jupyter HepatitisCdata Last Checkpoint: 43 minutes ago (autosaved)

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3 (ipykernel)

In [1]:
```
import pandas as pd
import numpy as np
import numpy as nm
import matplotlib.pyplot as plt
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.svm import SVC
from sklearn.linear_model import LogisticRegression
from sklearn.linear_model import LinearSVC
from sklearn.ensemble import GradientBoostingClassifier
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import GridSearchCV
from sklearn.model_selection import RandomizedSearchCV
from sklearn.preprocessing import LabelEncoder
```

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In [2]:
```
df = pd.read_csv('datasets/hepatitis.csv')
df.head()
```

Out[2]:

	Unnamed	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	1	0.Blood Donor	32	m	38.5	52.5	7.7	22.1	7.5	6.93	3.23	106.0	12.1	69.0
1	2	0.Blood Donor	32	m	38.5	70.3	18.0	24.3	7.5	11.17	4.80	114.1	212.0	75.1
2	3	0.Blood Donor	32	m	46.3	74.1	36.2	52.6	7.5	8.84	5.20	115.1	79.3	70.3
3	4	0.Blood Donor	32	m	43.2	52.6	12.1	16.1	7.5	8.33	5.80	93.0	15.1	71.7
4	5	0.Blood Donor	32	m	39.2	74.1	32.6	24.8	6.9	4.82	7.53	104.0	39.8	68.7

```
(615, 14)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 615 entries, 0 to 614
Data columns (total 14):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   Unnamed     615 non-null    int64
 1   Category    615 non-null    object
 2   Age         615 non-null    int64
 3   Sex         615 non-null    object
 4   ALB         614 non-null    float64
 5   ALP         568 non-null    float64
 6   ALT         614 non-null    float64
 7   AST         615 non-null    float64
 8   BG          615 non-null    float64
 9   CHE         615 non-null    float64
 10  CHOL        605 non-null    float64
 11  CREA        615 non-null    float64
 12  GGT         615 non-null    float64
 13  PROT        612 non-null    float64
dtypes: float64(12), int64(2), object(2)
memory usage: 67.3 KB
```

In [3]:
```
df.info()
```

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In [4]:
```
df.drop(['Unnamed'],axis=1,inplace=True)
df.shape
```

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In [5]:
```
df.sample(5)
```

Out[5]:

	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	0.Blood Donor	32	m	38.5	52.5	7.7	22.1	7.5	6.93	3.23	106.0	12.1	69.0
1	0.Blood Donor	32	m	38.5	70.3	18.0	24.3	7.5	11.17	4.80	114.1	212.0	75.1
2	0.Blood Donor	32	m	46.3	74.1	36.2	52.6	7.5	8.84	5.20	115.1	79.3	70.3
3	0.Blood Donor	32	m	43.2	52.6	12.1	16.1	7.5	8.33	5.80	93.0	15.1	71.7
4	0.Blood Donor	32	m	39.2	74.1	32.6	24.8	6.9	4.82	7.53	104.0	39.8	68.7

```
(615, 13)
```

In [6]:
```
df.info()
```

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In [7]:
```
df.isnull()
```

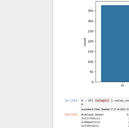
Out[7]:

	Unnamed	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	False	False	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
609	False	False	False	False	False	False	False	False	False	False	False	False	False	False
610	False	False	False	False	False	False	False	False	False	False	False	False	False	False
611	False	False	False	False	False	False	False	False	False	False	False	False	False	False
612	False	False	False	False	False	False	False	False	False	False	False	False	False	False
614	False	False	False	False	False	False	False	False	False	False	False	False	False	False

615 rows × 14 columns

In [8]:
```
sns.countplot('Sex',data=df)
plt.title('Count of Sex')
sns.boxplot(x='Sex',y='Age',data=df)
```

Out[8]:



In [9]:
```
df['Category'].value_counts()
```

Out[9]:
```
0.Blood Donor    533
3.Cirrhosis       30
2.Fibrosis        21
1.Hepatitis       20
Name: Category, dtype: int64
```

In [10]:
```
df['Sex'].value_counts()
```

Out[10]:
```
m    377
f    238
Name: Sex, dtype: int64
```

In [11]:
```
df.replace({'Sex': {'m': 0, 'f': 1}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [12]:
```
def clean_category(x):
    if x == '0.Blood Donor':
        df.drop(x,inplace=True)
    elif x == '1.Hepatitis':
        return df[df[x] == 1].sample(n=20, ng_ref, ng_ref).empty
    elif x == '2.Fibrosis':
        return df[df[x] == 1].sample(n=20, ng_ref, ng_ref).empty
    elif x == '3.Cirrhosis':
        return df[df[x] == 1].sample(n=20, ng_ref, ng_ref).empty

ng_ref = pd.Series([False, True])
df['Category'].apply(clean_category)
df['Category'].value_counts()
```

Out[12]:
```
3.Cirrhosis    False
2.Fibrosis     False
1.Hepatitis    False
Name: Category, dtype: bool
```

In [13]:
```
df.replace({'Category': {'1.Hepatitis': 1, '2.Fibrosis': 2, '3.Cirrhosis': 3}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [14]:
```
df.shape
```

