Assignment 6

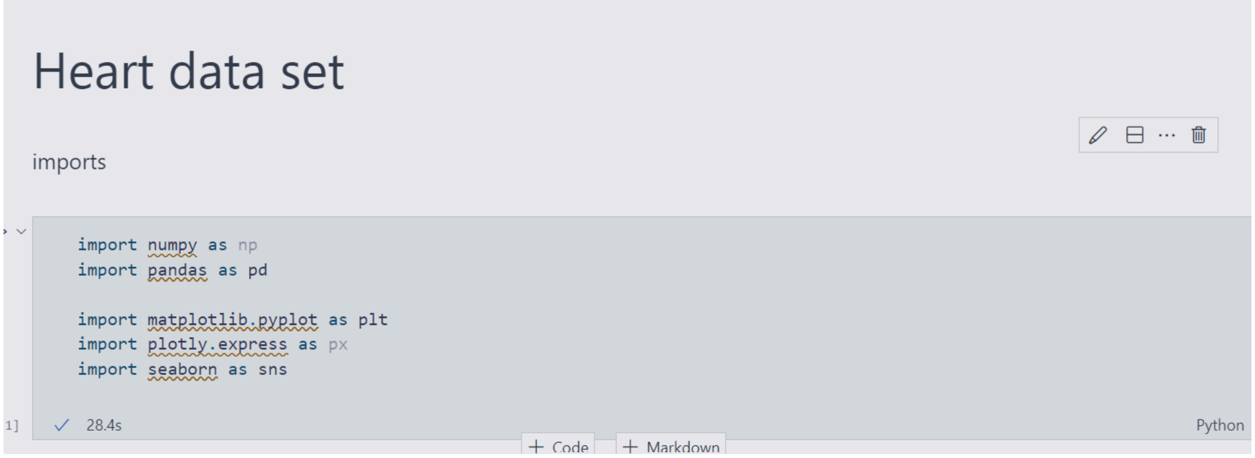
-by Aditya verma

Dataset -

https://drive.google.com/file/d/1G3O3u3HGmQFZTaJ7M9mtaJhdm6Q4VQmz/view?usp=classroom_web&authuser=0

Aim

Assignment 06 : Perform KNN, SVM and Decision Tree classifier to predict the heart disease based on the attached dataset. Also perform comparative study among the models.

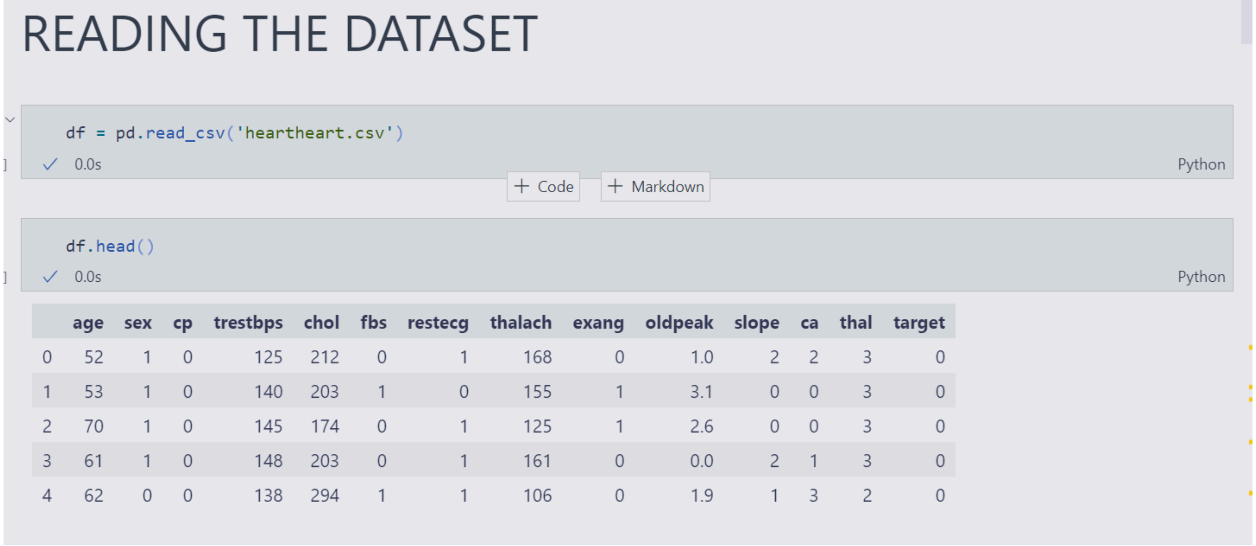


Heart data set

imports

```
import numpy as np
import pandas as pd

import matplotlib.pyplot as plt
import plotly.express as px
import seaborn as sns
```

