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import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier, plot_tree
from sklearn.metrics import classification_report, accuracy_score
import matplotlib.pyplot as plt

# Load dataset
df = pd.read_csv('data/bank-additional-full.csv', sep=';')

# Preprocessing
df = pd.get_dummies(df, drop_first=True)

# Features & Target
X = df.drop('y_yes', axis=1)
y = df['y_yes']

# Train-test split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3,
random_state=42)

# Decision Tree Classifier
clf = DecisionTreeClassifier(max_depth=5, random_state=42)
clf.fit(X_train, y_train)

# Predictions
y_pred = clf.predict(X_test)

# Evaluation
print("Accuracy:", accuracy_score(y_test, y_pred))
print("\nClassification Report:\n", classification_report(y_test, y_pred))

# Plot Decision Tree
plt.figure(figsize=(20,10))
plot_tree(clf, filled=True, feature_names=X.columns, class_names=["No", "Yes"])
plt.savefig("output/decision_tree.png")
plt.show()

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