Out[14]:
```
(615, 13)
```

In [15]:
```
df.isnull().sum()
```

Out[15]:
```
Unnamed    0
Category   0
Age        0
Sex        0
ALB        0
ALP        0
ALT        0
AST        0
BG         0
CHE        0
CHOL       0
CREA       0
GGT        0
PROT       0
dtype: int64
```

In [16]:
```
df['Category'].value_counts()
```

Out[16]:
```
0    615
dtype: int64
```

In [17]:
```
df.replace({'Category': {'0.Blood Donor': 0}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [18]:
```
df.replace({'Sex': {'m': 0, 'f': 1}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [19]:
```
df.shape
```

Out[19]:
```
(615, 13)
```

In [20]:
```
df.sample(5)
```

Out[20]:

	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	0	32	0	38.5	52.5	7.7	22.1	7.5	6.93	3.23	106.0	12.1	69.0
1	0	32	0	38.5	70.3	18.0	24.3	7.5	11.17	4.80	114.1	212.0	75.1
2	0	32	0	46.3	74.1	36.2	52.6	7.5	8.84	5.20	115.1	79.3	70.3
3	0	32	0	43.2	52.6	12.1	16.1	7.5	8.33	5.80	93.0	15.1	71.7
4	0	32	0	39.2	74.1	32.6	24.8	6.9	4.82	7.53	104.0	39.8	68.7

```
(615, 13)
```

In [21]:
```
df.info()
```

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In [22]:
```
df.isnull()
```

Out[22]:

	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	False	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...
609	False	False	False	False	False	False	False	False	False	False	False	False	False
610	False	False	False	False	False	False	False	False	False	False	False	False	False
611	False	False	False	False	False	False	False	False	False	False	False	False	False
612	False	False	False	False	False	False	False	False	False	False	False	False	False
614	False	False	False	False	False	False	False	False	False	False	False	False	False

615 rows × 13 columns

In [23]:
```
df.Category.value_counts()
```

Out[23]:
```
0    615
dtype: int64
```

In [24]:
```
df.Sex.value_counts()
```

Out[24]:
```
0    377
1    238
Name: Sex, dtype: int64
```

In [25]:
```
df.replace({'Sex': {'0': 'male', '1': 'female'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [26]:
```
df.Sex.value_counts()
```

Out[26]:
```
0    377
1    238
Name: Sex, dtype: int64
```

In [27]:
```
df.replace({'Sex': {'0': 'male', '1': 'female'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [28]:
```
df.sample(5)
```

Out[28]:

	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	0	32	0	38.5	52.5	7.7	22.1	7.5	6.93	3.23	106.0	12.1	69.0
1	0	32	0	38.5	70.3	18.0	24.3	7.5	11.17	4.80	114.1	212.0	75.1
2	0	32	0	46.3	74.1	36.2	52.6	7.5	8.84	5.20	115.1	79.3	70.3
3	0	32	0	43.2	52.6	12.1	16.1	7.5	8.33	5.80	93.0	15.1	71.7
4	0	32	0	39.2	74.1	32.6	24.8	6.9	4.82	7.53	104.0	39.8	68.7

```
(615, 13)
```

In [29]:
```
df.replace({'Sex': {'male': 0, 'female': 1}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [30]:
```
df.shape
```

Out[30]:
```
(615, 13)
```

In [31]:
```
df.Sex.value_counts()
```

Out[31]:
```
0    377
1    238
Name: Sex, dtype: int64
```

In [32]:
```
df.replace({'Sex': {'0': 0, '1': 1}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [33]:
```
df.Sex.value_counts()
```

Out[33]:
```
0    377
1    238
Name: Sex, dtype: int64
```

In [34]:
```
df.replace({'Sex': {'0': 'male', '1': 'female'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [35]:
```
df.Sex.value_counts()
```

Out[35]:
```
male    377
female  238
Name: Sex, dtype: int64
```

In [36]:
```
df.replace({'Sex': {'male': 0, 'female': 1}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [37]:
```
df.Sex.value_counts()
```