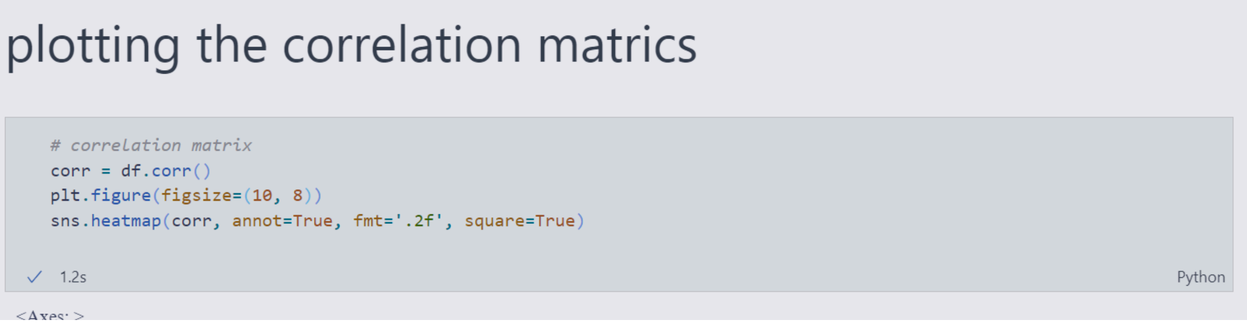


READING THE DATASET

```
df = pd.read_csv('heartheart.csv')
```

```
df.head()
```

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
0	52	1	0	125	212	0	1	168	0	1.0	2	2	3	0
1	53	1	0	140	203	1	0	155	1	3.1	0	0	3	0
2	70	1	0	145	174	0	1	125	1	2.6	0	0	3	0
3	61	1	0	148	203	0	1	161	0	0.0	2	1	3	0
4	62	0	0	138	294	1	1	106	0	1.9	1	3	2	0



