

XYZ Pharma company wanted to build machine learning model to predict which drug type is good for the patient based on the patient details

In this project, U have used following classssification algorithm

KNN Algorithm

Decision Tree Classification

Support Vector Machine

Random Forest

Gaussian Naive Bayes

Stochastic Gradient Descent

Linear SVC

```
1 import numpy as np # Linear Algebra
2 import pandas as pd # Data processing, CSV file
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```


Loading and Exploring Data

```
1 data = pd.read_csv('/content/drug200.csv')
```



```
1 Start coding or generate with AI.
```

Data Size and Structure

```
1 data.head()
```



	Age	Sex	BP	Cholesterol	Na_to_K	Drug
0	23	F	HIGH	HIGH	25.355	drugY
1	47	M	LOW	HIGH	13.093	drugC
2	47	M	LOW	HIGH	10.114	drugC
3	28	F	NORMAL	HIGH	7.798	drugX
4	61	F	LOW	HIGH	18.043	drugY

Next steps:

Generate code with data

View recommended plots

New interactive sheet

Features In Data

```
1 print('='*50)
2 print('Columns in data')
3 print('='*50)
4 print(data.columns.values)
```

```
=====
Columns in data
=====
['Age' 'Sex' 'BP' 'Cholesterol' 'Na_to_K' 'Drug']
```

The target featre is drug type

The feature sets are:

- age : Age of patient
- Sex : Sex/Gender of patient
- Blood Pressure Levels("BP")
- Cholestrol Level
- Na to Potassium Ration

```
1 print('='*20)
2 print("Data Shape")
3 print('='*20)
4 print('='*20)
5 print(data.shape)
```

```
=====
Data Shape
=====
(200, 6)
```

The data contains 200 samples

New section

Descriptive Statistics

```
1 data.describe()
```

	Age	Na_to_K
count	200.000000	200.000000
mean	44.315000	16.084485
std	16.544315	7.223956
min	15.000000	6.269000
25%	31.000000	10.445500
50%	45.000000	13.936500
75%	58.000000	19.380000
max	74.000000	38.247000

```
1 print('='*50)
2 print("\nData Information")
3 print('='*50)
4 print(data.info())
```

```
=====

Data Information
=====
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 6 columns):
#   Column      Non-Null Count  Dtype
---  -
0   Age         200 non-null   int64
1   Sex         200 non-null   object
2   BP          200 non-null   object
3   Cholesterol 200 non-null   object
4   Na_to_K     200 non-null   float64
5   Drug        200 non-null   object
dtypes: float64(1), int64(1), object(4)
```

memory usage: 9.5+ KB
None

```
1 # lets check the correlation
2 # Drop non-numeric columns before calculating correlation
3 numeric_data = data.drop(['Sex', 'BP', 'Cholesterol', 'Drug'], axis=1)
4 print(numeric_data.corr())
```

↔

	Age	Na_to_K
Age	1.000000	-0.063119
Na_to_K	-0.063119	1.000000

```
1 #lets check the covarriance
2 # Droip non-numeric columns before calculating correlation
3 numeric_data = data.drop(['Sex', 'BP', 'Cholesterol', 'Drug'], axis=1)
4 print(numeric_data.cov())
```

↔

	Age	Na_to_K
Age	273.714347	-7.543752
Na_to_K	-7.543752	52.185533

```
1 # dropping the null values
2 data.isnull().any()
```

↔

	0
Age	False
Sex	False
BP	False
Cholesterol	False
Na_to_K	False
Drug	False

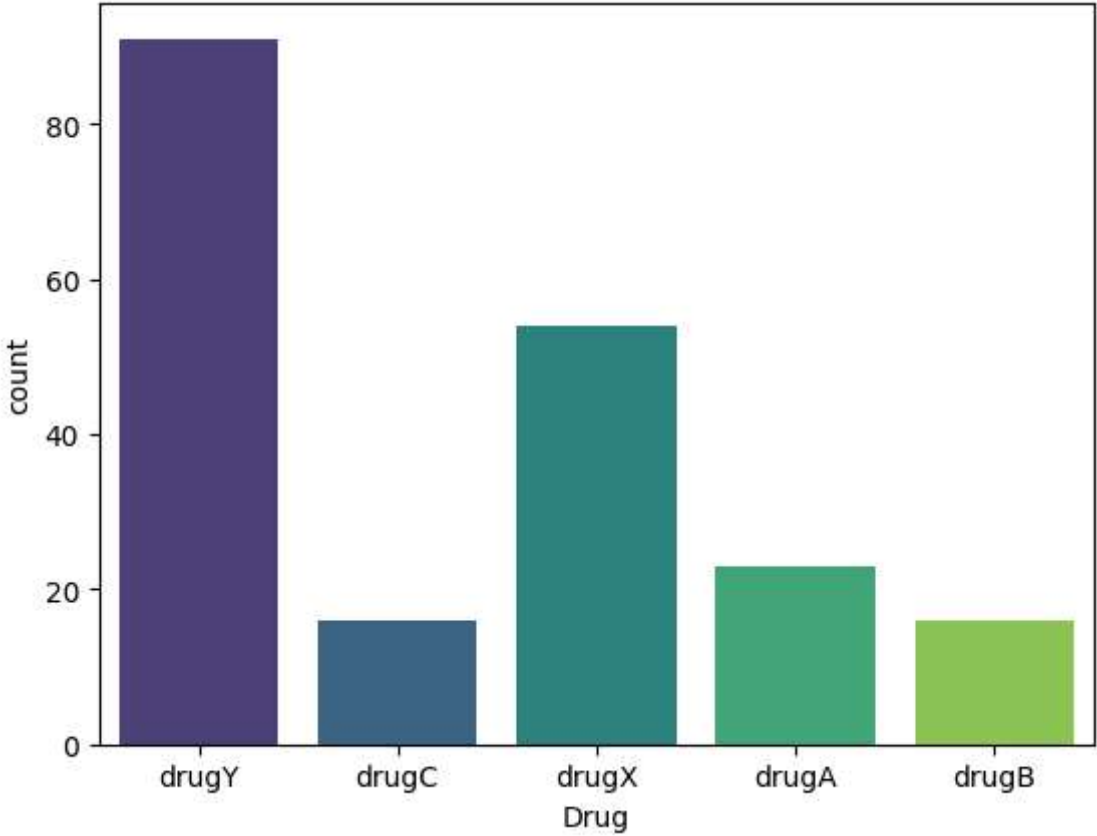
dtype: bool

✎ Exploring drug features and realtion with target

The class Variable; Drug Type


