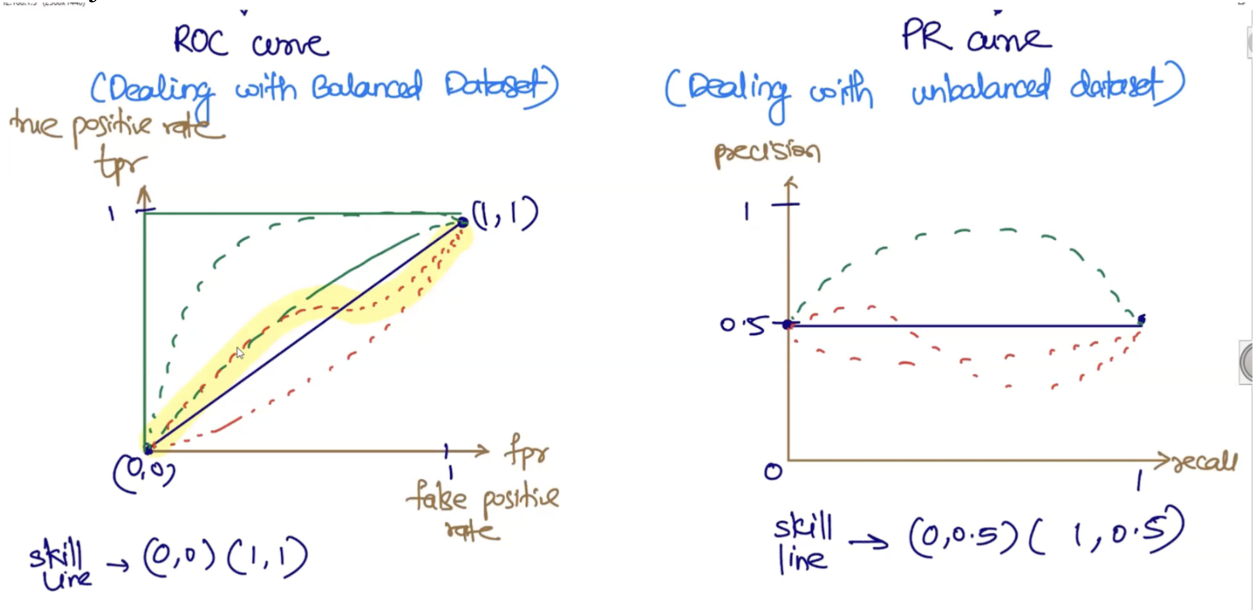
Visualization-Based for Classification metrics

We have two Visualization-Based for Classification metrics:

1- ROC Curve ➔ Dealing with balanced dataset
2- PR Curve ➔ Dealing with unbalanced dataset

We Reject the model if it is bellow skill line



Example:

		data = pd.read_csv('Social_Network_Ads.csv')

		features = data.iloc[:,[2,3]].values
		label = data.iloc[:,4].values

		data.Purchased.value_counts() 0 257 1 143 Name: Purchased, dtype: int64

		from sklearn.model_selection import train_test_split
		from sklearn.linear_model import LogisticRegression
		
		X_train,X_test,y_train,y_test = train_test_split(features,
		label,
		test_size=0.2,
		random_state=199)

		model = LogisticRegression()
		model.fit(X_train,y_train)

