```
In [1]:  import pandas as pd
         import numpy as np
         import seaborn as sns
         import matplotlib.pyplot as plt
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\numpy\_distribu
tor_init.py:32: UserWarning: loaded more than 1 DLL from .libs:
c:\users\user\miniconda3\envs\bd\lib\site-packages\numpy\.libs\lib
openblas.NOIJJG62EMASZI6NYURL6JBKM4EVBGM7.gfortran-win_amd64.dll
c:\users\user\miniconda3\envs\bd\lib\site-packages\numpy\.libs\lib
openblas.PYQHXLVVQ7VESDPUVUADXEVJOBGHJPAY.gfortran-win_amd64.dll
  stacklevel=1)
```

prepare data

```
In [2]:  df_train=pd.read_csv('./data/train.csv')
```

```
In [3]:  #check null    Age,Cabin,Embarked
         df_train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count   Dtype
---  ------       --------------   -----
 0   PassengerId  891 non-null     int64
 1   Survived     891 non-null     int64
 2   Pclass       891 non-null     int64
 3   Name         891 non-null     object
 4   Sex          891 non-null     object
 5   Age          714 non-null     float64
 6   SibSp        891 non-null     int64
 7   Parch        891 non-null     int64
 8   Ticket       891 non-null     object
 9   Fare         891 non-null     float64
 10  Cabin        204 non-null     object
 11  Embarked     889 non-null     object
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

```
In [4]:  #df_train=df_train.drop(['Cabin','Name','Ticket','PassengerId'],
         axis=1,inplace=False)
```

In [5]: `df_train.head()`

Out[5]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	

EDA

In [6]: `#correlation`

```python
plt.figure(figsize=(10,10))
sns.heatmap(df_train.corr(),cmap = 'GnBu',annot=True)
plt.show()
```
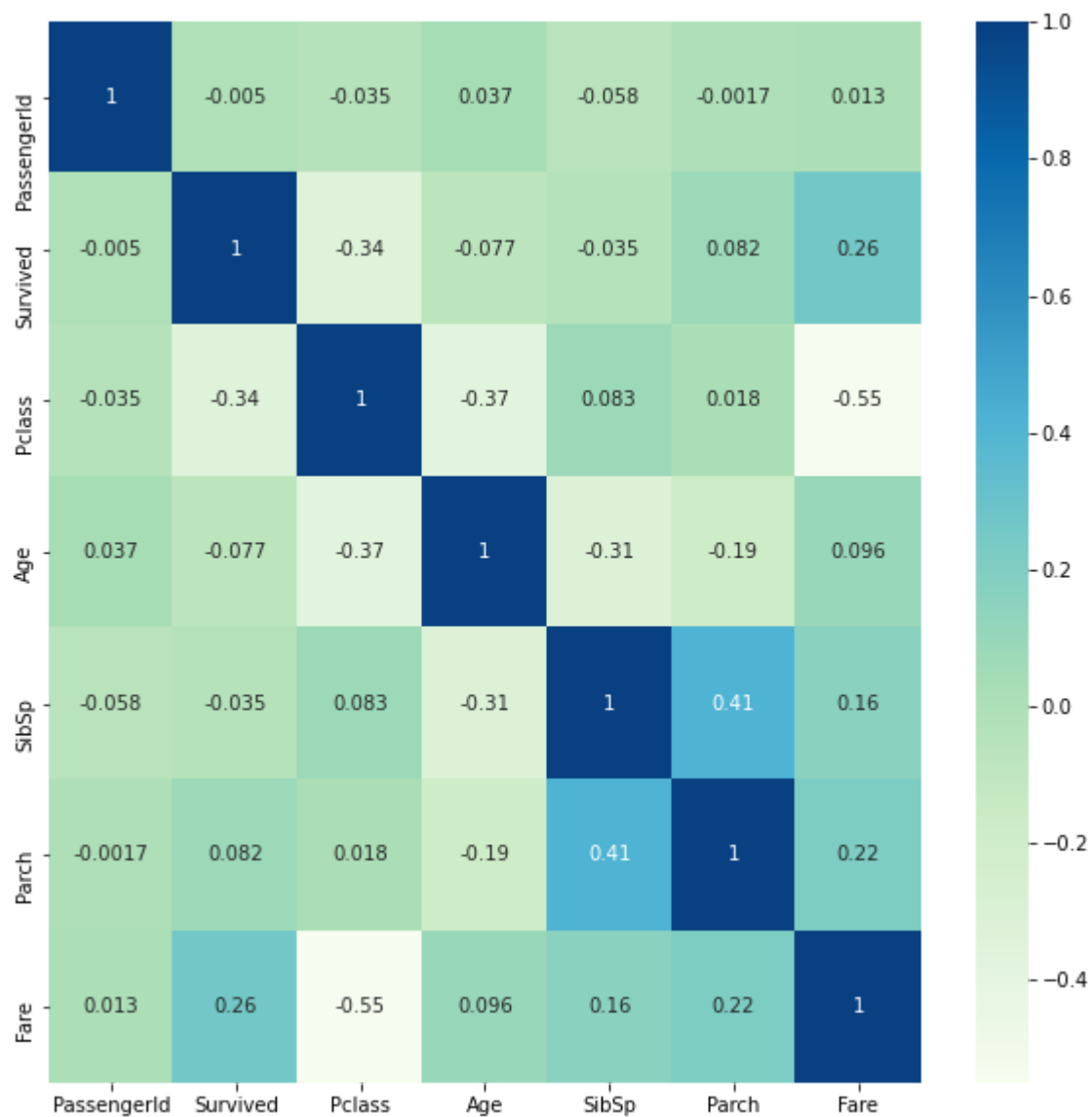
In [7]:
```python
#count number

fig,ax = plt.subplots(2,4,figsize=(16,10))
sns.countplot('Survived',data=df_train,ax=ax[0][0])
sns.countplot('Pclass',data=df_train,ax=ax[0][1])
sns.countplot('Sex',data=df_train,ax=ax[0][2])
sns.countplot('SibSp',data=df_train,ax=ax[0][3])
sns.countplot('Parch',data=df_train,ax=ax[1][0])
sns.countplot('Embarked',data=df_train,ax=ax[1][1])
sns.distplot(df_train['Fare'],kde=True,ax=ax[1][2])

plt.show()
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\distrib
utions.py:2551: FutureWarning: `distplot` is a deprecated function
and will be removed in a future version. Please adapt your code to
use either `displot` (a figure-level function with similar flexibi
lity) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```
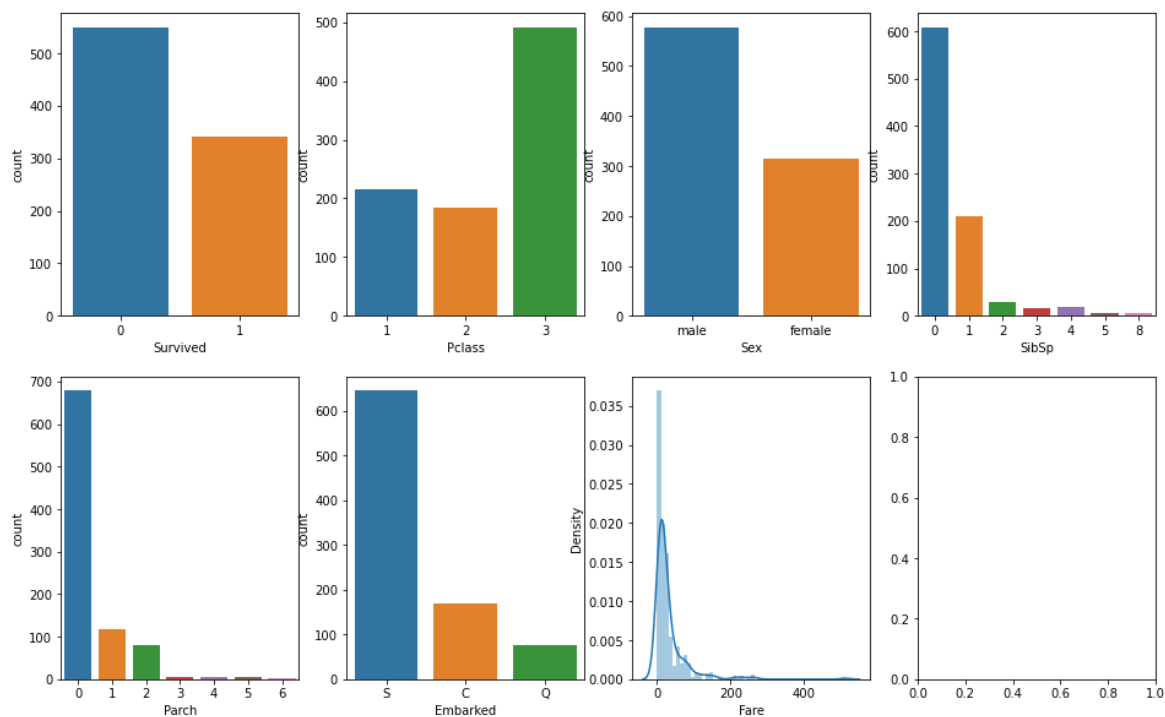
```
In [8]:  '''
         implies:
         1. death more than lives
         2. most people live in third class
         3. male more than female
         4. most people don't have siblings and spouse
         5. most people don't have parch
         6. most people embark at S
         7. most people pay 0~100 fare
         '''
         print()
```

