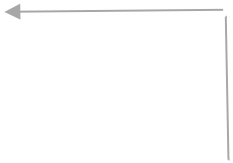
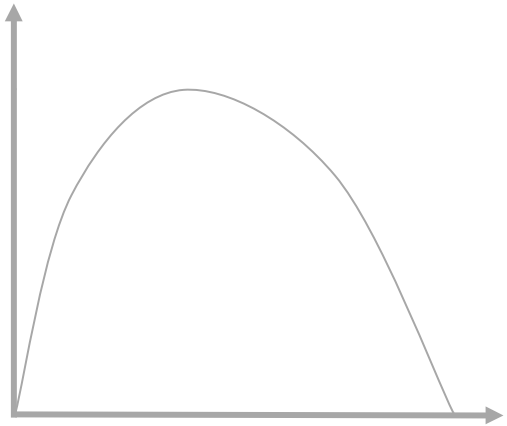
AUC - ROC

Area Under Curve



AUC - ROC

Area Under Curve



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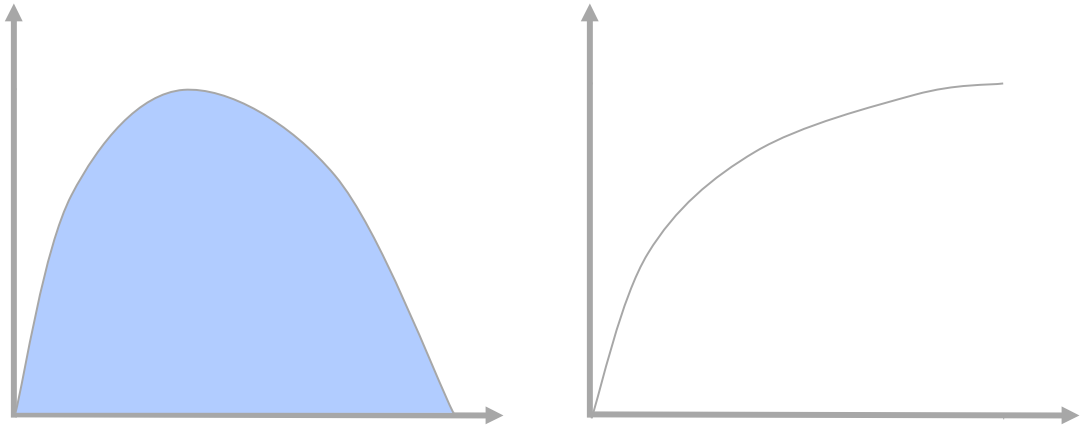
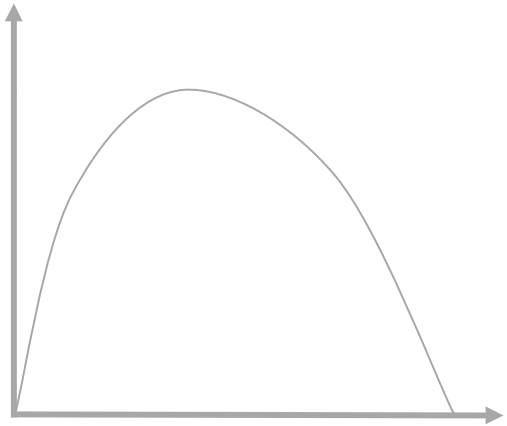
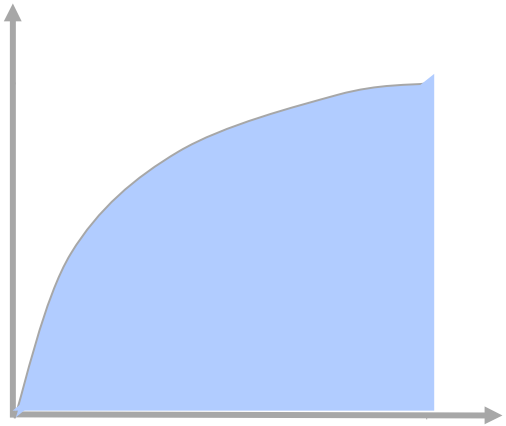
Area Under Curve