```
1 sns.countplot(x='Drug', data=data, palette='viridis')
```

↔ <Axes: xlabel='Drug', ylabel='count'>



Sex/Gender


```
1 data['Sex'].value_counts()
```






count	
Sex	
M	104
F	96

dtype: int64

```
1 df = pd.DataFrame(data.groupby(['Sex', 'Drug'])['Drug'].size())
2 df
```



		Drug	
Sex	Drug		
F	drugA	9	
	drugB	6	
	drugC	7	
	drugX	27	
	drugY	47	
M	drugA	14	
	drugB	10	
	drugC	9	
	drugX	27	
	drugY	44	

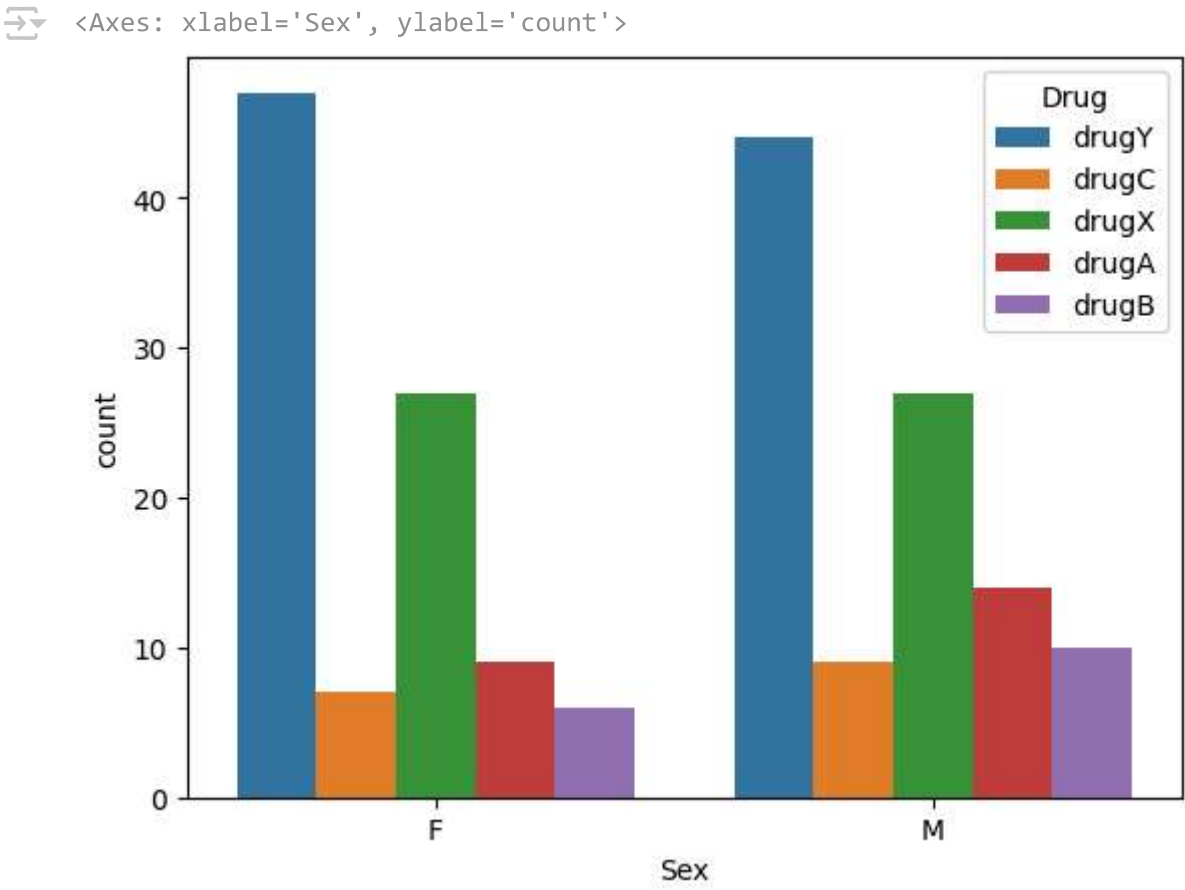
Next steps:

[Generate code with df](#)


[View recommended plots](#)

[New interactive sheet](#)