In [9]:
```python
# survived Sex Age pclass Embarked

fig,ax = plt.subplots(2,4,figsize=(16,10))
sns.countplot('Survived',hue='Sex',linewidth=2.5,edgecolor=".2",
data=df_train,ax=ax[0][0])
sns.countplot('Pclass',hue='Sex',linewidth=2.5,edgecolor=".2",da
ta=df_train,ax=ax[0][1])
sns.countplot('Survived',hue='Pclass',linewidth=2.5,edgecolor=".
2",data=df_train,ax=ax[0][2])
sns.stripplot(x="Survived", y="Age", data=df_train,jitter=True,a
x=ax[0][3])
sns.stripplot(x="Pclass", y="Age", data=df_train,jitter=True,ax=
ax[1][0])
sns.stripplot(x="Sex", y="Age", data=df_train,jitter=True,ax=ax[
1][1])
sns.countplot('Embarked',hue='Pclass',linewidth=2.5,edgecolor=".
2",data=df_train,ax=ax[1][2])
sns.countplot('Embarked',hue='Sex',linewidth=2.5,edgecolor=".2",
data=df_train,ax=ax[1][3])
plt.show()
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
```
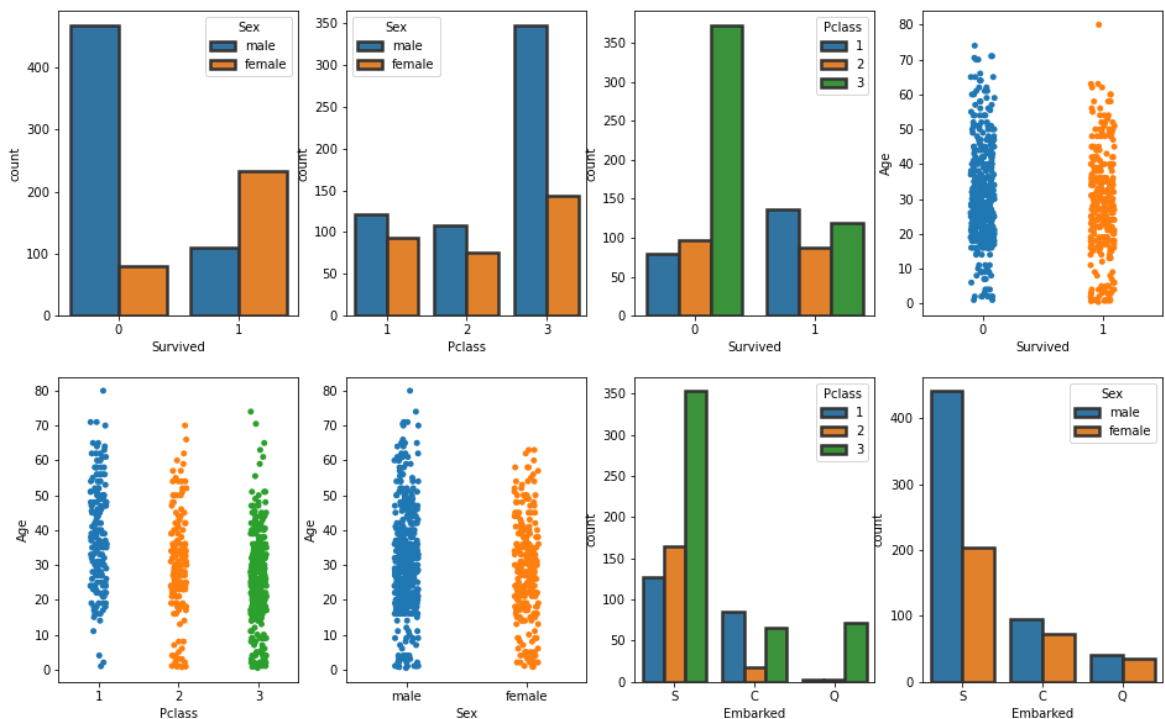
In [10]:
```python
#pclass 3 is the cheapest
plt.figure(figsize=(7,7))
sns.boxplot(x='Pclass',y='Fare',data=df_train)
plt.ylim([0,270])
plt.show()
```
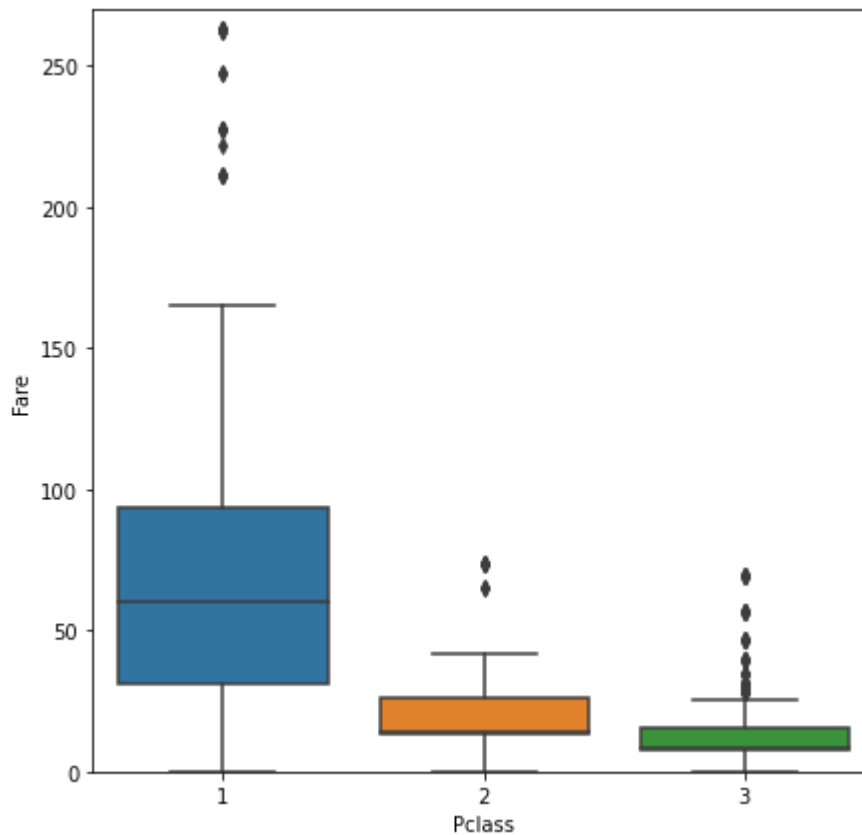

In [11]:
```python
'''
implies:

1.male die the most
2.most male live in pclass 3
3.pclass 3 die the most
4.Age  20~40 die the most
5.most people in pclass 3 are in age 20~40
6.most male are in age 20~40
7.most people live in pclass 3 embarked at S
8.most male embarked at S

--> those who are male in age 20~40 live in pclass 3 embarked at
S die the most

'''
print()
```

