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import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report

# Sample mobile price dataset
data = {
    "RAM": [2, 4, 6, 8, 12, 3, 4, 6],
    "Storage": [16, 32, 64, 128, 256, 32, 64, 128],
    "Battery": [3000, 3500, 4000, 4500, 5000, 3200, 4200, 4800],
    "Camera": [8, 12, 16, 48, 64, 13, 20, 48],
    "PriceRange": ["Low", "Medium", "Medium", "High", "High", "Low",
    "Medium", "High"]
}

df = pd.DataFrame(data)
df

{
  "summary": {
    "name": "df",
    "rows": 8,
    "fields": [
      {
        "column": "RAM",
        "properties": {
          "dtype": "number",
          "std": 3,
          "min": 2,
          "max": 12,
          "num_unique_values": 6,
          "samples": [2, 4, 3, 1, 4, 2, 3, 1]
        }
      },
      {
        "column": "Storage",
        "properties": {
          "dtype": "number",
          "std": 79,
          "min": 16,
          "max": 256,
          "num_unique_values": 5,
          "samples": [32, 256, 64, 32, 256, 32, 32, 32]
        }
      },
      {
        "column": "Battery",
        "properties": {
          "dtype": "number",
          "std": 738,
          "min": 3000,
          "max": 5000,
          "num_unique_values": 8,
          "samples": [3200, 3000, 3500, 3200, 3000, 3500, 3200, 3000]
        }
      },
      {
        "column": "Camera",
        "properties": {
          "dtype": "number",
          "std": 21,
          "min": 8,
          "max": 64,
          "num_unique_values": 7,
          "samples": [8, 12, 13, 16, 13, 12, 16, 8]
        }
      },
      {
        "column": "PriceRange",
        "properties": {
          "dtype": "category",
          "num_unique_values": 3,
          "samples": ["Low", "High", "Medium"]
        }
      }
    ]
  }
}

# Convert target labels to numerical values
df["PriceRange"] = df["PriceRange"].map({

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    "Low": 0,
    "Medium": 1,
    "High": 2
})

X = df[["RAM", "Storage", "Battery", "Camera"]]
y = df["PriceRange"]

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.25, random_state=42
)

model = RandomForestClassifier(n_estimators=100, random_state=42)
model.fit(X_train, y_train)

RandomForestClassifier(random_state=42)

y_pred = model.predict(X_test)

print("Accuracy:", accuracy_score(y_test, y_pred))
print("\nClassification Report:",
      classification_report(y_test, y_pred, zero_division=0))

Accuracy: 0.5

Classification Report:
              precision    recall   f1-score   support
              0       0.50     1.00     0.67      1
              1       0.00     0.00     0.00      1

           accuracy         0.50      2
      macro avg       0.25     0.50     0.33      2
weighted avg       0.25     0.50     0.33      2

# New mobile phone details
new_mobile = pd.DataFrame(
    [[6, 128, 4500, 48]],
    columns=["RAM", "Storage", "Battery", "Camera"]
)

prediction = model.predict(new_mobile)

price_map = {0: "Low", 1: "Medium", 2: "High"}
print("Predicted Mobile Price Range:", price_map[prediction[0]])

Predicted Mobile Price Range: High

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