Area Under Curve





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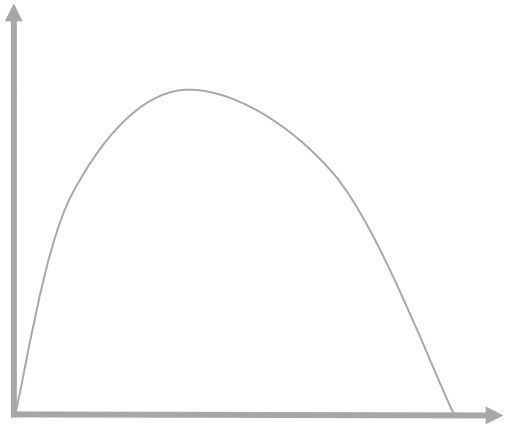
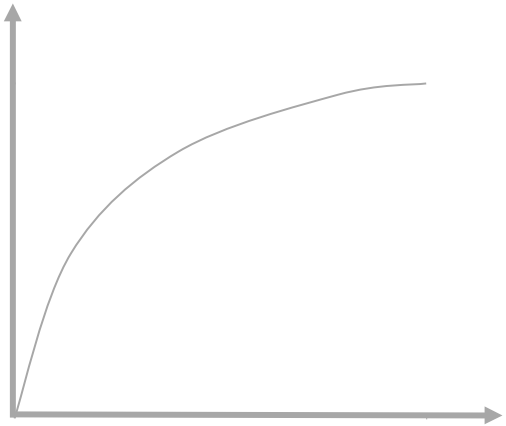
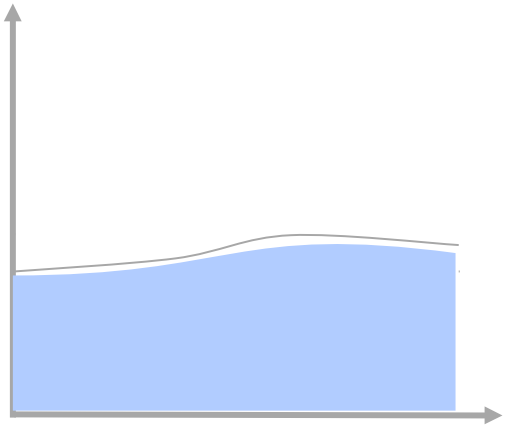
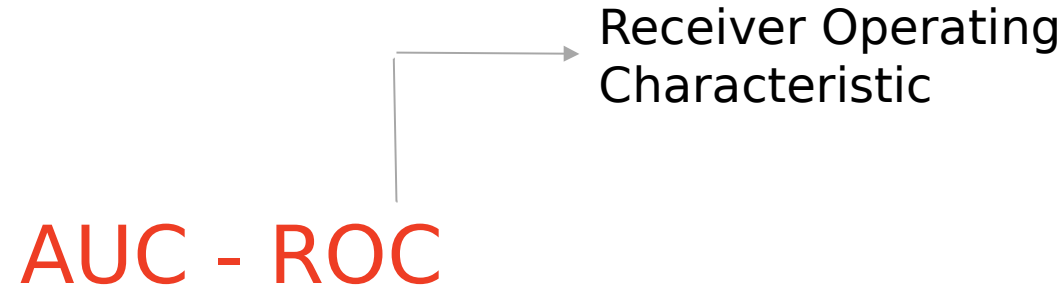
Area Under Curve









The ROC Curve

- ROC: Receiver Operating Characteristic

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- Originally used for distinguishing ‘noise’ from ‘not noise’

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- Evaluation Metric for Binary Classification

