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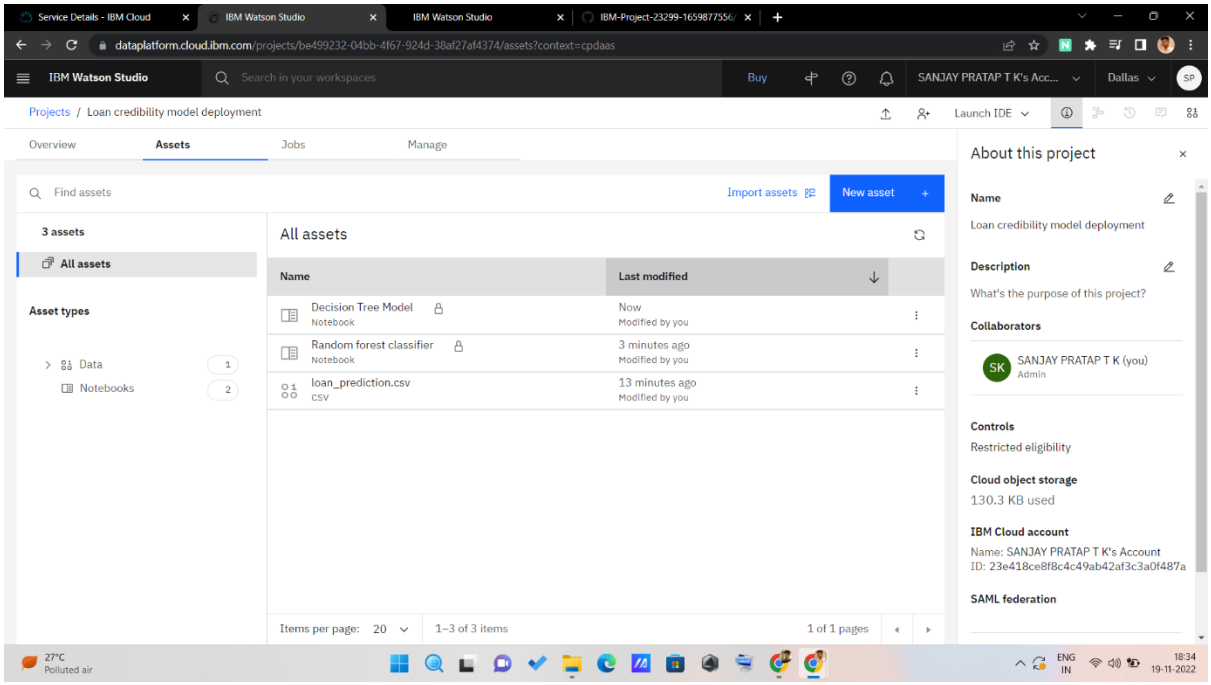

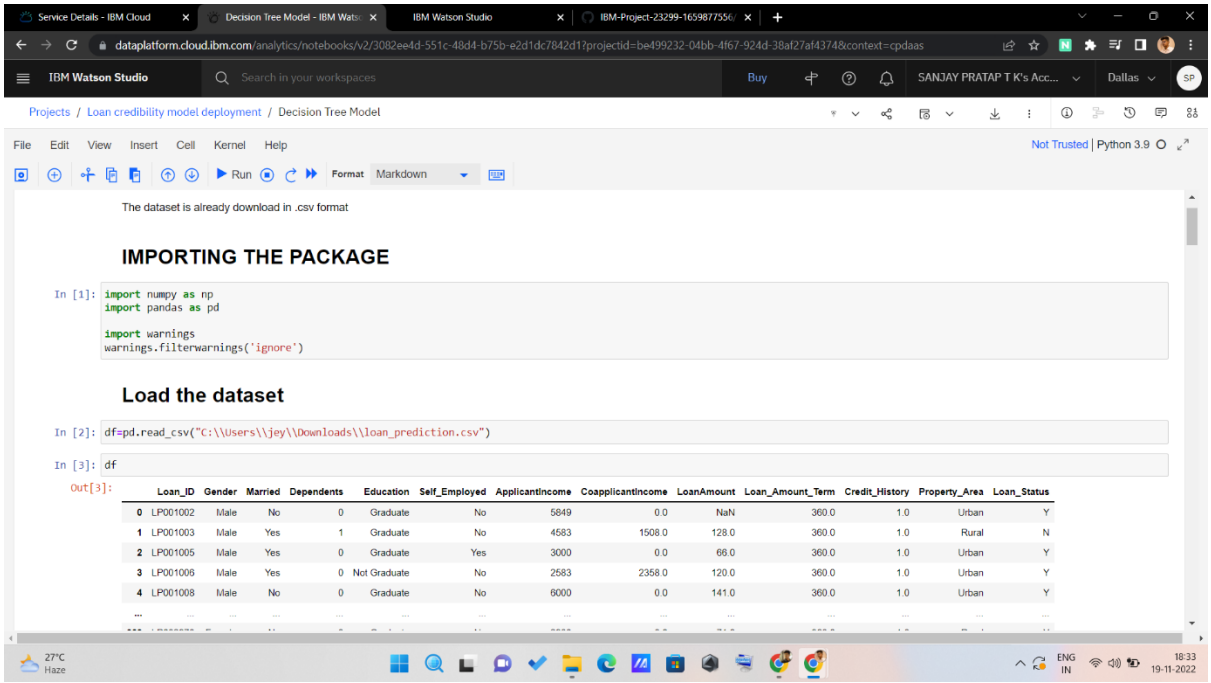

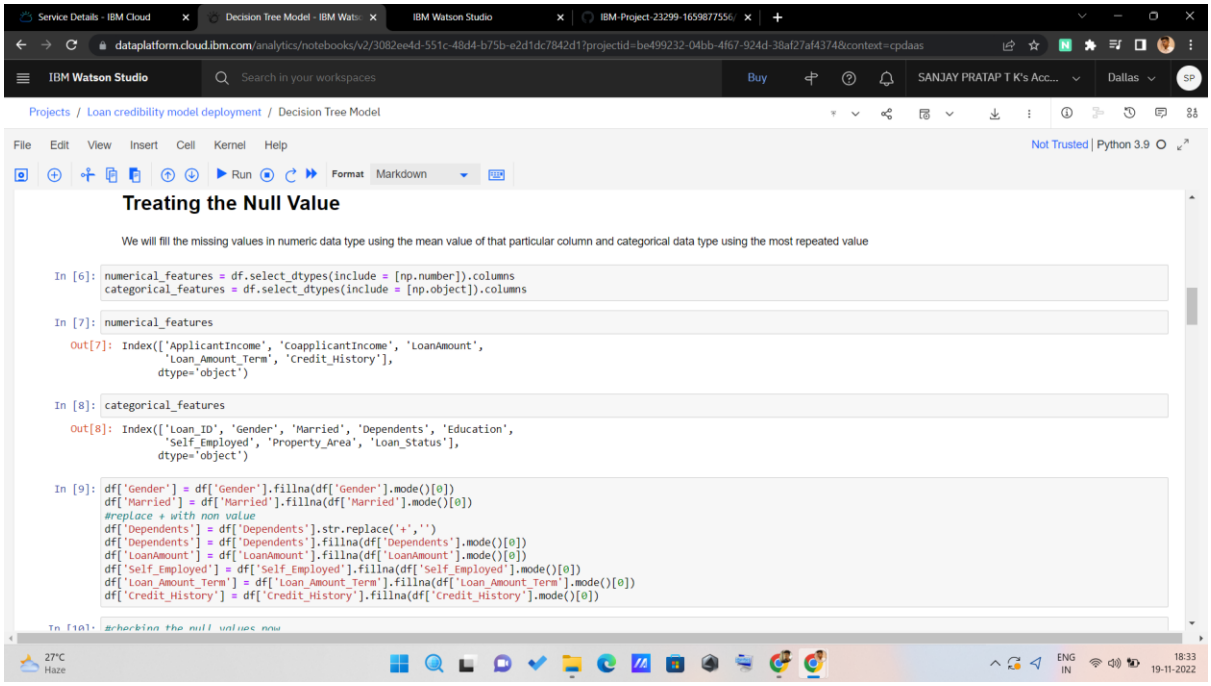
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Treating the Null Value
We will fill the missing values in numeric data type using the mean value of that particular column and categorical data type using the most repeated value
In [6]:
numerical_features = df.select_dtypes(include = [np.number]).columns
categorical_features = df.select_dtypes(include = [np.object]).columns
In [7]:
numerical_features
Out[7]:
Index(['ApplicantIncome', 'CoapplicantIncome', 'LoanAmount',
'Loan_Amount_Term', 'Credit_History'],
dtype='object')
