Prova MAC0459 - 2021

Questão 2

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Dataset

Analisaremos alguns dados do dataset Heart Disease, sendo estes:

1. Idade do paciente (*age*)
2. Sexo do paciente (*sex*)
3. Pressão arterial em repouso (*trestbps*)
4. *ST depression induced by exercise relative to rest* (*oldpeak*)

Com 304 pacientes observados, este dataset oferece uma alta variabilidade de pacientes, tendo de jovens a idosos de ambos os sexos, com doença ou não.

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split
from sklearn.model_selection import GridSearchCV
```

```
from google.colab import files
uploaded = files.upload()
```

Choose Files heart.csv

- **heart.csv**(text/csv) - 11328 bytes, last modified: 1/14/2022 - 100% done

```
Saving heart.csv to heart.csv
```

```
# Criação do dataframe
df_heart = pd.read_csv("heart.csv")
df_heart[['age', 'trestbps', 'cp']]
```

	age	trestbps	cp
0	63	145	3
1	37	130	2
2	41	130	1
3	56	120	1
4	57	120	0
...	...	...	...
298	57	140	0
299	45	110	3
300	68	144	0

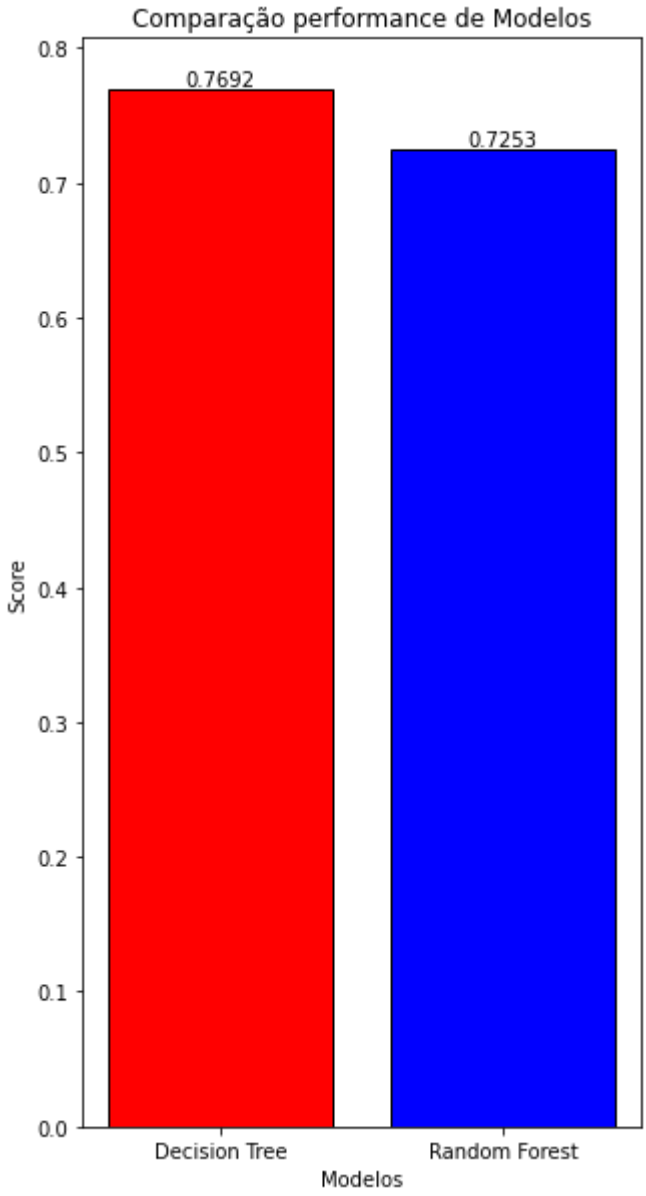
```
features = ['age', 'trestbps', 'oldpeak']
x = df_heart[features]
y = df_heart['sex']

x_treinado, x_validado, y_treinado, y_validado = train_test_split(x, y, test_size=(


random_forest = RandomForestClassifier(random_state=0)
decision_tree = DecisionTreeClassifier(random_state=0)


# Parâmetros para modelo de Random Forest
criterion = ['gini', 'entropy']
max_depth = [4, 5, 6]
n_estimators = [50, 100, 500]
max_features = ['auto', 'sqrt', 'log2']
params_random_forest = dict(criterion=criterion, n_estimators=n_estimators, max_fea

# Parâmetros para modelo de Decision Tree
criterion = ['gini', 'entropy']
splitter = ['best', 'random']
max_depth = [4, 5, 6]
min_samples_leaf = [0.1, 0.2, 0.3]
max_features = ['auto', 'sqrt', 'log2']
params_decision_tree = dict(criterion=criterion, splitter=splitter, max_depth=max_(


# Random Forest
random_forest_grid = GridSearchCV(random_forest, params_random_forest, cv=5, scorin
random_forest_grid.fit(x_treinado, y_treinado)
```

```
Fitting 5 folds for each of 54 candidates, totalling 270 fits
GridSearchCV(cv=5, estimator=RandomForestClassifier(random_state=0), n_jobs=-
             param_grid={'criterion': ['gini', 'entropy'],
                         'max_depth': [4, 5, 6],
                         'max_features': ['auto', 'sqrt', 'log2'],
                         'n_estimators': [50, 100, 500]},
             scoring='accuracy', verbose=True)
```

```
# Decision Tree
decision_tree_grid = GridSearchCV(decision_tree, params_decision_tree, cv=5, scori
decision_tree_grid.fit(x_treinado, y_treinado)
```

```
Fitting 5 folds for each of 108 candidates, totalling 540 fits
GridSearchCV(cv=5, estimator=DecisionTreeClassifier(random_state=0), n_jobs=-
             param_grid={'criterion': ['gini', 'entropy'],
                         'max_depth': [4, 5, 6],
                         'max_features': ['auto', 'sqrt', 'log2'],
                         'min_samples_leaf': [0.1, 0.2, 0.3],
                         'splitter': ['best', 'random']},
             scoring='accuracy', verbose=True)
```

```
score_decision_tree = decision_tree_grid.score(x_validado, y_validado)
score_random_forest = random_forest_grid.score(x_validado, y_validado)

models = np.array(['Decision Tree', 'Random Forest'])

scores_validacao = np.array([score_decision_tree, score_random_forest])
scores_validacao = np.around(scores_validacao, 4)

fig = plt.figure(figsize = (5, 10))

plt.bar(models, scores_validacao, color=['red', 'blue'], ec='black')

for i in range(len(scores_validacao)):
    plt.text(i, scores_validacao[i], scores_validacao[i], ha='center', va='bottom'

plt.title('Comparação performance de Modelos')
plt.xlabel('Modelos')
plt.ylabel('Score')
plt.show()
```



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