The ROC Curve

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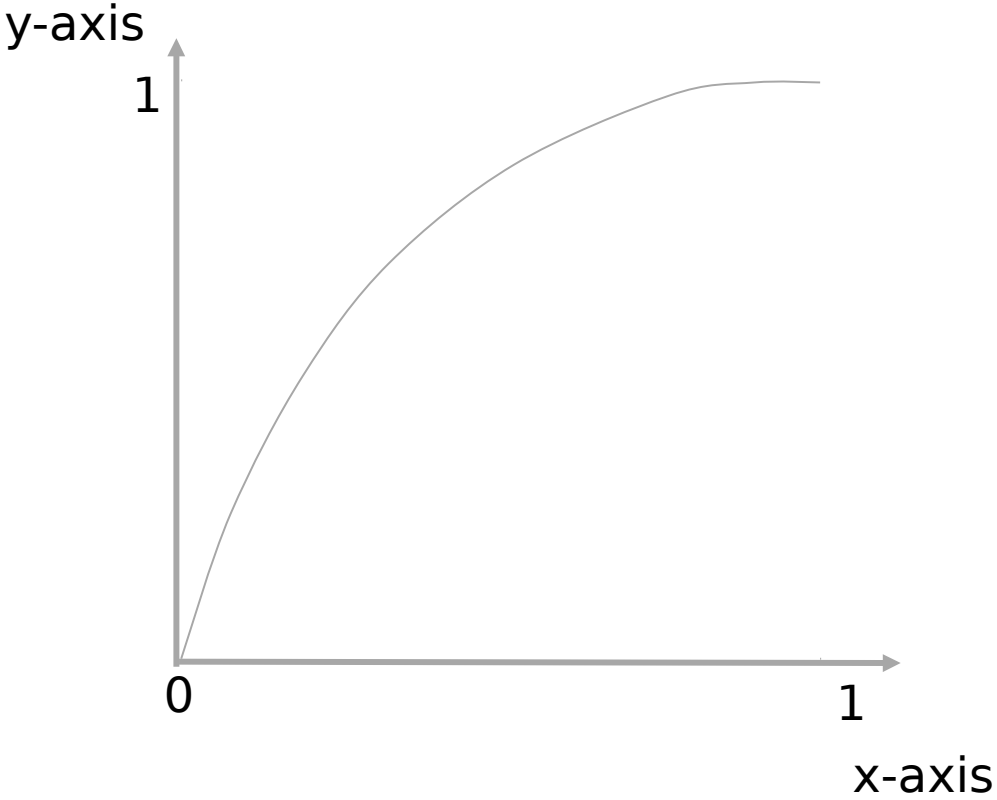
- Originally used for distinguishing ‘noise’ from ‘not noise’
- Evaluation Metric for Binary Classification
- Gives trade-off between True Positives and False Positives

The ROC Curve



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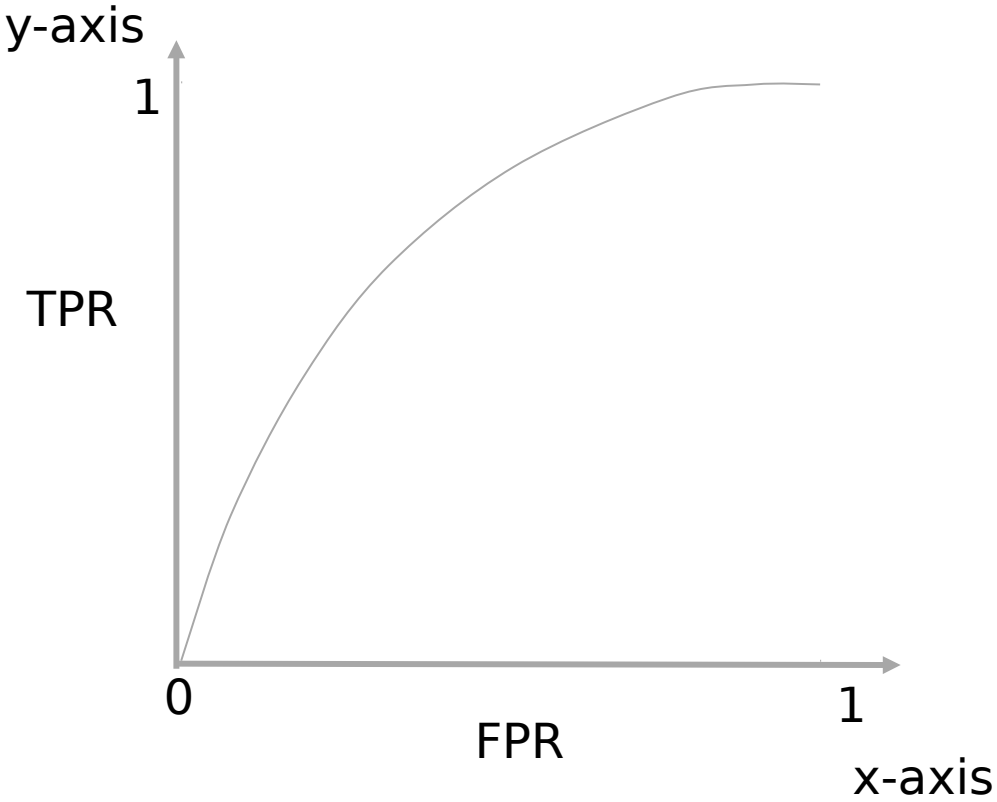
The ROC Curve