In [8]:
categorical_features
Out[8]:
Index(['Loan_ID', 'Gender', 'Married', 'Dependents', 'Education',
'Self_Employed', 'Property_Area', 'Loan_Status'],
dtype='object')
In [9]:
df['Gender'] = df['Gender'].fillna(df['Gender'].mode()[0])
df['Married'] = df['Married'].fillna(df['Married'].mode()[0])
#replace + with non value
df['Dependents'] = df['Dependents'].str.replace('+','')
df['Dependents'] = df['Dependents'].fillna(df['Dependents'].mode()[0])
df['LoanAmount'] = df['LoanAmount'].fillna(df['LoanAmount'].mode()[0])
df['Self_Employed'] = df['Self_Employed'].fillna(df['Self_Employed'].mode()[0])
df['Loan_Amount_Term'] = df['Loan_Amount_Term'].fillna(df['Loan_Amount_Term'].mode()[0])
df['Credit_History'] = df['Credit_History'].fillna(df['Credit_History'].mode()[0])
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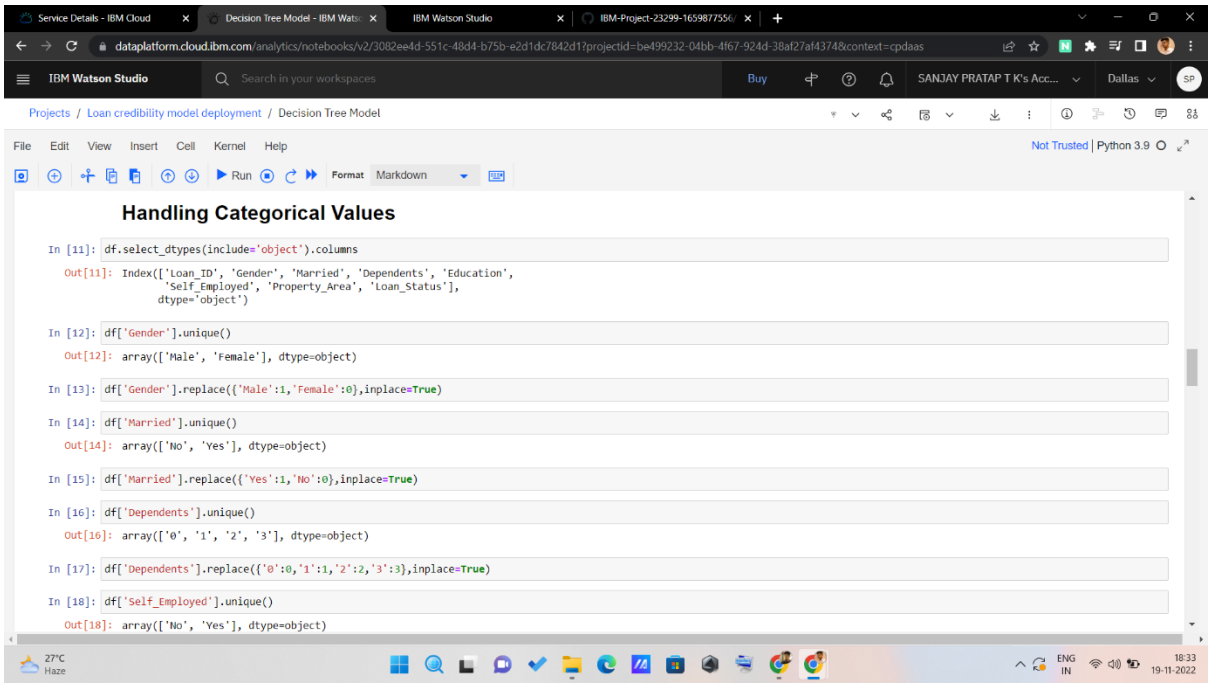
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Handling Categorical Values
In [11]:
df.select_dtypes(include='object').columns
Out[11]:
Index(['Loan_ID', 'Gender', 'Married', 'Dependents', 'Education',
'Self_Employed', 'Property_Area', 'Loan_Status'],
dtype='object')
In [12]:
df['Gender'].unique()
Out[12]:
array(['Male', 'Female'], dtype=object)
In [13]:
df['Gender'].replace({'Male':1,'Female':0},inplace=True)
In [14]:
df['Married'].unique()
Out[14]:
array(['No', 'Yes'], dtype=object)
In [15]:
df['Married'].replace({'Yes':1,'No':0},inplace=True)
