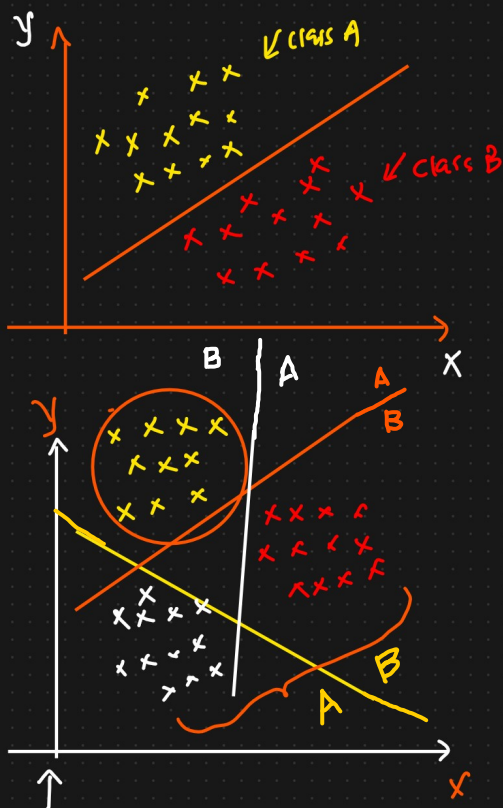


Logistic Regression (One Versus Rest)



① Binary Classification

One Versus One

Multiclass Classification {Logistic Regression}

- More than two output categories.
- We try to create multiple models, internally each model act as binary classification model

$\rightarrow M_1 \rightarrow$ Binary classification
 $\rightarrow M_2 \rightarrow$ Binary classification
 $\rightarrow M_3 \rightarrow$ Binary classification

One Versus Rest (OvR) \rightarrow Logistic Regression

f_1	f_2	f_3	$\downarrow 0_1, 0_2, 0_3$	O/p	$\boxed{0_1}$	0_2	$\boxed{0_3}$
-	-	-	0_1	1	0	0	
-	-	-	0_2	0	1	0	
-	-	-	0_3	0	0	1	
-	-	-	0_1	1	0	0	
-	-	-	0_3	0	0	1	
-	-	-	0_2	0	1	0	

Model \uparrow
 $M_1 \leftarrow \text{I/P } \{f_1, f_2, f_3\} \text{ O/p } \{0_1\}$
 $M_2 \leftarrow \text{I/P } \{f_1, f_2, f_3\} \text{ O/p } \{0_2\}$
 $M_3 \leftarrow \text{I/P } \{f_1, f_2, f_3\} \text{ O/p } \{0_3\}$

$0.55 \rightarrow \text{O/p } = \boxed{0_3} \rightarrow \underline{\text{Category 3}}$

New Test Data \rightarrow
 $M_1 \rightarrow 0.25 \checkmark$
 $M_2 \rightarrow 0.20 \checkmark$
 $M_3 \rightarrow 0.55 \checkmark$

Probability \downarrow
 $\boxed{0.25, 0.20, 0.55}$
 $\uparrow \quad \uparrow \quad \uparrow$
 $M_1 \quad M_2 \quad \boxed{M_3}$
 \uparrow
 $\underline{\underline{\text{O/p}}}$