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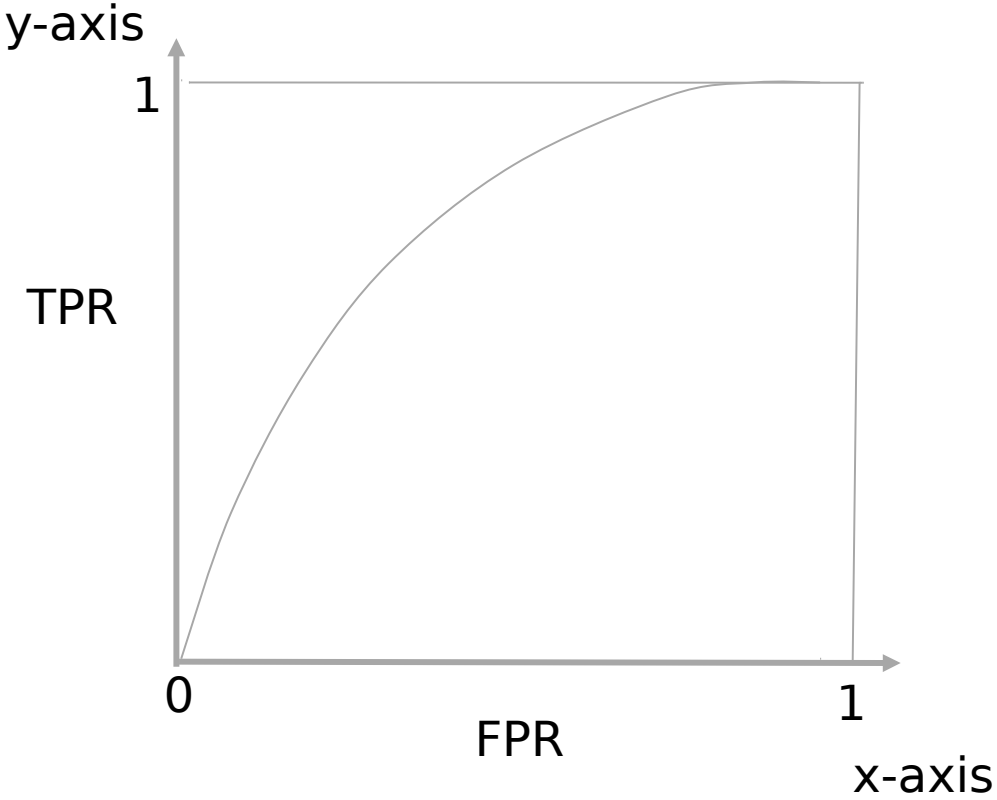
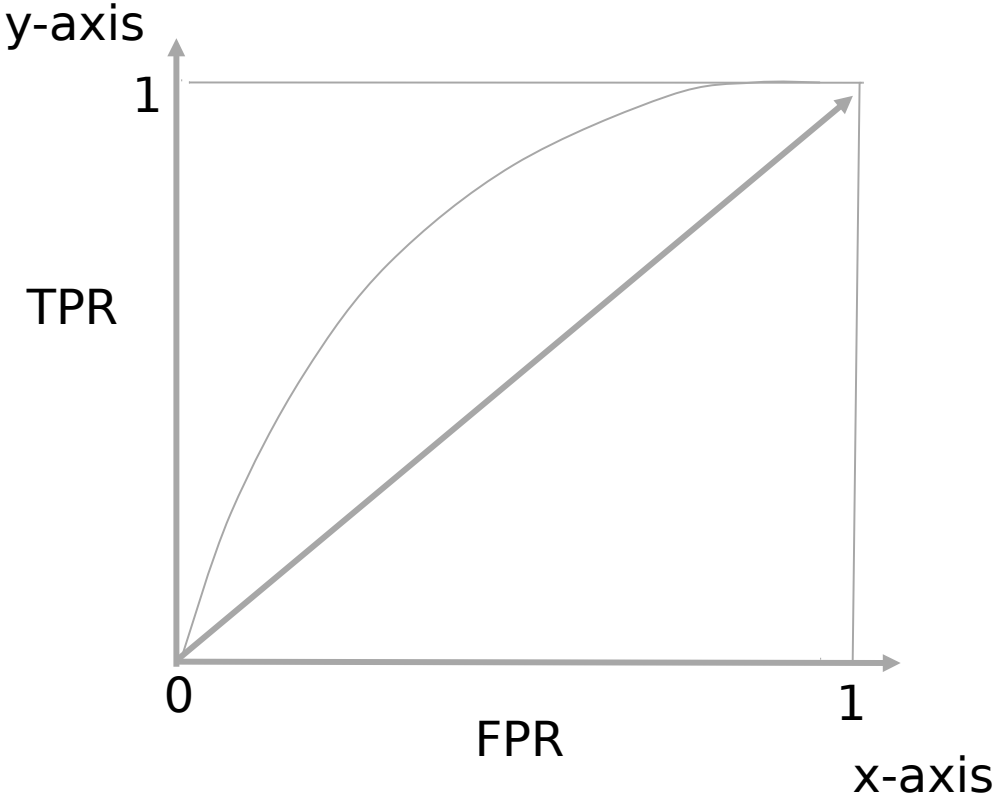
The ROC Curve