In [16]:
df['Dependents'].unique()
Out[16]:
array(['0', '1', '2', '3'], dtype=object)
In [17]:
df['Dependents'].replace({'0':0,'1':1,'2':2,'3':3},inplace=True)
In [18]:
df['Self_Employed'].unique()
Out[18]:
array(['No', 'Yes'], dtype=object)
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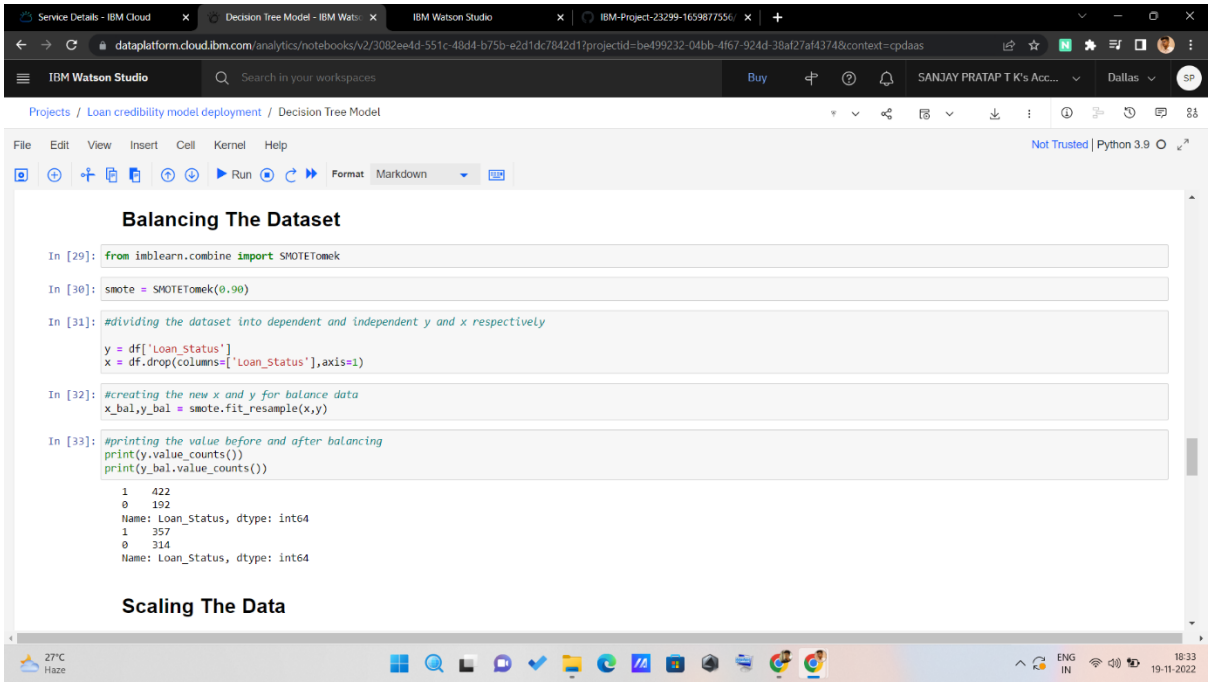
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Balancing The Dataset
In [29]: from imblearn.combine import SMOTETomek
In [30]: smote = SMOTETomek(0.90)
In [31]: #dividing the dataset into dependent and independent y and x respectively
y = df['Loan_Status']
x = df.drop(columns=['Loan_status'],axis=1)
In [32]: #creating the new x and y for balance data
