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## Implications Precision-Recall

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		PREDICTED		
		P	N	
ACTUAL	P	TP	FN Type II Error	<i>Sensitivity = Recall</i> $\frac{TP}{TP + FN} = \text{TPR}$
	N	FP Type I Error	TN	<i>Specificity</i> $\frac{TN}{TN + FP} = 1 - \text{FPR}$
		<i>Precision</i> $\frac{TP}{TP + FP}$	<i>Negative Predicted Value</i> $\frac{TN}{TN + FN}$	

You can see:

i.  $\text{FP} \approx 0$  :

$$(\hat{y} = 1 \Rightarrow y = 1)$$

$$(y = 0 \Rightarrow \hat{y} = 0)$$

ii.  $\text{FN} \approx 0$  :

$$(\hat{y} = 0 \Rightarrow y = 0)$$

$$(y = 1 \Rightarrow \hat{y} = 1)$$

## Implications

$$\text{If } Recall \approx 1 \Rightarrow \frac{TP}{TP + FN} \approx 1 \Rightarrow FN \approx 0 \Rightarrow \boxed{(\hat{y} = 1 \Rightarrow y = 1) \wedge (y = 0 \Rightarrow \hat{y} = 0)}$$

$$\text{If } Precision \approx 1 \Rightarrow \frac{TP}{TP + FP} \approx 1 \Rightarrow FP \approx 0 \Rightarrow \boxed{(\hat{y} = 0 \Rightarrow y = 0) \wedge (y = 1 \Rightarrow \hat{y} = 1)}$$

$$\text{If } F1 \approx 1 \Rightarrow [(Recall \approx 1) \wedge (Precision \approx 1)] \Rightarrow \boxed{(\hat{y} = 1 \Leftrightarrow y = 1) \wedge (y = 0 \Leftrightarrow \hat{y} = 0)}$$

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