The ROC Curve



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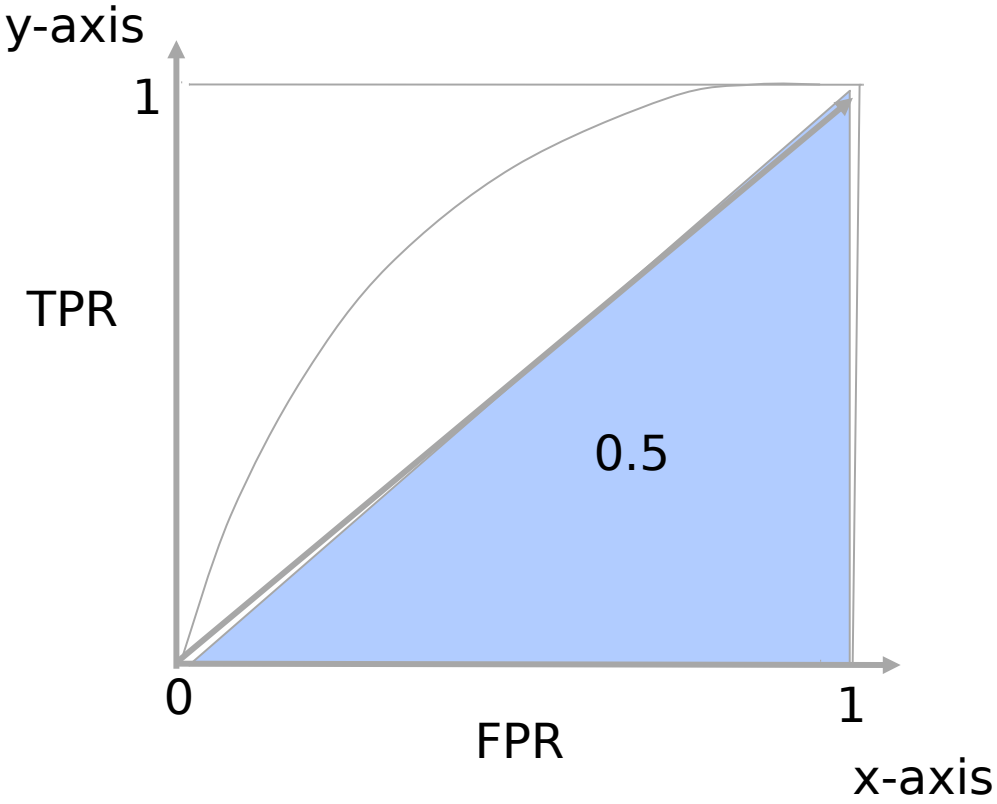
The ROC Curve



