price range of mobile phones.

Model Evaluation

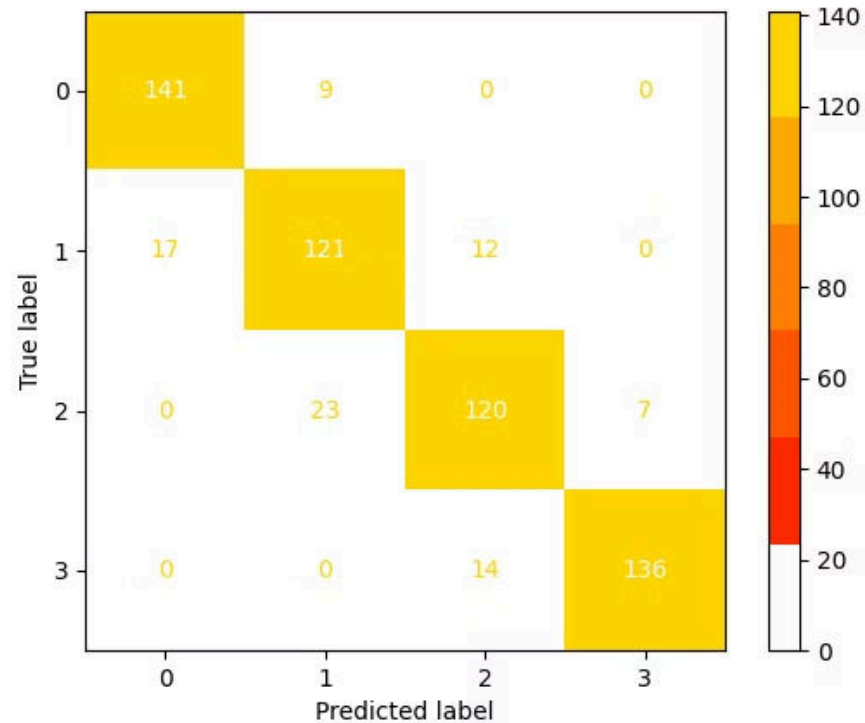The model's accuracy , confusion matrix and classification report are evaluated.

```python
#building the model using Random Forest
datacopy=data
X = datacopy.drop('price_range', axis=1)
y = datacopy['price_range'].values.reshape(-1, 1)
print( X.shape, y.shape)
X_train, X_test, y_train, y_test = train_test_split( *arrays: X, y, stratify=y, test_size = 0.3, random_state = 0)
RF_model = RandomForestClassifier()
RF_model.fit(X_train, y_train.ravel())
y_pred = RF_model.predict(X_test)
#accracy
print(accuracy_score(y_test, y_pred))
# Score
print(RF_model.score(X_train, y_train))
print(RF_model.score(X_test, y_test))


#Confusion Matrix
ConfusionMatrixDisplay.from_estimator(RF_model, X_test, y_test, cmap=cmap)


plt.show()
#classification report
print(classification_report(y_test, y_pred))
```

Model Evaluation

1 **Accuracy Metrics**

The model's accuracy score, training score, and testing score are calculated.

2 **Confusion Matrix**

The confusion matrix and classification report are displayed.

```
    predicted_price_cat
0           Very High Price
1           Very High Price
2                High Price
3           Very High Price
4             Medium Price
..                     ...
995           Medium Price
996           Medium Price
997              Low Price
998             High Price
999             High Price

[1000 rows x 22 columns]
```

Predicting Test Data

Predict Prices

The trained model is used to predict the price range of test data.

Price Categorization

The predicted prices are categorized into price categories(Low Price , Medium Price , High Price , Very High Price) .

Practical Applications of the Classification Code

Pricing Optimization

Retailers can use the code to price their mobile phone inventory competitively and maximize profitability.

Product Recommendations

The code can help consumers find the best-value mobile phones based on their budget and needs.

Market Insights

Manufacturers can leverage the code's insights to guide their product development and pricing strategies.