Out[37]:
```
0    377
1    238
Name: Sex, dtype: int64
```

In [38]:
```
df.replace({'Sex': {'0': 'male', '1': 'female'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [39]:
```
def clean_sex(x):
    if x == 'male':
        df.drop(x,inplace=True)
    elif x == 'female':
        return df[df[x] == 'female'].sample(n=20, ng_ref, ng_ref).empty
    else:
        return df[df[x] == 'female'].sample(n=20, ng_ref, ng_ref).empty

ng_ref = pd.Series([False, True])
df['Sex'].apply(clean_sex)
df['Sex'].value_counts()
```

Out[39]:
```
female    False
male      False
Name: Sex, dtype: bool
```

In [40]:
```
df['Sex'] = df['Sex'].astype('category')
df['Sex'].cat.codes
```

Out[40]:
```
0    0
1    0
2    0
3    0
4    0
    ..
609  0
610  0
611  0
612  0
614  0
dtype: int8
```

In [41]:
```
df['Sex'].value_counts()
```

Out[41]:
```
0    377
1    238
Name: Sex, dtype: int64
```

In [42]:
```
df.replace({'Sex': {'0': 'male', '1': 'female'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [43]:
```
df.Sex.value_counts()
```

Out[43]:
```
male    377
female  238
Name: Sex, dtype: int64
```

In [44]:
```
df.replace({'Sex': {'male': 0, 'female': 1}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [45]:
```
df.Sex.value_counts()
```

Out[45]:
```
0    377
1    238
Name: Sex, dtype: int64
```

In [46]:
```
df.shape
```

Out[46]:
```
(615, 13)
```

In [47]:
```
df.sample(5)
```

Out[47]:

	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	0	32	0	38.5	52.5	7.7	22.1	7.5	6.93	3.23	106.0	12.1	69.0
1	0	32	0	38.5	70.3	18.0	24.3	7.5	11.17	4.80	114.1	212.0	75.1
2	0	32	0	46.3	74.1	36.2	52.6	7.5	8.84	5.20	115.1	79.3	70.3
3	0	32	0	43.2	52.6	12.1	16.1	7.5	8.33	5.80	93.0	15.1	71.7
4	0	32	0	39.2	74.1	32.6	24.8	6.9	4.82	7.53	104.0	39.8	68.7