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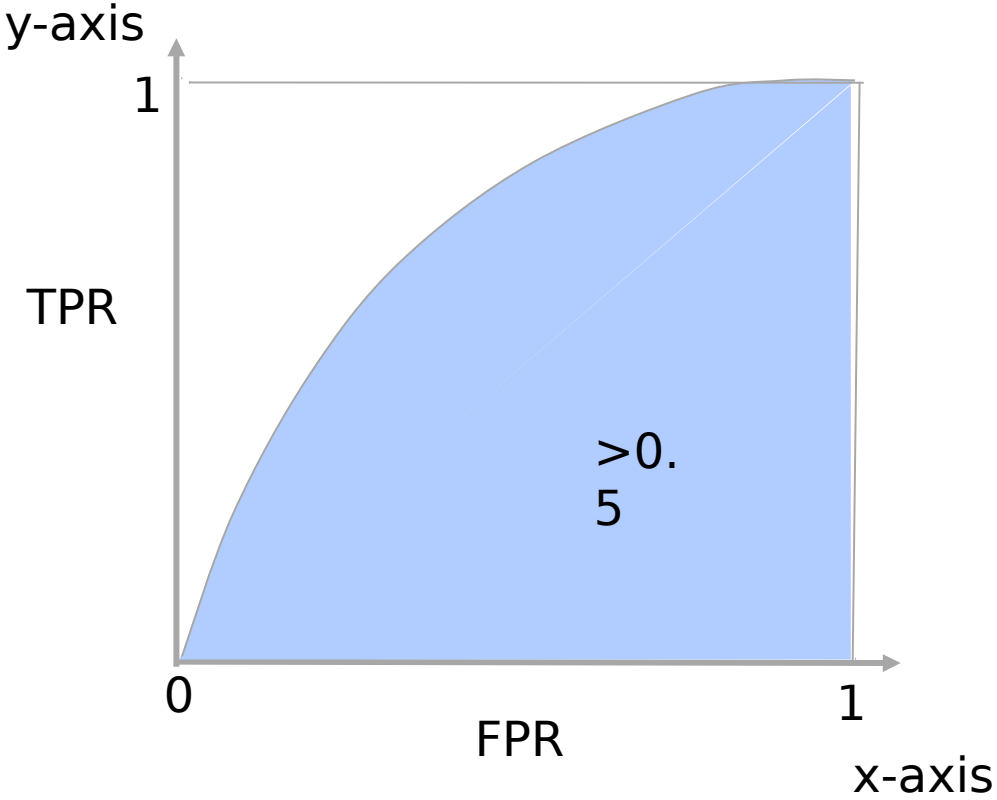
The ROC Curve



The ROC Curve

ID	Actual Values	Predicted probabilities
ID1	1	0.9
ID2	0	0.51
ID3	1	0.47
ID4	1	0.32
ID5	0	0.1
ID6	1	0.94
ID7	1	0.78
ID8	0	0.56

Predicted Probabilities

Threshold 0.4	Threshold 0.5	Threshold 0.6
TPR = 0.8	TPR = 0.6	TPR = 0.6
FNR = 0.2	FNR = 0.4	FNR = 0.4
TNR = 0.33	TNR = 0.33	TNR = 1
FPR = 0.66	FPR = 0.66	FPR = 0

The ROC Curve

ID	Actual Values	Predicted probabilities
ID1	1	0.9
ID2	0	0.51
ID3	1	0.47
ID4	1	0.32
ID5	0	0.1
ID6	1	0.94
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The ROC Curve

ID	Actual Values	Predicted probabilities
ID6	1	0.94
ID1	1	0.90
ID7	1	0.78
ID8	0	0.56
ID2	0	0.51
ID3	1	0.47
ID4	1	0.32
ID5	0	0.10

Step 1: Arrange in Decreasing order

The ROC Curve

ID	Actual Values	Predicted probabilities	At threshold 0.94
ID6	1	0.94	1
ID1	1	0.90	0
ID7	1	0.78	0
ID8	0	0.56	0
ID2	0	0.51	0
ID3	1	0.47	0
ID4	1	0.32	0
ID5	0	0.10	0