```
1 sns.countplot(x='Sex', hue='Drug', data=data)
```



```
1 data['BP'].value_counts()
```



count	
BP	
HIGH	77
LOW	64
NORMAL	59

dtype: int64

```
1 df = pd.DataFrame(data.groupby(['BP', 'Drug'])['Drug'].count())
2 df
```

		Drug
BP	Drug	
HIGH	drugA	23
	drugB	16
	drugY	38
LOW	drugC	16
	drugX	18
	drugY	30
NORMAL	drugX	36
	drugY	23

Next steps:

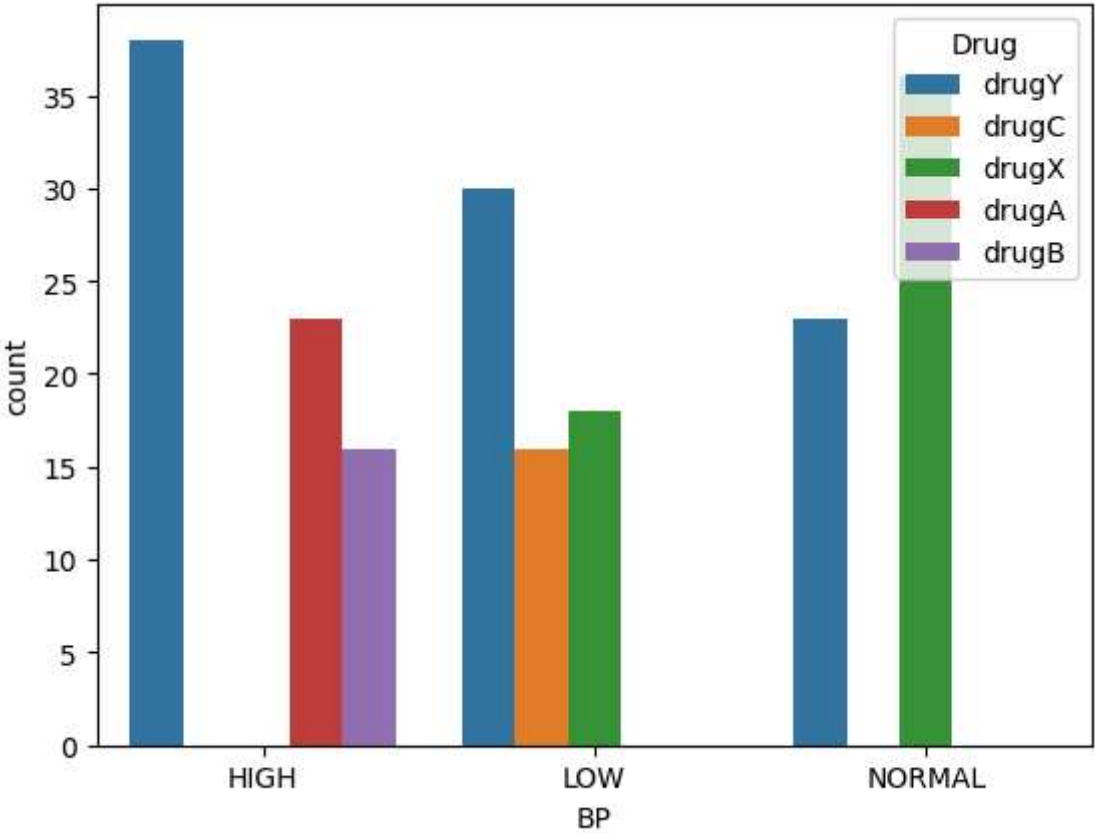
Generate code with df

View recommended plots

New interactive sheet

```
1 sns.countplot(x='BP', hue='Drug', data=data)
```

<Axes: xlabel='BP', ylabel='count'>



1 data

	Age	Sex	BP	Cholesterol	Na_to_K	Drug
0	23	F	HIGH	HIGH	25.355	drugY
1	47	M	LOW	HIGH	13.093	drugC
2	47	M	LOW	HIGH	10.114	drugC
3	28	F	NORMAL	HIGH	7.798	drugX
4	61	F	LOW	HIGH	18.043	drugY
...
195	56	F	LOW	HIGH	11.567	drugC
196	16	M	LOW	HIGH	12.006	drugC
197	52	M	NORMAL	HIGH	9.894	drugX
198	23	M	NORMAL	NORMAL	14.020	drugX
199	40	F	LOW	NORMAL	11.349	drugX

200 rows × 6 columns

Next steps:

Generate code with data

View recommended plots

New interactive sheet

1 Start coding or [generate](#) with AI.