In [12]:
```python
fig,ax = plt.subplots(2,2,figsize=(16,10))
sns.countplot('Survived',hue='SibSp',linewidth=2.5,edgecolor=".
2",data=df_train,ax=ax[0][0])
sns.countplot('Survived',hue='Parch',linewidth=2.5,edgecolor=".
2",data=df_train,ax=ax[0][1])
sns.countplot('Pclass',hue='Parch',linewidth=2.5,edgecolor=".2",
data=df_train,ax=ax[1][0])
sns.countplot('Pclass',hue='SibSp',linewidth=2.5,edgecolor=".2",
data=df_train,ax=ax[1][1])

plt.show()
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
```



```
In [13]: import re
         #add name
         df_train['Title'] = df_train.Name.apply(lambda x: re.search('
          ([A-Z][a-z]+)\.', x).group(1))
```

In [14]:
```python
plt.figure(figsize=(12,5))
sns.countplot(x='Title',data=df_train,palette='hls',hue='Survived')
plt.xlabel('Title',fontsize=15)
plt.ylabel('Count',fontsize=15)
plt.title('title_name vs Survived',fontsize=20)
plt.show()
```
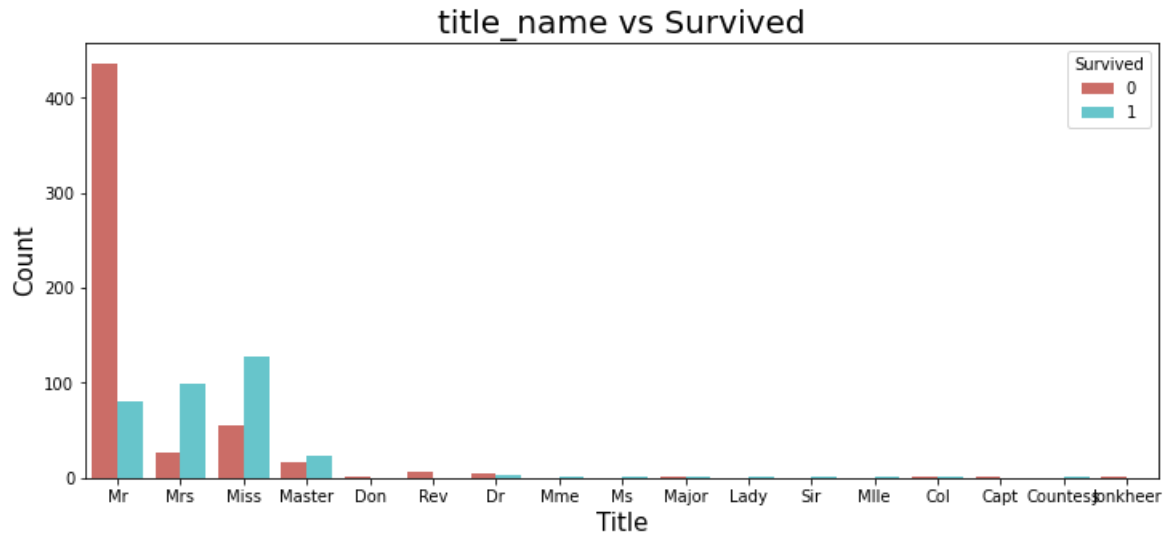

In [15]:
```python
plt.figure(figsize=(12,5))
sns.countplot(x='Title',data=df_train,palette='hls',hue='Pclass')
plt.xlabel('Title',fontsize=15)
plt.ylabel('Count',fontsize=15)
plt.title('pclass vs title_name',fontsize=20)
```

Out[15]: Text(0.5, 1.0, 'pclass vs title_name')
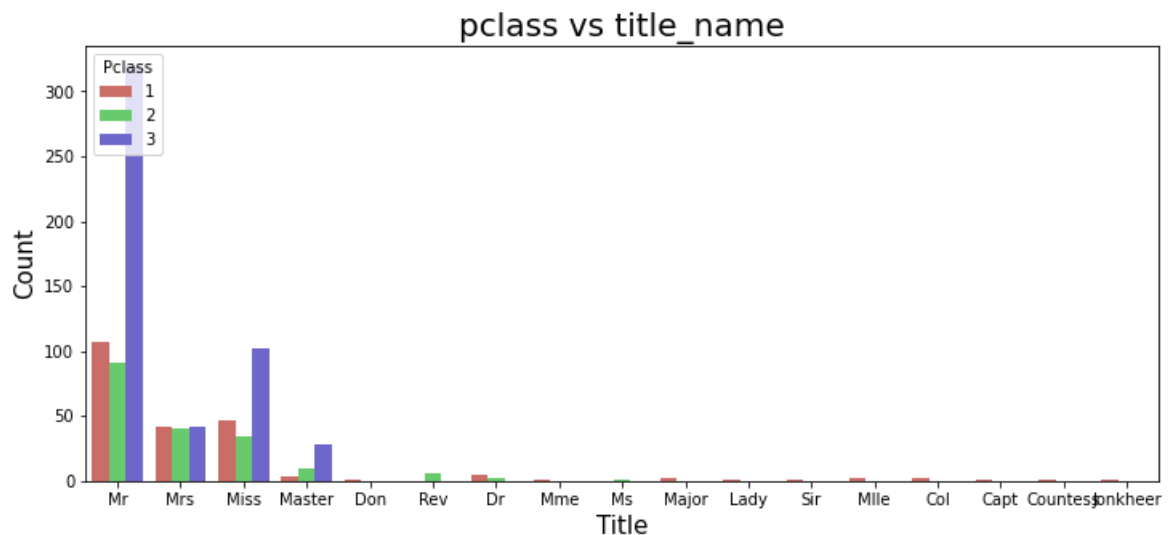
In [16]:
```python
plt.figure(figsize=(12,5))
sns.countplot(x='Title',data=df_train,palette='hls',hue='Embarke
d')
plt.xlabel('Title',fontsize=15)
plt.ylabel('Count',fontsize=15)
plt.title('Embarked vs title_name',fontsize=20)
```