```
(615, 13)
```

In [48]:
```
df.info()
```

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In [49]:
```
df.isnull()
```

Out[49]:

	Category	Age	Sex	ALB	ALP	ALT	AST	BG	CHE	CHOL	CREA	GGT	PROT
0	False	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...
609	False	False	False	False	False	False	False	False	False	False	False	False	False
610	False	False	False	False	False	False	False	False	False	False	False	False	False
611	False	False	False	False	False	False	False	False	False	False	False	False	False
612	False	False	False	False	False	False	False	False	False	False	False	False	False
614	False	False	False	False	False	False	False	False	False	False	False	False	False

615 rows × 13 columns

In [50]:
```
df.Category.value_counts
```

Out[50]:
```
<bound_method_Series.value_counts of 0    False
1    False
2    False
3    False
4    False
     ...
609  False
610  False
611  False
612  False
614  False
Name: Category, dtype: bool>
```

In [51]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [52]:
```
df.Category.value_counts
```

Out[52]:
```
<bound_method_Series.value_counts of 0    False
1    False
2    False
3    False
4    False
     ...
609  False
610  False
611  False
612  False
614  False
Name: Category, dtype: bool>
```

In [53]:
```
df.Category.value_counts()
```

Out[53]:
```
0    615
dtype: int64
```

In [54]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [55]:
```
df.Category.value_counts()
```

Out[55]:
```
0    615
dtype: int64
```

In [56]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [57]:
```
df.Category.value_counts()
```

Out[57]:
```
0    615
dtype: int64
```

In [58]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [59]:
```
df.Category.value_counts()
```

Out[59]:
```
0    615
dtype: int64
```

In [60]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [61]:
```
df.Category.value_counts()
```

Out[61]:
```
0    615
dtype: int64
```

In [62]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [63]:
```
df.Category.value_counts()
```

Out[63]:
```
0    615
dtype: int64
```

In [64]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [65]:
```
df.Category.value_counts()
```

Out[65]:
```
0    615
dtype: int64
```

In [66]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [67]:
```
df.Category.value_counts()
```

Out[67]:
```
0    615
dtype: int64
```

In [68]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [69]:
```
df.Category.value_counts()
```

Out[69]:
```
0    615
dtype: int64
```

In [70]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [71]:
```
df.Category.value_counts()
```

Out[71]:
```
0    615
dtype: int64
```

In [72]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [73]:
```
df.Category.value_counts()
```

Out[73]:
```
0    615
dtype: int64
```

In [74]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [75]:
```
df.Category.value_counts()
```

Out[75]:
```
0    615
dtype: int64
```

In [76]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [77]:
```
df.Category.value_counts()
```

Out[77]:
```
0    615
dtype: int64
```

In [78]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [79]:
```
df.Category.value_counts()
```

Out[79]:
```
0    615
dtype: int64
```

In [80]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

Executed in time, finished 19:07:20 2022-06-23

In [81]:
```
df.Category.value_counts()
```

Out[81]:
```
0    615
dtype: int64
```

In [82]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [83]:
```
df.Category.value_counts()
```

Out[83]:
```
0    615
dtype: int64
```

In [84]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [85]:
```
df.Category.value_counts()
```

Out[85]:
```
0    615
dtype: int64
```

In [86]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [87]:
```
df.Category.value_counts()
```

Out[87]:
```
0    615
dtype: int64
```

In [88]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [89]:
```
df.Category.value_counts()
```

Out[89]:
```
0    615
dtype: int64
```

In [90]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [91]:
```
df.Category.value_counts()
```

Out[91]:
```
0    615
dtype: int64
```

In [92]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [93]:
```
df.Category.value_counts()
```

Out[93]:
```
0    615
dtype: int64
```

In [94]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [95]:
```
df.Category.value_counts()
```

Out[95]:
```
0    615
dtype: int64
```

In [96]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [97]:
```
df.Category.value_counts()
```

Out[97]:
```
0    615
dtype: int64
```

In [98]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [99]:
```
df.Category.value_counts()
```

Out[99]:
```
0    615
dtype: int64
```

In [100]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [101]:
```
df.Category.value_counts()
```

Out[101]:
```
0    615
dtype: int64
```

In [102]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [103]:
```
df.Category.value_counts()
```

Out[103]:
```
0    615
dtype: int64
```

In [104]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [105]:
```
df.Category.value_counts()
```

Out[105]:
```
0    615
dtype: int64
```

In [106]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [107]:
```
df.Category.value_counts()
```

Out[107]:
```
0    615
dtype: int64
```

In [108]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [109]:
```
df.Category.value_counts()
```

Out[109]:
```
0    615
dtype: int64
```

In [110]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [111]:
```
df.Category.value_counts()
```

Out[111]:
```
0    615
dtype: int64
```

In [112]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [113]:
```
df.Category.value_counts()
```

Out[113]:
```
0    615
dtype: int64
```

In [114]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [115]:
```
df.Category.value_counts()
```

Out[115]:
```
0    615
dtype: int64
```

In [116]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [117]:
```
df.Category.value_counts()
```

Out[117]:
```
0    615
dtype: int64
```

In [118]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [119]:
```
df.Category.value_counts()
```

Out[119]:
```
0    615
dtype: int64
```

In [120]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [121]:
```
df.Category.value_counts()
```

Out[121]:
```
0    615
dtype: int64
```

In [122]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [123]:
```
df.Category.value_counts()
```

Out[123]:
```
0    615
dtype: int64
```

In [124]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [125]:
```
df.Category.value_counts()
```

Out[125]:
```
0    615
dtype: int64
```

In [126]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [127]:
```
df.Category.value_counts()
```

Out[127]:
```
0    615
dtype: int64
```

In [128]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [129]:
```
df.Category.value_counts()
```

Out[129]:
```
0    615
dtype: int64
```

In [130]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [131]:
```
df.Category.value_counts()
```

Out[131]:
```
0    615
dtype: int64
```

In [132]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [133]:
```
df.Category.value_counts()
```

Out[133]:
```
0    615
dtype: int64
```

In [134]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [135]:
```
df.Category.value_counts()
```

Out[135]:
```
0    615
dtype: int64
```

In [136]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [137]:
```
df.Category.value_counts()
```

Out[137]:
```
0    615
dtype: int64
```

In [138]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [139]:
```
df.Category.value_counts()
```

Out[139]:
```
0    615
dtype: int64
```

In [140]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [141]:
```
df.Category.value_counts()
```

Out[141]:
```
0    615
dtype: int64
```

In [142]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

Executed in time, finished 19:07:20 2022-06-23

In [143]:
```
df.Category.value_counts()
```

Out[143]:
```
0    615
dtype: int64
```

In [144]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

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In [145]:
```
df.Category.value_counts()
```

Out[145]:
```
0    615
dtype: int64
```

In [146]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

Executed in time, finished 19:07:20 2022-06-23

In [147]:
```
df.Category.value_counts()
```

Out[147]:
```
0    615
dtype: int64
```

In [148]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

Executed in time, finished 19:07:20 2022-06-23

In [149]:
```
df.Category.value_counts()
```

Out[149]:
```
0    615
dtype: int64
```

In [150]:
```
df.replace({'Category': {'0': 'Blood Donor', '1': 'Hepatitis', '2': 'Fibrosis', '3': 'Cirrhosis'}}, inplace=True)
df.fillna(0, inplace=True)
```

Executed in time, finished 19:07:20 2022-06-23

In [151]:
```
df.Category.value_counts()
```

Out[151]:
```
0    615
```