Logistic Regression

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Logistic Regression

y
0
1

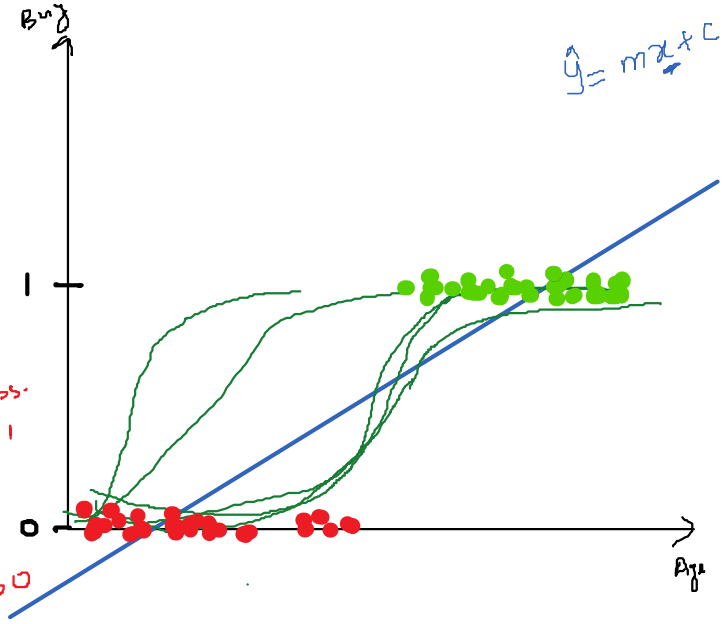
→ 1

→ 0

sigmoid / logistic fun

$$f(x) = \frac{1}{1+e^{-x}}$$

$f(x) \in \{0, 1\}$



$\hat{y} = mx + c$

$\frac{1}{1+e^{-\hat{y}}} = P$ = Probability of obs. to be in class 1

$\frac{1}{1+e^{-(mx+c)}} = P$

If $P \geq 0.5 \Rightarrow$ class 1

If $P < 0.5 \Rightarrow$ class 0

Linear Regression	Logistic Reg.
Regression	Classification
$\hat{y} = mx + c$	$\log\left(\frac{P}{1-P}\right) = mx + c$
Error mSE $E = \frac{1}{n}\sum (y - \hat{y})^2$	Error Binary cross entropy $E = \frac{1}{n}\sum (y \log \hat{y} + (1-y)\log(1-\hat{y}))$
Performance R^2 score	Performance Accuracy, Recall, F1 score Precision

$\hat{y} = mx + c$

$$\frac{1}{1+e^{-(mx+c)}} = P$$

$$\frac{1}{P} = 1 + e^{-(mx+c)}$$

$$\frac{1-P}{P} = e^{-(mx+c)}$$

$$\log\left(\frac{P}{1-P}\right) = mx + c$$

$$E = \frac{1}{n}\sum \left(y \log \hat{y} + (1-y)\log(1-\hat{y})\right)$$

$E \rightarrow$ error