x_bal,y_bal = smote.fit_resample(x,y)
In [33]: #printing the value before and after balancing
print(y.value_counts())
print(y_bal.value_counts())
1 422
0 192
Name: Loan_Status, dtype: int64
1 357
0 314
Name: Loan_Status, dtype: int64
Scaling The Data
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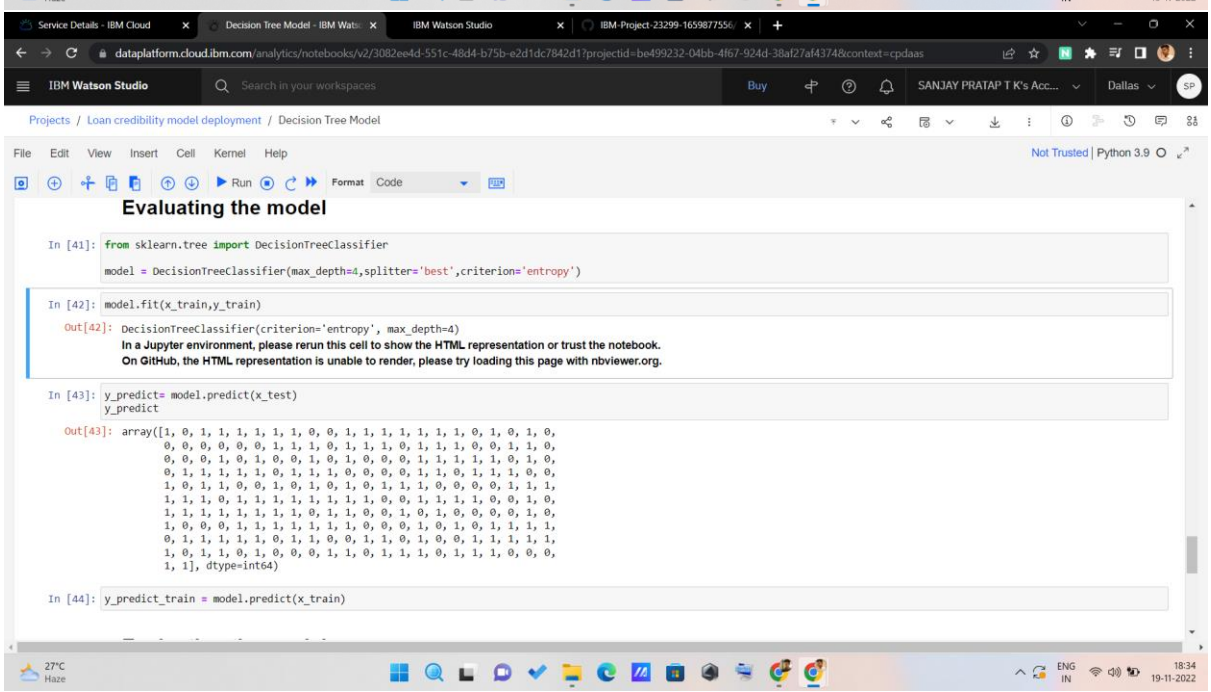
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Evaluating the model
In [41]: from sklearn.tree import DecisionTreeClassifier
model = DecisionTreeClassifier(max_depth=4,splitter='best',criterion='entropy')
In [42]: model.fit(x_train,y_train)
Out[42]: DecisionTreeClassifier(criterion='entropy', max_depth=4)
In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.