Out[16]: Text(0.5, 1.0, 'Embarked vs title_name')
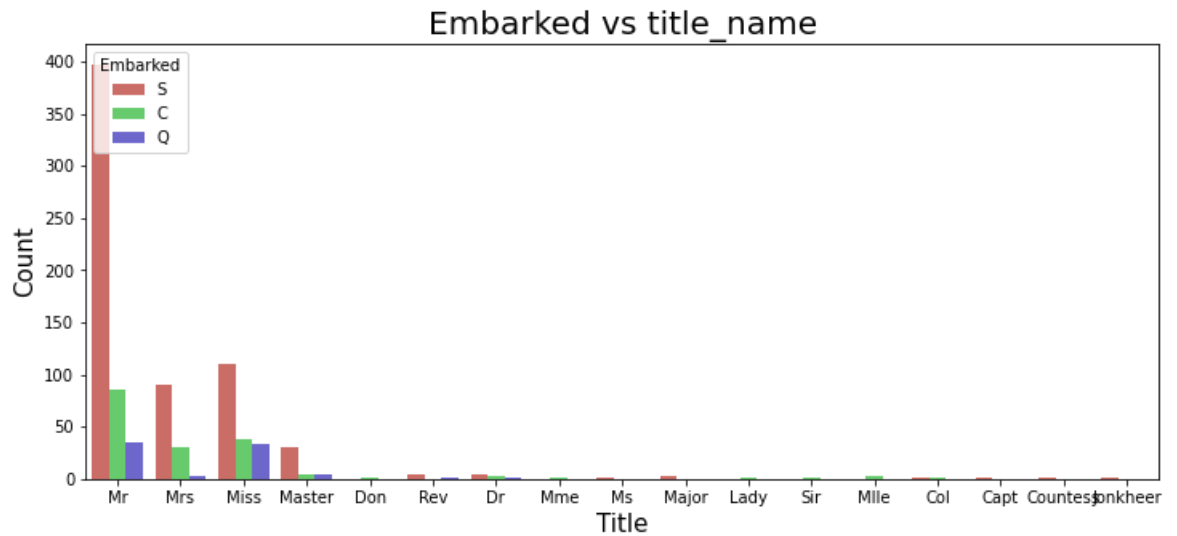
In [17]:

```python
# Pclass 3 -----embarked at some place ,show Title vs Survived count

df=df_train[df_train.Title.str.contains('M')]
df_S=df[df.Embarked.str[0]=='S']
df_S=df_S[df_S.Pclass==3]
df_Q=df[df.Embarked.str[0]=='Q']
df_Q=df_Q[df_Q.Pclass==3]
df_C=df[df.Embarked.str[0]=='C']
df_C=df_C[df_C.Pclass==3]


fig,ax = plt.subplots(1,3,figsize=(16,10))
sns.countplot('Title',hue='Survived',linewidth=2.5,edgecolor=".2",data=df_S,ax=ax[0])
sns.countplot('Title',hue='Survived',linewidth=2.5,edgecolor=".2",data=df_Q,ax=ax[1])
sns.countplot('Title',hue='Survived',linewidth=2.5,edgecolor=".2",data=df_C,ax=ax[2])

ax[0].title.set_text('Embarked_S')
ax[1].title.set_text('Embarked_Q')
ax[2].title.set_text('Embarked_C')
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decora
tors.py:43: FutureWarning: Pass the following variable as a keywor
d arg: x. From version 0.12, the only valid positional argument wi
ll be `data`, and passing other arguments without an explicit keyw
ord will result in an error or misinterpretation.
  FutureWarning
```
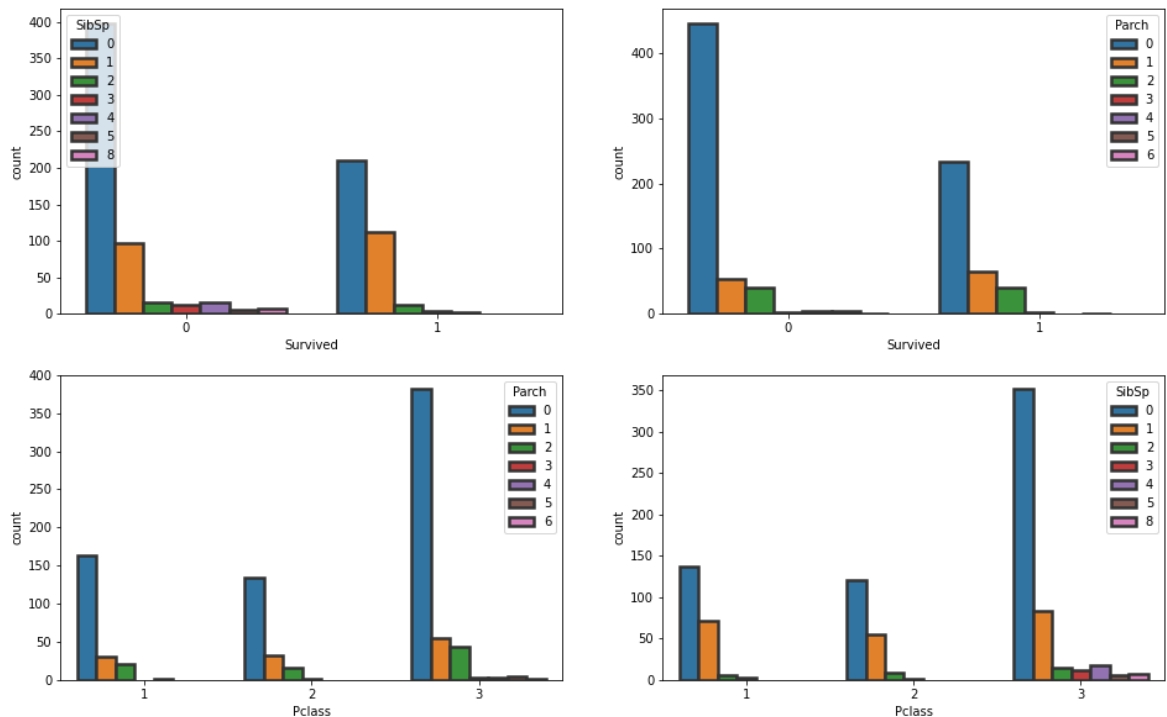

data process

In [18]:
```python
from sklearn.preprocessing import LabelEncoder
from sklearn.model_selection import train_test_split as tts
from sklearn.preprocessing import StandardScaler
```

```
In [19]:  #drop useless data
          df_train_label=pd.DataFrame(df_train['Survived'])
          df_train=df_train.drop(['Name','PassengerId','Cabin','Ticket','S
          urvived'],axis=1,inplace=False)
          df_train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 8 columns):
 #   Column    Non-Null Count   Dtype
---  ------    --------------   -----
 0   Pclass    891 non-null     int64
 1   Sex       891 non-null     object
 2   Age       714 non-null     float64
 3   SibSp     891 non-null     int64
 4   Parch     891 non-null     int64
 5   Fare      891 non-null     float64
 6   Embarked  889 non-null     object
 7   Title     891 non-null     object
dtypes: float64(2), int64(3), object(3)
memory usage: 55.8+ KB
```

```
In [20]:  df_train.Age.fillna(df_train.Age.mean(),inplace=True)
          df_train.Embarked.fillna('S',inplace=True)
```

```
In [21]:  #replace number to label
          #sex:male,female ---0,1
          #embarked:S,C,Q----0,1,2
          #title
          replace = LabelEncoder()

          #sex
          replace.fit(df_train.Sex)
          Sex_label = replace.transform(df_train.Sex)
          df_train['Sex_label'] = Sex_label
          df_train.drop(['Sex'],axis=1,inplace=True)

          #embarked
          replace.fit(df_train.Embarked)
          Embarked_label = replace.transform(df_train.Embarked)
          df_train['Embarked_label'] = Embarked_label
          df_train.drop(['Embarked'],axis=1,inplace=True)

          #title
          replace.fit(df_train.Title)
          Title_label = replace.transform(df_train.Title)
          df_train['Title_label'] = Title_label
          df_train.drop(['Title'],axis=1,inplace=True)
```

In [22]:   `df_train.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 8 columns):
 #   Column          Non-Null Count   Dtype
---  ------          --------------   -----
 0   Pclass          891 non-null     int64
 1   Age             891 non-null     float64
 2   SibSp           891 non-null     int64
 3   Parch           891 non-null     int64
 4   Fare            891 non-null     float64
 5   Sex_label       891 non-null     int32
 6   Embarked_label  891 non-null     int32
 7   Title_label     891 non-null     int32
dtypes: float64(2), int32(3), int64(3)
memory usage: 45.4 KB
```

In [23]:   `df_train.head(9)`

Out[23]:

	Pclass	Age	SibSp	Parch	Fare	Sex_label	Embarked_label	T
0	3	22.000000	1	0	7.2500	1	2	
1	1	38.000000	1	0	71.2833	0	0	
2	3	26.000000	0	0	7.9250	0	2	
3	1	35.000000	1	0	53.1000	0	2	
4	3	35.000000	0	0	8.0500	1	2	
5	3	29.699118	0	0	8.4583	1	1	
6	1	54.000000	0	0	51.8625	1	2	
7	3	2.000000	3	1	21.0750	1	2	
8	3	27.000000	0	2	11.1333	0	2	

In [164]:
```python
X=np.array(df_train)
y=np.array(df_train_label).astype(np.float32)
X.shape,y.shape
```

Out[164]:   `((891, 8), (891, 1))`

In [165]:
```python
#normalize
from sklearn.preprocessing import StandardScaler

normalize=StandardScaler()
X_=normalize.fit_transform(X)
```

In [166]: `X_.mean(),X_.std()`

Out[166]: `(2.6353778867364827e-17, 1.0)`

In [167]:
```
#the distribution of negative and positive sample is not extreme, so we use accuracy as metrics