plotting the correlation matrics

```python
# correlation matrix
corr = df.corr()
plt.figure(figsize=(10, 8))
sns.heatmap(corr, annot=True, fmt='.2f', square=True)
```

```
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```
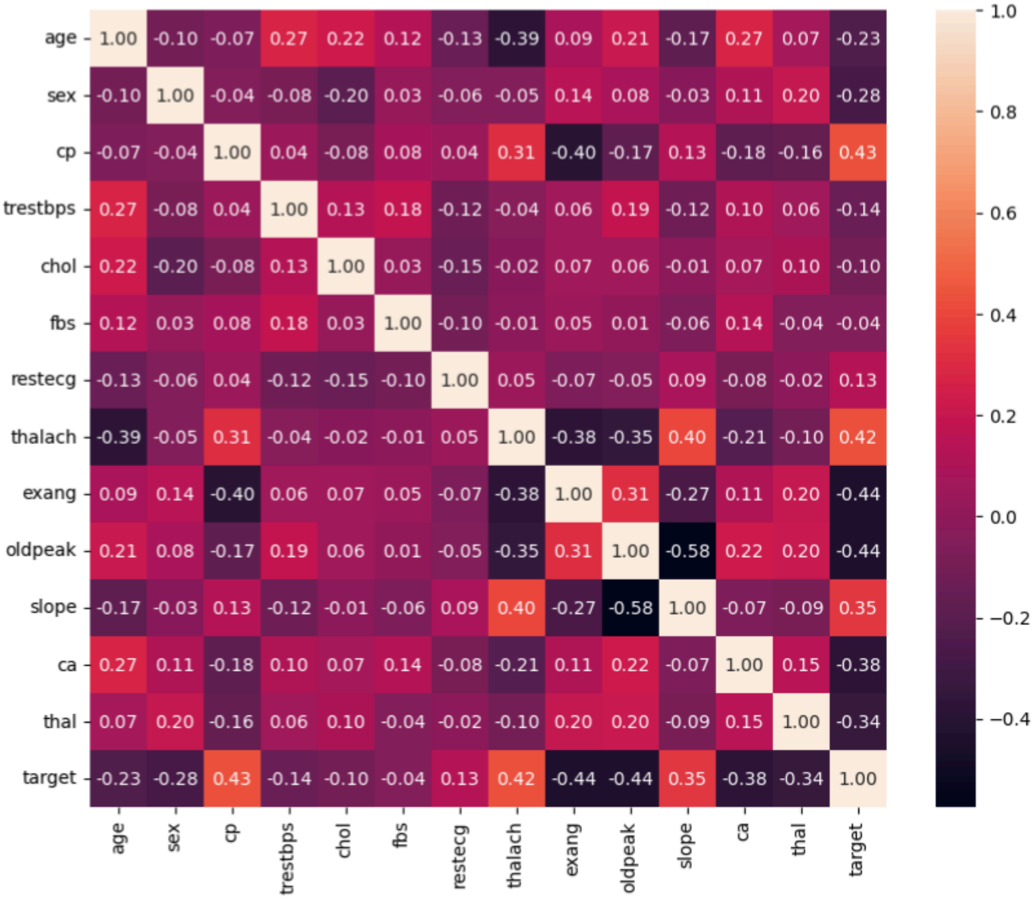
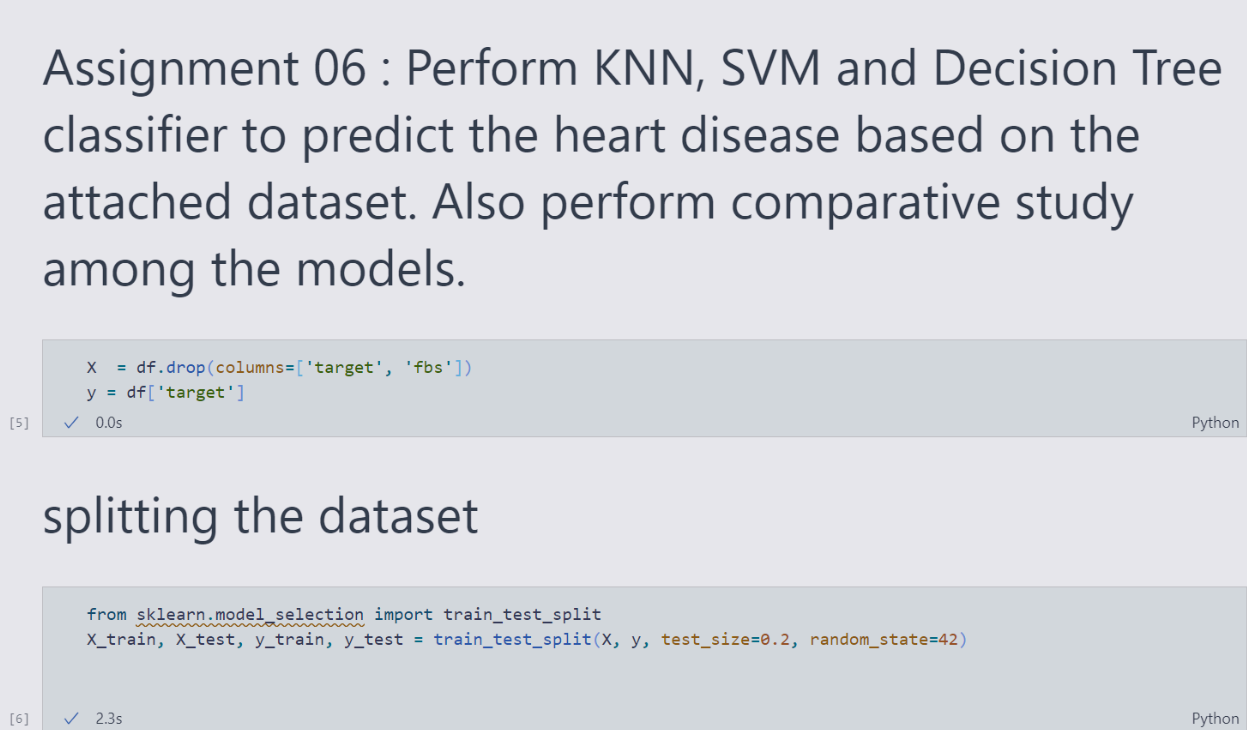



	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
age	1.00	-0.10	-0.07	0.27	0.22	0.12	-0.13	-0.39	0.09	0.21	-0.17	0.27	0.07	-0.23
sex	-0.10	1.00	-0.04	-0.08	-0.20	0.03	-0.06	-0.05	0.14	0.08	-0.03	0.11	0.20	-0.28
cp	-0.07	-0.04	1.00	0.04	-0.08	0.08	0.04	0.31	-0.40	-0.17	0.13	-0.18	-0.16	0.43
trestbps	0.27	-0.08	0.04	1.00	0.13	0.18	-0.12	-0.04	0.06	0.19	-0.12	0.10	0.06	-0.14
chol	0.22	-0.20	-0.08	0.13	1.00	0.03	-0.15	-0.02	0.07	0.06	-0.01	0.07	0.10	-0.10
fbs	0.12	0.03	0.08	0.18	0.03	1.00	-0.10	-0.01	0.05	0.01	-0.06	0.14	-0.04	-0.04
restecg	-0.13	-0.06	0.04	-0.12	-0.15	-0.10	1.00	0.05	-0.07	-0.05	0.09	-0.08	-0.02	0.13