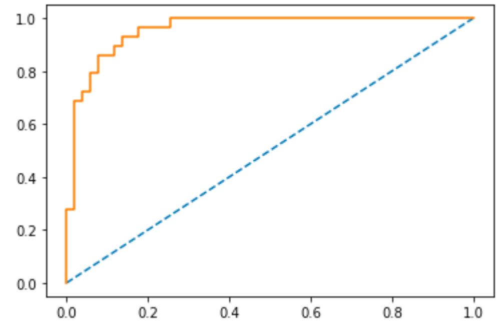
		model.score(X_train,y_train) 0.8375
		model.score(X_test,y_test) 0.8875
	ROC Curve We know this dataset is unbalanced and we canot use ROC. We just show this for understand the topic	
	For ROC, you need to use probability for true label. For label one.	model.predict_proba(X_test)
	We are extracting index 1	model.predict_proba(X_test)[:,1] array([0.30836264, 0.91079273, 0.13700251, 0.00401364, 0.88616071, 0.26557903, 0.55949243, 0.21612017, 0.99728588, 0.19815624, 0.42705761, 0.87926715, 0.18204413, 0.31550988, 0.1630387 , 0.969827 , 0.8154532 , 0.93892347, 0.02560173, 0.5908719 , 0.99426102, 0.92376635, 0.00518353, 0.02644595, 0.0780933 , 0.13476784, 0.78985382, 0.00831599, 0.98412275, 0.05254734, 0.00132795, 0.95645756, 0.00688454, 0.0142874 , 0.73021371, 0.17713787, 0.01319186, 0.90149143, 0.99146485, 0.24832158, 0.92737277, 0.96220317, 0.35798254, 0.01415401, 0.25640291, 0.00131539, 0.00388266, 0.33006896, 0.0373644 , 0.04169682, 0.33854344, 0.00638312, 0.00600248, 0.00117359, 0.00283913, 0.05827129, 0.02258472, 0.1630387 , 0.14744885, 0.99654298, 0.59661342, 0.00170823, 0.33854344, 0.26557903, 0.79533085, 0.00940094, 0.06287203, 0.17783311, 0.01900801, 0.0475731 , 0.17713787, 0.20895466, 0.36567181, 0.05596516, 0.05723516, 0.7283332 , 0.07843621, 0.50980936, 0.59546459, 0.8767174])

	Plot ROC	from sklearn.metrics import roc_curve
		from sklearn.metrics import roc_auc_score
		import matplotlib.pyplot as plt
		%matplotlib inline

```
Step1: Extract the prob of true value for your label (1)
#Step2: Calc AUC
#Step3: Plot the Skill line (0,0) (1,1)
#Step4: Plot ROC


y_test is True value
probabilityValues is the predicted value
```

```
1.
probabilityValues = model.predict_proba(X_test)[:,1]

2.
auc = roc_auc_score(y_test, probabilityValues)

3.
plt.plot([0,1],[0,1] , linestyle='--')

4.
fpr,tpr,_ = roc_curve(y_test , probabilityValues)

plt.plot(fpr,tpr)
print(auc)
```

```
0.9574036511156186
```

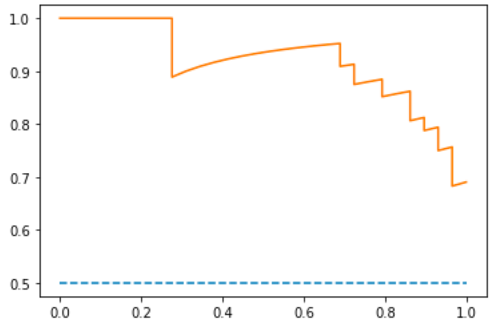


```
#Note: For this example use of ROC is invalid since the dataset is an UNBALANCED dataset.
```

PR Curve

```
#Step1: Extract the prob values for label 1
#Step2: Calc PR and AUC
#Step3: Plot the Skill line (0,0.5) (1,0.5)
#Step4: Plot PR Curve
```

```
from sklearn.metrics import precision_recall_curve
from sklearn.metrics import auc
import matplotlib.pyplot as plt
%matplotlib inline

#Step1:
probabilityValues = model.predict_proba(X_test)[:,1]

#Step2:
precision,recall,_ = precision_recall_curve(y_test,
probabilityValues)
aucPR = auc(recall,precision)
print(aucPR)

#Step3:
```

		plt.plot([0,1],[0.5,0.5], linestyle='--')
		#Step4
		plt.plot(recall,precision)
		0.9164619166014315
		

	We will accept the model !!!	

Example 2:
Use-Case: You need to create a model that can predict the species of the iris flower based on the biological factor of iris flower:

- Iris Setosa
- Iris Versicolor
- Iris Virginica

Use:
LogisticRegression
KNeighborClassifier

SL = 0.1