sns.countplot('Survived',data=pd.DataFrame(y,columns=df_train_label.columns))
```
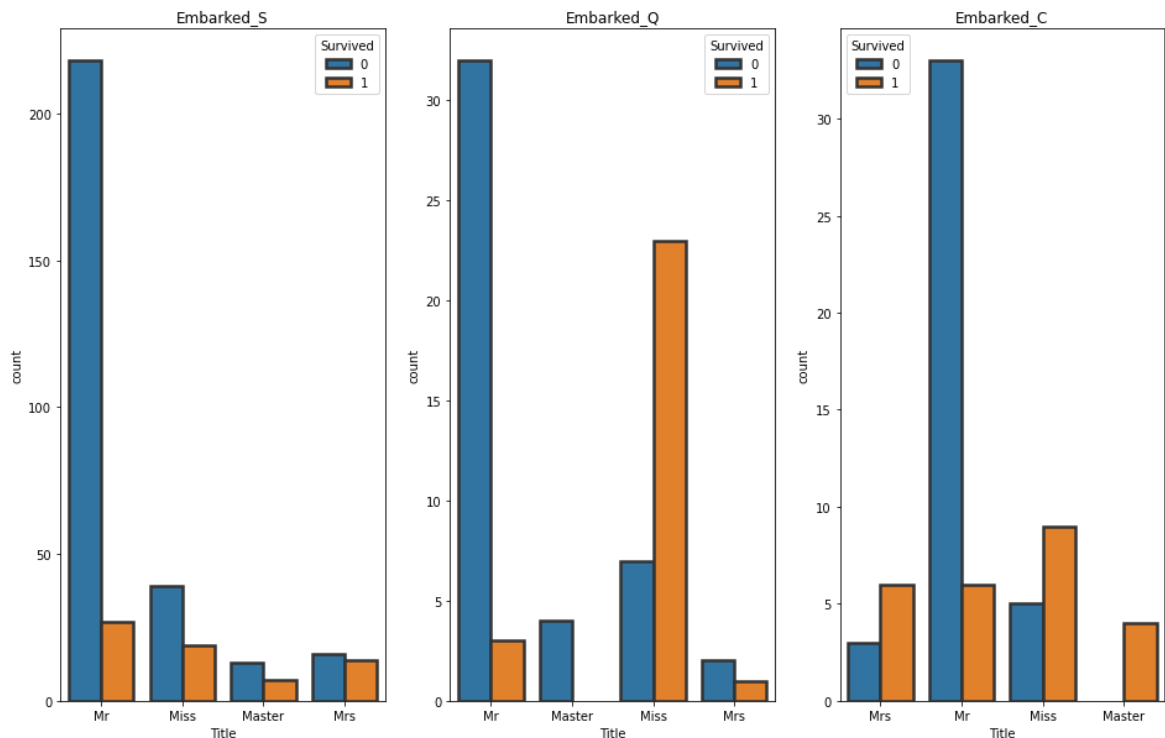
```
c:\users\user\miniconda3\envs\bd\lib\site-packages\seaborn\_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.
  FutureWarning
```

Out[167]: `<AxesSubplot:xlabel='Survived', ylabel='count'>`
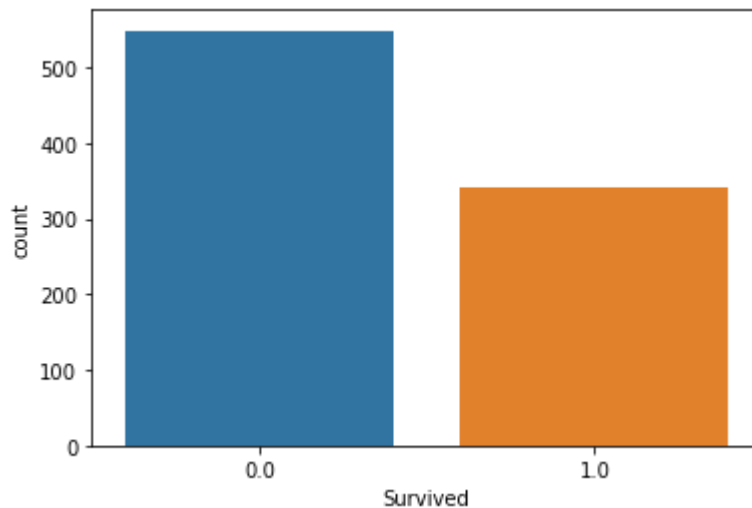
build model

we use K-fold to evaluate model

logistic regression

In [168]:
```
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import GridSearchCV
```

In [169]:
```python
#tunning hyperparameters: C(lambda) , max_iter , random_state

reg=LogisticRegression()

params={
    'C':[0.5,1.0,1.2,1.5],
    'max_iter':[50,100,150],
    'random_state':[1,2,3,4]
}
grid=GridSearchCV(
    reg,
    params,
    cv=3,
    verbose=2,
    scoring='accuracy',
    refit=True
)
grid.fit(X_,y)
print("best score: {:.3f}, best params: {}".format(grid.best_sco
re_, grid.best_params_))
```

```
Fitting 3 folds for each of 48 candidates, totalling 144 fits
[CV] C=0.5, max_iter=50, random_state=1
..............................
[CV] .............. C=0.5, max_iter=50, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=1
..............................
[CV] .............. C=0.5, max_iter=50, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=1
..............................
[CV] .............. C=0.5, max_iter=50, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=2
..............................
[CV] .............. C=0.5, max_iter=50, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=2
..............................
[CV] .............. C=0.5, max_iter=50, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=2
..............................
[CV] .............. C=0.5, max_iter=50, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=3
..............................
[CV] .............. C=0.5, max_iter=50, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=3
..............................
[CV] .............. C=0.5, max_iter=50, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=3
..............................
[CV] .............. C=0.5, max_iter=50, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=4
..............................
[CV] .............. C=0.5, max_iter=50, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=4
..............................
[CV] .............. C=0.5, max_iter=50, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=50, random_state=4
..............................
[CV] .............. C=0.5, max_iter=50, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=1
..............................
[CV] .............. C=0.5, max_iter=100, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=1
..............................
[CV] .............. C=0.5, max_iter=100, random_state=1, total=
0.0s
```

```
[CV] C=0.5, max_iter=100, random_state=1
...........................
[CV] .............. C=0.5, max_iter=100, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=2
...........................
[CV] .............. C=0.5, max_iter=100, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=2
...........................
[CV] .............. C=0.5, max_iter=100, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=2
...........................
[CV] .............. C=0.5, max_iter=100, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=3
...........................
[CV] .............. C=0.5, max_iter=100, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=3
...........................
[CV] .............. C=0.5, max_iter=100, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=3
...........................
[CV] .............. C=0.5, max_iter=100, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=4
...........................
[CV] .............. C=0.5, max_iter=100, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=4
...........................
[CV] .............. C=0.5, max_iter=100, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=100, random_state=4
...........................
[CV] .............. C=0.5, max_iter=100, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=1
...........................
[CV] .............. C=0.5, max_iter=150, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=1
...........................
[CV] .............. C=0.5, max_iter=150, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=1
...........................
[CV] .............. C=0.5, max_iter=150, random_state=1, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=2
...........................
[CV] .............. C=0.5, max_iter=150, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=2
```

```
.............................
[CV] .............. C=0.5, max_iter=150, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=2
.............................
[CV] .............. C=0.5, max_iter=150, random_state=2, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=3
.............................
[CV] .............. C=0.5, max_iter=150, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=3
.............................
[CV] .............. C=0.5, max_iter=150, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=3
.............................
[CV] .............. C=0.5, max_iter=150, random_state=3, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=4
.............................
[CV] .............. C=0.5, max_iter=150, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=4
.............................
[CV] .............. C=0.5, max_iter=150, random_state=4, total=
0.0s
[CV] C=0.5, max_iter=150, random_state=4
.............................
[CV] .............. C=0.5, max_iter=150, random_state=4, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=1
.............................
[CV] .............. C=1.0, max_iter=50, random_state=1, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=1
.............................
[CV] .............. C=1.0, max_iter=50, random_state=1, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=1
.............................
[CV] .............. C=1.0, max_iter=50, random_state=1, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=2
.............................
[CV] .............. C=1.0, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=2
.............................
[CV] .............. C=1.0, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=2
.............................
```

```
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1 concu
rrent workers.
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
[Parallel(n_jobs=1)]: Done    1 out of    1 | elapsed:      0.0s remai
ning:    0.0s
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
```

```
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
```

ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)