thalach	-0.39	-0.05	0.31	-0.04	-0.02	-0.01	0.05	1.00	-0.38	-0.35	0.40	-0.21	-0.10	0.42
exang	0.09	0.14	-0.40	0.06	0.07	0.05	-0.07	-0.38	1.00	0.31	-0.27	0.11	0.20	-0.44
oldpeak	0.21	0.08	-0.17	0.19	0.06	0.01	-0.05	-0.35	0.31	1.00	-0.58	0.22	0.20	-0.44
slope	-0.17	-0.03	0.13	-0.12	-0.01	-0.06	0.09	0.40	-0.27	-0.58	1.00	-0.07	-0.09	0.35
ca	0.27	0.11	-0.18	0.10	0.07	0.14	-0.08	-0.21	0.11	0.22	-0.07	1.00	0.15	-0.38
thal	0.07	0.20	-0.16	0.06	0.10	-0.04	-0.02	-0.10	0.20	0.20	-0.09	0.15	1.00	-0.34
target	-0.23	-0.28	0.43	-0.14	-0.10	-0.04	0.13	0.42	-0.44	-0.44	0.35	-0.38	-0.34	1.00



Assignment 06 : Perform KNN, SVM and Decision Tree classifier to predict the heart disease based on the attached dataset. Also perform comparative study among the models.

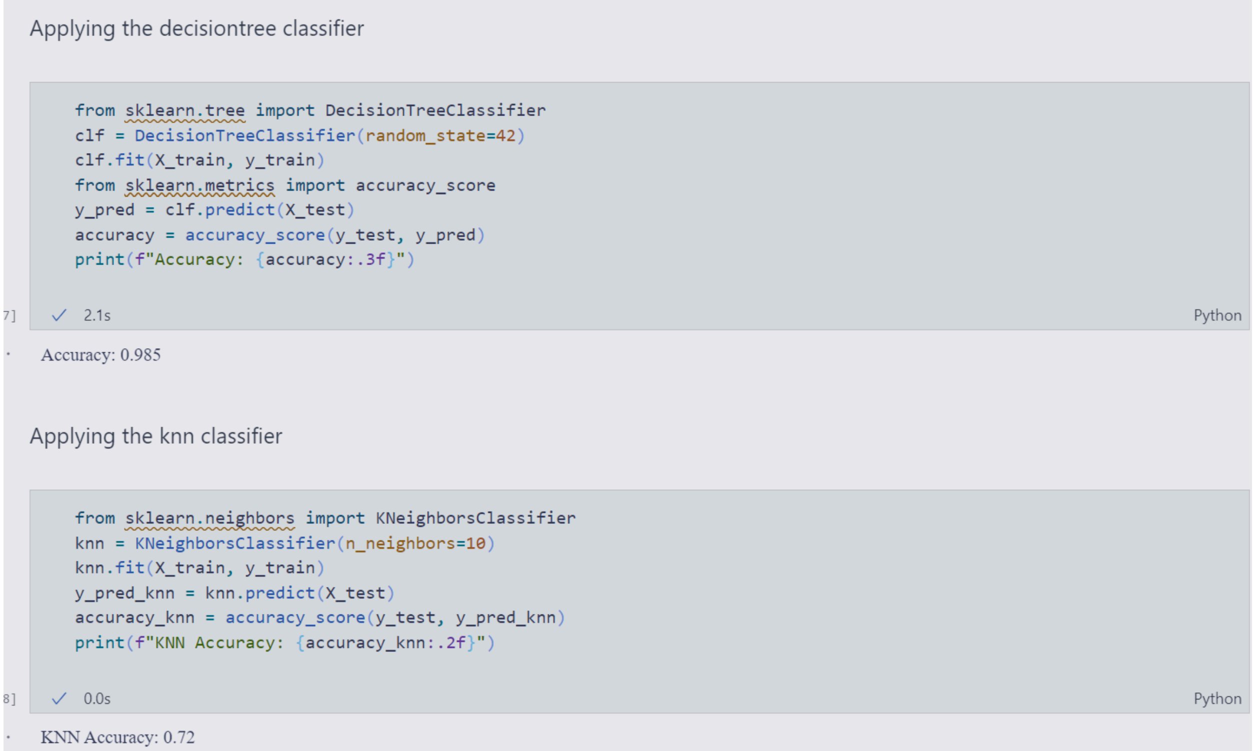
```
X  = df.drop(columns=['target', 'fbs'])
y = df['target']
```

[5] ✓ 0.0s Python

splitting the dataset