In [43]: y_predict= model.predict(x_test)
y_predict
Out[43]: array([1, 0, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 0, 1, 0, 1, 0,
0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 1, 1, 0, 0,
0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 1, 0, 1, 0,
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1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0, 0, 1, 0,
1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0,
1, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 1,
0, 1, 1, 1, 1, 1, 0, 1, 1, 0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 1, 1, 1,
1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 0,
1, 1], dtype=int64)
In [44]: y_predict_train = model.predict(x_train)
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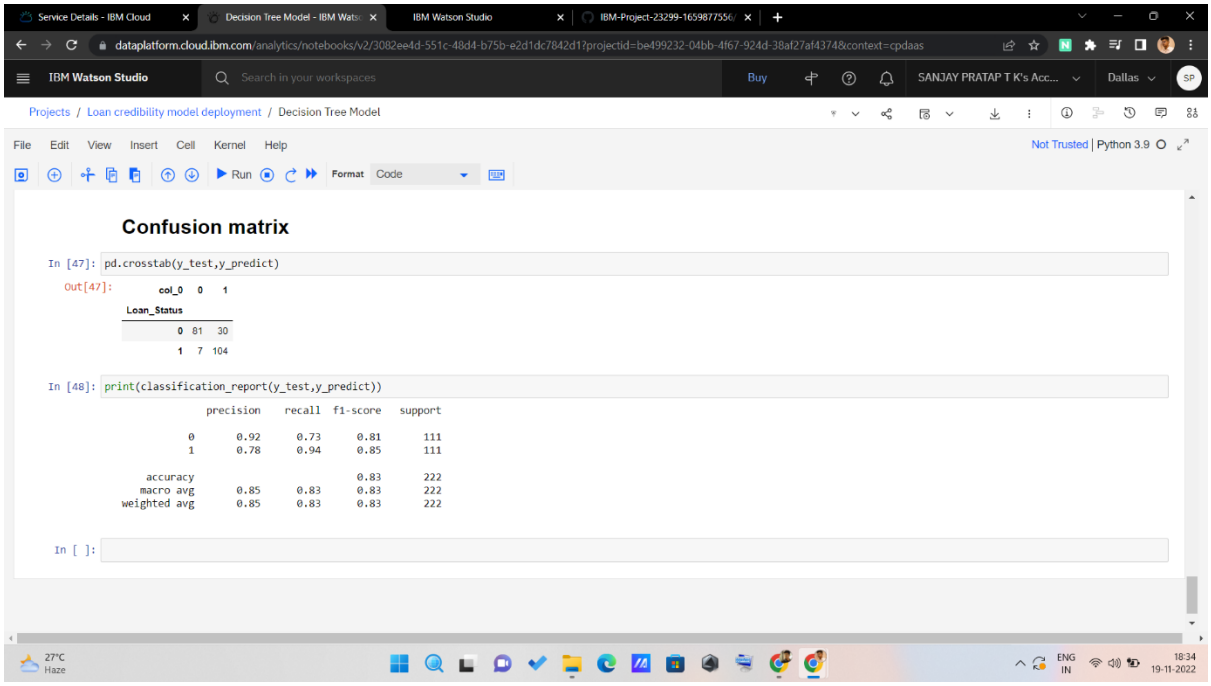
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Confusion matrix
In [47]: pd.crosstab(y_test,y_predict)
Out[47]:
col_0 0 1
Loan_Status
0 81 30
1 7 104
In [48]: print(classification_report(y_test,y_predict))
precision recall f1-score support
0 0.92 0.73 0.81 111
1 0.78 0.94 0.85 111
accuracy 0.83 222
macro avg 0.85 0.83 0.83 222
weighted avg 0.85 0.83 0.83 222
In [ ]:
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