```
[CV] ............... C=1.0, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=3
...............................
[CV] ............... C=1.0, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=3
...............................
[CV] ............... C=1.0, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=3
...............................
[CV] ............... C=1.0, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=4
...............................
[CV] ............... C=1.0, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=4
...............................
[CV] ............... C=1.0, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.0, max_iter=50, random_state=4
...............................
[CV] ............... C=1.0, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=1
...............................
[CV] .............. C=1.0, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=1
...............................
[CV] .............. C=1.0, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=1
...............................
[CV] .............. C=1.0, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=2
...............................
[CV] .............. C=1.0, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=2
...............................
[CV] .............. C=1.0, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=2
...............................
[CV] .............. C=1.0, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=3
...............................
[CV] .............. C=1.0, max_iter=100, random_state=3, total=
0.0s
[CV] C=1.0, max_iter=100, random_state=3
...............................
[CV] .............. C=1.0, max_iter=100, random_state=3, total=
```

```
                            0.0s
                            [CV] C=1.0, max_iter=100, random_state=3
                            ...........................
                            [CV] .............. C=1.0, max_iter=100, random_state=3, total=
                            0.0s
                            [CV] C=1.0, max_iter=100, random_state=4
                            ...........................
                            [CV] .............. C=1.0, max_iter=100, random_state=4, total=
                            0.0s
                            [CV] C=1.0, max_iter=100, random_state=4
                            ...........................
                            [CV] .............. C=1.0, max_iter=100, random_state=4, total=
                            0.0s
                            [CV] C=1.0, max_iter=100, random_state=4
                            ...........................
                            [CV] .............. C=1.0, max_iter=100, random_state=4, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=1
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=1, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=1
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=1, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=1
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=1, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=2
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=2, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=2
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=2, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=2
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=2, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=3
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=3, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=3
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=3, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=3
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=3, total=
                            0.0s
                            [CV] C=1.0, max_iter=150, random_state=4
                            ...........................
                            [CV] .............. C=1.0, max_iter=150, random_state=4, total=
                            0.0s
```

```
[CV] C=1.0, max_iter=150, random_state=4
.............................
[CV] .............. C=1.0, max_iter=150, random_state=4, total=
0.0s
[CV] C=1.0, max_iter=150, random_state=4
.............................
[CV] .............. C=1.0, max_iter=150, random_state=4, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=1
.............................
[CV] .............. C=1.2, max_iter=50, random_state=1, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=1
.............................
[CV] .............. C=1.2, max_iter=50, random_state=1, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=1
.............................
[CV] .............. C=1.2, max_iter=50, random_state=1, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=2
.............................
[CV] .............. C=1.2, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=2
.............................
[CV] .............. C=1.2, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=2
.............................
[CV] .............. C=1.2, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=3
.............................
[CV] .............. C=1.2, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=3
.............................
[CV] .............. C=1.2, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=3
.............................
[CV] .............. C=1.2, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=4
.............................
[CV] .............. C=1.2, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=4
.............................
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
```

ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().

```
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
        return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
```

alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)

```
[CV] ............... C=1.2, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.2, max_iter=50, random_state=4
..............................
[CV] ............... C=1.2, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=1
.............................
[CV] ............... C=1.2, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=1
.............................
[CV] ............... C=1.2, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=1
.............................
[CV] ............... C=1.2, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=2
.............................
[CV] ............... C=1.2, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=2
.............................
[CV] ............... C=1.2, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=2
.............................
[CV] ............... C=1.2, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=3
.............................
[CV] ............... C=1.2, max_iter=100, random_state=3, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=3
.............................
[CV] ............... C=1.2, max_iter=100, random_state=3, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=3
.............................
[CV] ............... C=1.2, max_iter=100, random_state=3, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=4
.............................
[CV] ............... C=1.2, max_iter=100, random_state=4, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=4
.............................
[CV] ............... C=1.2, max_iter=100, random_state=4, total=
0.0s
[CV] C=1.2, max_iter=100, random_state=4
.............................
[CV] ............... C=1.2, max_iter=100, random_state=4, total=
0.0s
[CV] C=1.2, max_iter=150, random_state=1
.............................
[CV] ............... C=1.2, max_iter=150, random_state=1, total=
```

```
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=1
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=1, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=1
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=1, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=2
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=2, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=2
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=2, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=2
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=2, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=3
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=3, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=3
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=3, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=3
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=3, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=4
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=4, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=4
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=4, total=
                    0.0s
                    [CV] C=1.2, max_iter=150, random_state=4
                    ............................
                    [CV] .............. C=1.2, max_iter=150, random_state=4, total=
                    0.0s
                    [CV] C=1.5, max_iter=50, random_state=1
                    ............................
                    [CV] .............. C=1.5, max_iter=50, random_state=1, total=
                    0.0s
                    [CV] C=1.5, max_iter=50, random_state=1
                    ............................
                    [CV] .............. C=1.5, max_iter=50, random_state=1, total=
                    0.0s
                    [CV] C=1.5, max_iter=50, random_state=1
                    ............................
                    [CV] .............. C=1.5, max_iter=50, random_state=1, total=
                    0.0s
```

```
[CV] C=1.5, max_iter=50, random_state=2
..............................
[CV] .............. C=1.5, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=2
..............................
[CV] .............. C=1.5, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=2
..............................
[CV] .............. C=1.5, max_iter=50, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=3
..............................
[CV] .............. C=1.5, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=3
..............................
[CV] .............. C=1.5, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=3
..............................
[CV] .............. C=1.5, max_iter=50, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=4
..............................
[CV] .............. C=1.5, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=4
..............................
[CV] .............. C=1.5, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=50, random_state=4
..............................
[CV] .............. C=1.5, max_iter=50, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=1
..............................
[CV] .............. C=1.5, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=1
..............................
[CV] .............. C=1.5, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=1
..............................
[CV] .............. C=1.5, max_iter=100, random_state=1, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=2
..............................
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
```

ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().

```
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
   return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
```

```
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
```

```
[CV] .............. C=1.5, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=2
...........................
[CV] .............. C=1.5, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=2
...........................
[CV] .............. C=1.5, max_iter=100, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=3
...........................
[CV] .............. C=1.5, max_iter=100, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=3
...........................
[CV] .............. C=1.5, max_iter=100, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=3
...........................
[CV] .............. C=1.5, max_iter=100, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=4
...........................
[CV] .............. C=1.5, max_iter=100, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=4
...........................
[CV] .............. C=1.5, max_iter=100, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=100, random_state=4
...........................
[CV] .............. C=1.5, max_iter=100, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=1
...........................
[CV] .............. C=1.5, max_iter=150, random_state=1, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=1
...........................
[CV] .............. C=1.5, max_iter=150, random_state=1, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=1
...........................
[CV] .............. C=1.5, max_iter=150, random_state=1, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=2
...........................
[CV] .............. C=1.5, max_iter=150, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=2
...........................
[CV] .............. C=1.5, max_iter=150, random_state=2, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=2
...........................
[CV] .............. C=1.5, max_iter=150, random_state=2, total=
```