```
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)
```

[6] ✓ 2.3s Python



Applying the decisiontree classifier

```
from sklearn.tree import DecisionTreeClassifier
clf = DecisionTreeClassifier(random_state=42)
clf.fit(X_train, y_train)
from sklearn.metrics import accuracy_score
y_pred = clf.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy:.3f}")
```

7] ✓ 2.1s Python

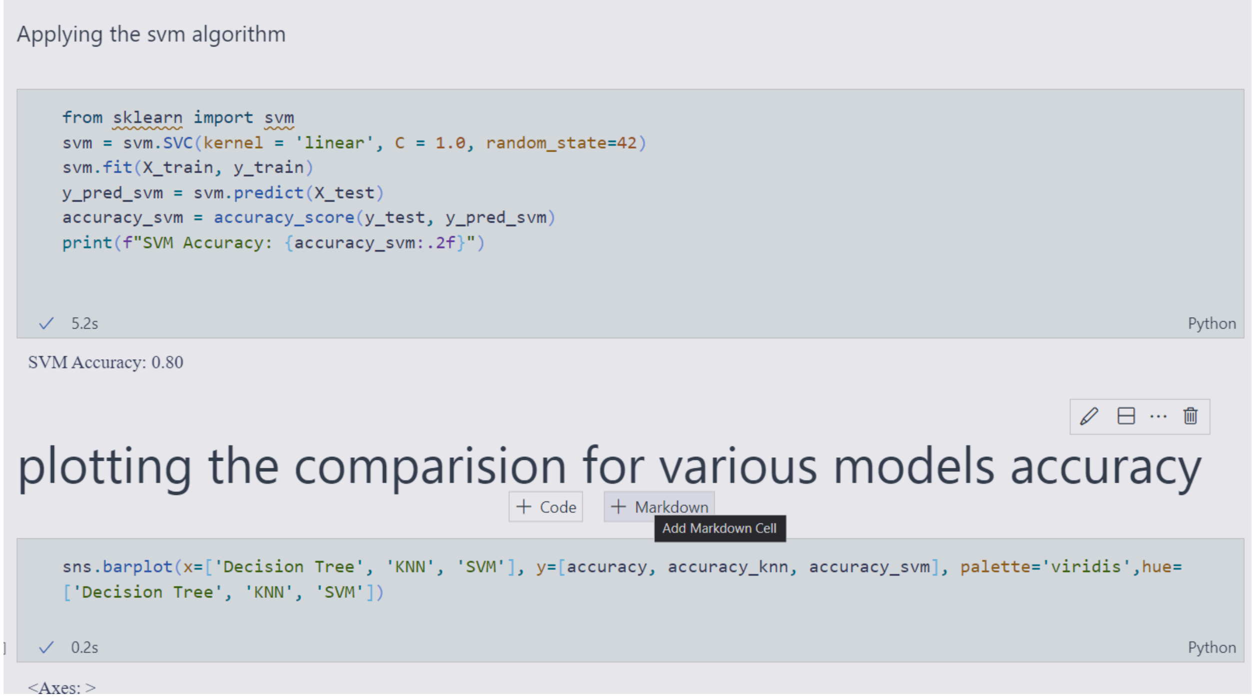
```
Accuracy: 0.985
```

Applying the knn classifier

```
from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier(n_neighbors=10)
knn.fit(X_train, y_train)
y_pred_knn = knn.predict(X_test)
accuracy_knn = accuracy_score(y_test, y_pred_knn)
print(f"KNN Accuracy: {accuracy_knn:.2f}")
```

8] ✓ 0.0s Python

```
KNN Accuracy: 0.72
```



Applying the svm algorithm

```
from sklearn import svm
svm = svm.SVC(kernel = 'linear', C = 1.0, random_state=42)
svm.fit(X_train, y_train)
y_pred_svm = svm.predict(X_test)
accuracy_svm = accuracy_score(y_test, y_pred_svm)
print(f"SVM Accuracy: {accuracy_svm:.2f}")
```