Step 1: Arrange in Decreasing order

Step 2: Take the first probability as Threshold

The ROC Curve

ID	Actual Values	Predicted probabilities	At threshold 0.94	
ID6	1	0.94	1	TP
ID1	1	0.90	0	FN
ID7	1	0.78	0	FN
ID8	0	0.56	0	TN
ID2	0	0.51	0	TN
ID3	1	0.47	0	FN
ID4	1	0.32	0	FN
ID5	0	0.10	0	TN

Step 1: Arrange in Decreasing order

Step 2: Take the first probability as Threshold

Step 3: Calculate TPR FPR

The ROC Curve

ID	Actual Values	Predicted probabilities	At threshold 0.90
ID6	1	0.94	1
ID1	1	0.90	1
ID7	1	0.78	0
ID8	0	0.56	0
ID2	0	0.51	0
ID3	1	0.47	0
ID4	1	0.32	0
ID5	0	0.10	0

Step 1: Arrange in Decreasing order

Step 2: Take the first probability as Threshold

Step 3: Calculate TPR FPR

Step 4: Repeat

The ROC Curve

ID	Actual Values	Predicted probabilities	At threshold 0.78
ID6	1	0.94	1
ID1	1	0.90	1
ID7	1	0.78	1
ID8	0	0.56	0
ID2	0	0.51	0
ID3	1	0.47	0
ID4	1	0.32	0
ID5	0	0.10	0

Step 1: Arrange in Decreasing order

Step 2: Take the first probability as Threshold

Step 3: Calculate TPR FPR

Step 4: Repeat

The ROC Curve

ID	Actual Values	Predicted probabilities	At threshold 0.56
ID6	1	0.94	1
ID1	1	0.90	1
ID7	1	0.78	1
ID8	0	0.56	1
ID2	0	0.51	0
ID3	1	0.47	0
ID4	1	0.32	0
ID5	0	0.10	0

Step 1: Arrange in Decreasing order

Step 2: Take the first probability as Threshold

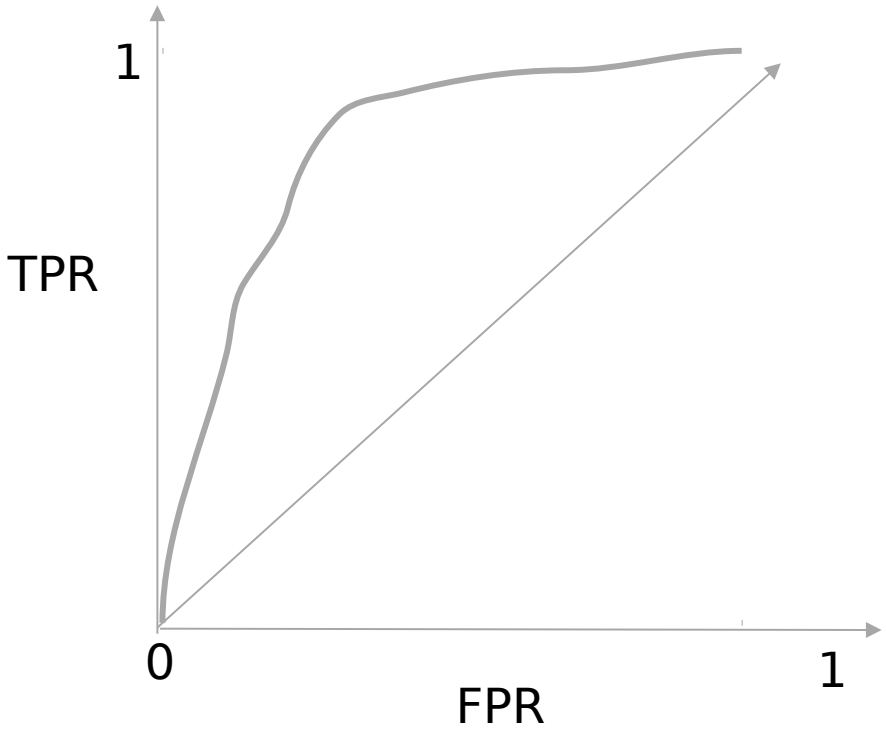
Step 3: Calculate TPR FPR

Step 4: Repeat

Calculated TPR and FPR

Threshold	TPR	FPR
0.94	1	0.571
0.90	1	0.5
0.78	1	0.4
0.56	0.75	0.5
0.51	.	.
0.47	.	.
0.32	.	.
0.10	.	.

The ROC Curve



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