```
0.0s
[CV] C=1.5, max_iter=150, random_state=3
...........................
[CV] ............. C=1.5, max_iter=150, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=3
...........................
[CV] ............. C=1.5, max_iter=150, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=3
...........................
[CV] ............. C=1.5, max_iter=150, random_state=3, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=4
...........................
[CV] ............. C=1.5, max_iter=150, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=4
...........................
[CV] ............. C=1.5, max_iter=150, random_state=4, total=
0.0s
[CV] C=1.5, max_iter=150, random_state=4
...........................
[CV] ............. C=1.5, max_iter=150, random_state=4, total=
0.0s
best score: 0.793, best params: {'C': 1.2, 'max_iter': 50, 'random
_state': 1}
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples, ), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
```

ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)
[Parallel(n_jobs=1)]: Done 144 out of 144 | elapsed: 0.6s finis
hed
c:\users\user\miniconda3\envs\bd\lib\site-packages\sklearn\utils\v
alidation.py:72: DataConversionWarning: A column-vector y was pass
ed when a 1d array was expected. Please change the shape of y to
(n_samples,), for example using ravel().
  return f(**kwargs)

In [170]:
```python
from sklearn.metrics import plot_confusion_matrix

plot_confusion_matrix(grid.best_estimator_,X_,y,labels=[0,1])
```

Out[170]: <sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at
0x28aa1c28b70>
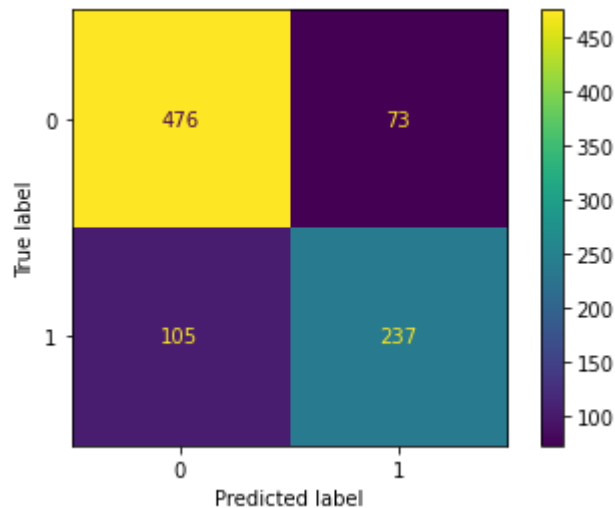
deep learning

In [171]:
```python
#skorch method
from skorch import NeuralNetBinaryClassifier
from sklearn.model_selection import RandomizedSearchCV

#pytorch
import torch
import torch.nn as nn
import torch.optim as optim
import torch.nn.functional as F
```

In [172]:

```python
#model

#o-o-o-o-o

class logistic_network(nn.Module):
    def __init__(self,prob=0.5,num_units=8,n_f=8):
        super(logistic_network,self).__init__()
        self.input=nn.Linear(n_f,num_units)
        self.hidden=nn.Sequential(

            nn.Dropout(prob),

            nn.Linear(num_units,num_units),
            nn.BatchNorm1d(num_units),
            nn.ReLU(),

            nn.Dropout(prob),

            nn.Linear(num_units,num_units),
            nn.BatchNorm1d(num_units),
            nn.ReLU()
        )
        self.output=nn.Linear(num_units,1)
        self.initialize()

    def initialize(self):
        n=self.input.weight.shape[1]
        torch.nn.init.normal_(self.input.weight, mean=0, std=torch.sqrt(torch.tensor(2/n)))
        for layer in self.hidden:
            try:
                n=layer.weight.shape[1]
                torch.nn.init.normal_(layer.weight, mean=0, std=torch.sqrt(torch.tensor(2/n)))
            except:
                pass

    def forward(self,X):
        input_=F.relu(self.input(X))
        hidden=self.hidden(input_)
        out=self.output(hidden) #eat BCELogicLoss directly
        return out
```

In [173]:
```python
#setting model

#theshold default:0.5
model = NeuralNetBinaryClassifier(
    logistic_network,
    max_epochs=100,
    lr=0.001,
    optimizer=optim.Adam, #optimizer
    # Shuffle training data on each epoch
    iterator_train__shuffle=True,
    criterion=nn.BCEWithLogitsLoss,
    device=torch.device('cuda'),
)
```

In [174]:
```python
#tunning hyperparameters: lr , num_unis , dropout prob , optimiz
er , max_epochs
X_=X_.astype('float32')
y_=y.squeeze().astype('float32')

# deactivate skorch-internal train-valid split and verbose loggi
ng
model.set_params(train_split=False, verbose=0)


params = {
    'lr': [10**(-4*np.random.rand()) for i in range(10)],
    'max_epochs': [50,100],
    'module__num_units': [12,16],
    #'module__prob':[0.5],
    'optimizer__weight_decay':[0,0.001],
    #'optimizer':[optim.Adam,optim.SGD,optim.RMSprop]
}

#cvint, cross-validation generator or an iterable
#cv=kfold(3),default 5
#metric:accuracy
gs =RandomizedSearchCV(model, params, refit=True, cv=5, scoring=
'accuracy', verbose=2)

gs.fit(X_, y_)
print("best score: {:.3f}, best params: {}".format(gs.best_score
_, gs.best_params_))
```

```
Fitting 5 folds for each of 10 candidates, totalling 50 fits
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00012848378793001993

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1 concu
rrent workers.

[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00012848378793001993, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00012848378793001993

[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    1.4s remai
ning:    0.0s
```

```
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00012848378793001993, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00012848378793001993
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00012848378793001993, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00012848378793001993
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00012848378793001993, total=   1.4s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00012848378793001993
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00012848378793001993, total=   1.4s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.20879103361611484
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.20879103361611484, total=   2.9s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.20879103361611484
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.20879103361611484, total=   3.1s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.20879103361611484
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.20879103361611484, total=   3.1s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.20879103361611484
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.20879103361611484, total=   3.1s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.20879103361611484
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.20879103361611484, total=   3.3s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.00023757659375594646, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.00023757659375594646, total=   1.5s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.00023757659375594646, total=   1.7s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.00023757659375594646, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.00023757659375594646, total=   1.5s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.11717152150513566
[CV]  optimizer__weight_decay=0.001, module__num_units=16, max_epo
```

chs=100, lr=0.11717152150513566, total=   3.3s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.11717152150513566
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.11717152150513566, total=   3.2s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.11717152150513566
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.11717152150513566, total=   3.2s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.11717152150513566
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.11717152150513566, total=   3.2s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=100, lr=0.11717152150513566
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=100, lr=0.11717152150513566, total=   3.3s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=50, lr=0.17939137622795764
[CV]   optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=50, lr=0.17939137622795764, total=   1.7s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=50, lr=0.17939137622795764
[CV]   optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=50, lr=0.17939137622795764, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=50, lr=0.17939137622795764
[CV]   optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=50, lr=0.17939137622795764, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=50, lr=0.17939137622795764
[CV]   optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=50, lr=0.17939137622795764, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=50, lr=0.17939137622795764
[CV]   optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=50, lr=0.17939137622795764, total=   1.8s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.043022837429703066
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.043022837429703066, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.043022837429703066
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.043022837429703066, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.043022837429703066
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.043022837429703066, total=   1.6s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.043022837429703066
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.043022837429703066, total=   1.7s
[CV] optimizer__weight_decay=0.001, module__num_units=16, max_epoc
hs=50, lr=0.043022837429703066
[CV]   optimizer__weight_decay=0.001, module__num_units=16, max_epo
chs=50, lr=0.043022837429703066, total=   1.6s

2020/11/13

Titanic

```
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00023757659375594646, total=   1.6s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00023757659375594646, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00023757659375594646, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00023757659375594646, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=5
0, lr=0.00023757659375594646
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
50, lr=0.00023757659375594646, total=   1.6s
[CV] optimizer__weight_decay=0, module__num_units=16, max_epochs=5
0, lr=0.009364075620568993
[CV]  optimizer__weight_decay=0, module__num_units=16, max_epochs=
50, lr=0.009364075620568993, total=   1.6s
[CV] optimizer__weight_decay=0, module__num_units=16, max_epochs=5
0, lr=0.009364075620568993
[CV]  optimizer__weight_decay=0, module__num_units=16, max_epochs=
50, lr=0.009364075620568993, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=16, max_epochs=5
0, lr=0.009364075620568993
[CV]  optimizer__weight_decay=0, module__num_units=16, max_epochs=
50, lr=0.009364075620568993, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=16, max_epochs=5
0, lr=0.009364075620568993
[CV]  optimizer__weight_decay=0, module__num_units=16, max_epochs=
50, lr=0.009364075620568993, total=   1.5s
[CV] optimizer__weight_decay=0, module__num_units=16, max_epochs=5
0, lr=0.009364075620568993
[CV]  optimizer__weight_decay=0, module__num_units=16, max_epochs=
50, lr=0.009364075620568993, total=   1.9s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=100, lr=0.07781710719306544
[CV]  optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=100, lr=0.07781710719306544, total=   4.1s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=100, lr=0.07781710719306544
[CV]  optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=100, lr=0.07781710719306544, total=   3.6s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=100, lr=0.07781710719306544
[CV]  optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=100, lr=0.07781710719306544, total=   3.3s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
hs=100, lr=0.07781710719306544
[CV]  optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=100, lr=0.07781710719306544, total=   3.3s
[CV] optimizer__weight_decay=0.001, module__num_units=12, max_epoc
```
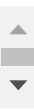
file:///C:/Users/USER/Downloads/Titanic.html

52/58