```
SVM Accuracy: 0.80
```

plotting the comparision for various models accuracy

```
sns.barplot(x=['Decision Tree', 'KNN', 'SVM'], y=[accuracy, accuracy_knn, accuracy_svm], palette='viridis',hue=
['Decision Tree', 'KNN', 'SVM'])
```

```
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```

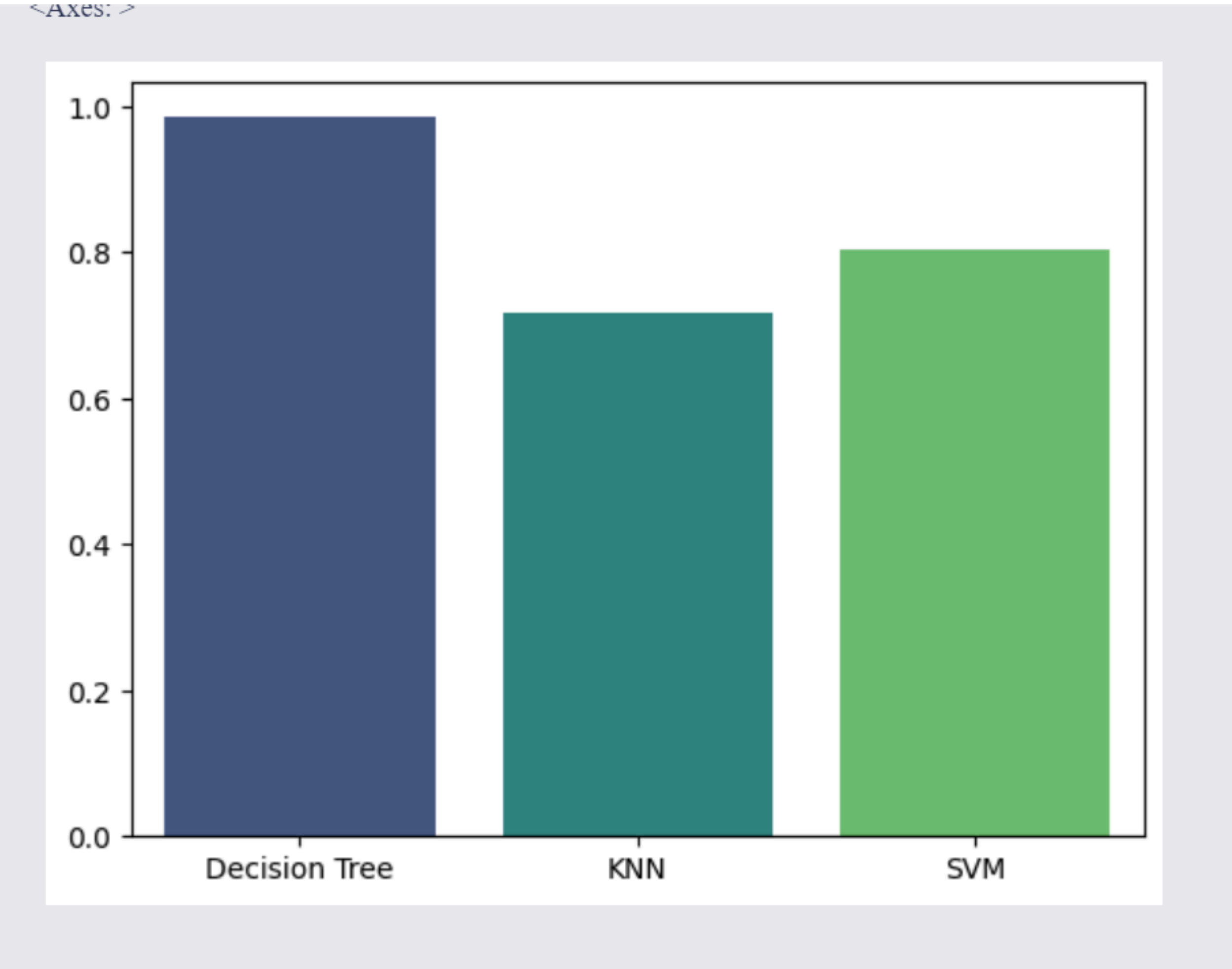

```
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```

Conclusion

Colab link

heart.ipynb

https://colab.research.google.com/drive/1iF3xtPFJdNiRyaL-nDPqm4K0mqw91Y-y?usp=sharing