```
hs=100, lr=0.07781710719306544
[CV]  optimizer__weight_decay=0.001, module__num_units=12, max_epo
chs=100, lr=0.07781710719306544, total=   3.3s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=1
00, lr=0.11717152150513566
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
100, lr=0.11717152150513566, total=   3.2s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=1
00, lr=0.11717152150513566
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
100, lr=0.11717152150513566, total=   3.1s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=1
00, lr=0.11717152150513566
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
100, lr=0.11717152150513566, total=   3.1s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=1
00, lr=0.11717152150513566
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
100, lr=0.11717152150513566, total=   3.1s
[CV] optimizer__weight_decay=0, module__num_units=12, max_epochs=1
00, lr=0.11717152150513566
[CV]  optimizer__weight_decay=0, module__num_units=12, max_epochs=
100, lr=0.11717152150513566, total=   3.3s

[Parallel(n_jobs=1)]: Done  50 out of  50 | elapsed:  1.9min finis
hed

best score: 0.819, best params: {'optimizer__weight_decay': 0, 'mo
dule__num_units': 16, 'max_epochs': 50, 'lr': 0.00936407562056899
3}
```

In [175]:
```python
final_model=gs.best_estimator_
```

In [176]:
```python
#compare logistic regression and network
print('logistic regression--',grid.best_estimator_.score(X_,y_))
print('logistic network--',final_model.score(X_,y))
```
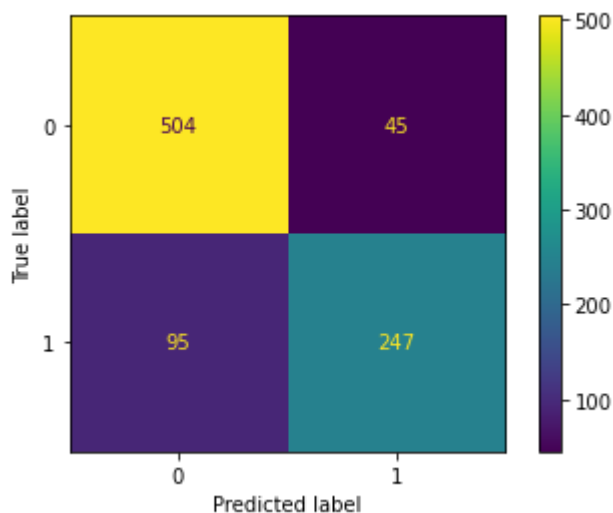
```
logistic regression-- 0.8002244668911336
logistic network-- 0.8428731762065096
```

In [177]:
```python
from sklearn.metrics import plot_confusion_matrix
plot_confusion_matrix(final_model,X_,y_,labels=[0,1])
```

Out[177]: `<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x28aa1bb1ef0>`

In [178]:
```python
#save model
torch.save(final_model.module_,'titanic_model.pkl')
```

In [179]:
```python
model_titanic=torch.load('titanic_model.pkl').cpu()
```

submit

In [180]:
```python
df_test=pd.read_csv('./data/test.csv')
df_test.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 11 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   PassengerId  418 non-null    int64
 1   Pclass       418 non-null    int64
 2   Name         418 non-null    object
 3   Sex          418 non-null    object
 4   Age          332 non-null    float64
 5   SibSp        418 non-null    int64
 6   Parch        418 non-null    int64
 7   Ticket       418 non-null    object
 8   Fare         417 non-null    float64
 9   Cabin        91 non-null     object
 10  Embarked     418 non-null    object
dtypes: float64(2), int64(4), object(5)
memory usage: 36.0+ KB
```

In [181]:
```python
# process
df_test['Title'] = df_test.Name.apply(lambda x: re.search(' ([A-
Z][a-z]+)\.', x).group(1))
```

In [182]:
```python
df_test.Age.fillna(df_test.Age.mean(),inplace=True)
df_test.Embarked.fillna('S',inplace=True)
df_test.Fare.fillna(df_test.Fare.mean(),inplace=True)
```

In [183]:
```python
df_test.drop(['PassengerId','Name','Ticket','Cabin'],axis=1,inpl
ace=True)
```

In [184]:
```python
df_test
```

Out[184]:

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked	Title
0	3	male	34.50000	0	0	7.8292	Q	Mr
1	3	female	47.00000	1	0	7.0000	S	Mrs
2	2	male	62.00000	0	0	9.6875	Q	Mr
3	3	male	27.00000	0	0	8.6625	S	Mr
4	3	female	22.00000	1	1	12.2875	S	Mrs
...	...	...	...	...	...	...	...	...
413	3	male	30.27259	0	0	8.0500	S	Mr
414	1	female	39.00000	0	0	108.9000	C	Dona
415	3	male	38.50000	0	0	7.2500	S	Mr
416	3	male	30.27259	0	0	8.0500	S	Mr
417	3	male	30.27259	1	1	22.3583	C	Master

418 rows × 8 columns

In [185]:
```python
df_test.Title[df_test.Title=='Dona']='Don'
```

```
c:\users\user\miniconda3\envs\bd\lib\site-packages\ipykernel_launc
her.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-
a-copy
  """Entry point for launching an IPython kernel.
```

In [186]:
```python
#replace number to label
#sex:male,female ---0,1
#embarked:S,C,Q----0,1,2
#title
replace_ = LabelEncoder()

#sex
replace_.fit(df_test.Sex)
Sex_label = replace_.transform(df_test.Sex)
df_test['Sex_label'] = Sex_label

#embarked
replace_.fit(df_test.Embarked)
Embarked_label = replace_.transform(df_test.Embarked)
df_test['Embarked_label'] = Embarked_label

#title
Title_label =  replace.transform(df_test.Title)
df_test['Title_label'] = Title_label
```

In [187]:
```python
df_test.drop(['Title','Sex','Embarked'],axis=1,inplace=True)
```

In [188]:
```python
df_test
```

Out[188]:

	Pclass	Age	SibSp	Parch	Fare	Sex_label	Embarked_label
0	3	34.50000	0	0	7.8292	1	1
1	3	47.00000	1	0	7.0000	0	2
2	2	62.00000	0	0	9.6875	1	1
3	3	27.00000	0	0	8.6625	1	2
4	3	22.00000	1	1	12.2875	0	2
...	...	...	...	...	...	...	...
413	3	30.27259	0	0	8.0500	1	2
414	1	39.00000	0	0	108.9000	0	0
415	3	38.50000	0	0	7.2500	1	2
416	3	30.27259	0	0	8.0500	1	2
417	3	30.27259	1	1	22.3583	1	0

418 rows × 8 columns

In [189]: `df_test.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 8 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Pclass         418 non-null    int64
 1   Age            418 non-null    float64
 2   SibSp          418 non-null    int64
 3   Parch          418 non-null    int64
 4   Fare           418 non-null    float64
 5   Sex_label      418 non-null    int32
 6   Embarked_label 418 non-null    int32
 7   Title_label    418 non-null    int32
dtypes: float64(2), int32(3), int64(3)
memory usage: 21.4 KB
```

In [190]:
```python
#normalize
normal= StandardScaler()

X_test=np.array(df_test)

normal.fit(X_test)
X_test_norm=normal.transform(X_test)
X_test_norm=X_test_norm.astype(np.float32)
```

In [191]:
```python
Survived=final_model.predict(X_test_norm).squeeze().astype('int32')
```

In [192]:
```python
#submit
PassengerId = np.arange(892,1310)

submit = pd.DataFrame(list(zip(PassengerId,Survived)),columns=['PassengerId','Survived'])
```

In [193]: `submit.head(10)`

Out[193]:

	PassengerId	Survived
0	892	0
1	893	1
2	894	0
3	895	0
4	896	0
5	897	0
6	898	1
7	899	0
8	900	1
9	901	0

In [194]: `submit.to_csv("final_ans_new.csv",index=False)`

In [ ]: