X		
X1	X2	Y
2.95	6.63	1
2.53	7.79	1
3.57	5.65	1
3.16	5.47	1
2.58	4.46	2
2.16	6.22	2
3.27	3.52	2

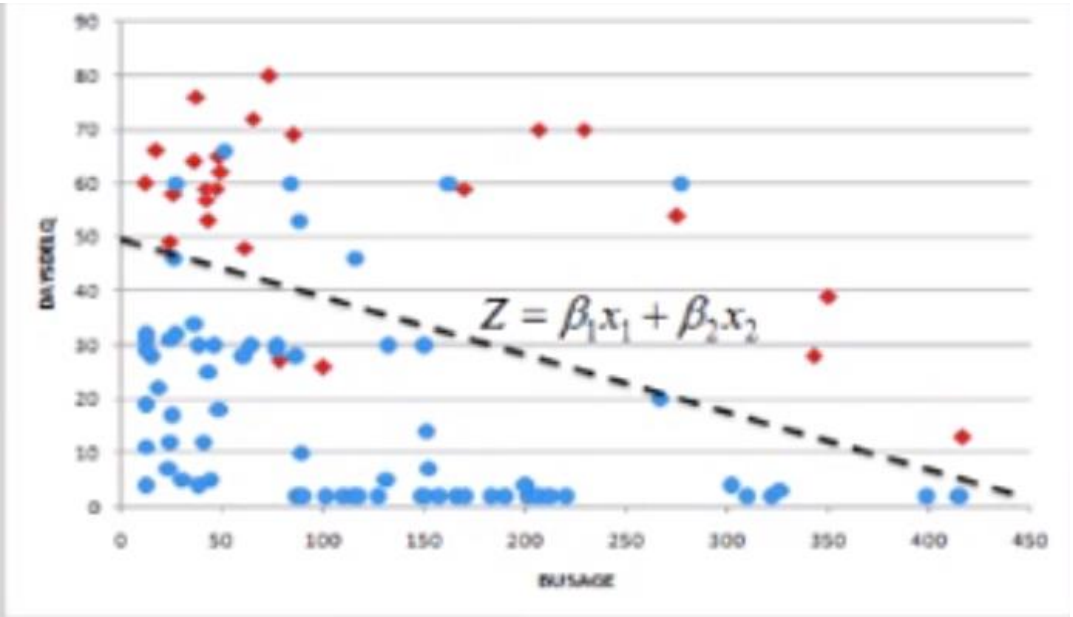
X(Class 1)	
X1	X2
2.95	6.63
2.53	7.79
3.57	5.65
3.16	5.47

X(Class 2)	
X1	X2
2.58	4.46
2.16	6.22
3.27	3.52

Class	count	probablity	statistic	X1	X2
Class 1	n1=4	p(C1)=0.57	Mean(C1)	3.05	6.39
			COV(C1)	0.56 -1.46 -1.46 3.43	
Class 2	n2=3	p(C2)=0.43	Mean(C2)	2.67	4.73
			COV(C2)	0.63 -1.46 -1.46 3.76	

C	
0.55	0.21
0.21	0.39

Beta	
0.63	0.85



$$C = \frac{1}{n_1 + n_2}(n_1 C_1 + n_2 C_2) = \begin{bmatrix} 10495 & -718 \\ -718 & 322 \end{bmatrix}$$

$$\beta = C^{-1}(\mu_1 - \mu_2) = \begin{bmatrix} -0.0095 & -0.1408 \end{bmatrix}$$

$$Z = -0.0095\ BUSAGE - 0.1408\ DAYSDELQ$$

$$\beta^T\left(x - \left(\frac{\mu_1 + \mu_2}{2}\right)\right) > \log\frac{p(c_1)}{p(c_2)}$$

Coefficients vector — Data vector — Mean vector — Class probability

Secure protocols in Horizontal case :

X (Alice)		
X1	X2	Y
2.95	6.63	1
2.53	7.79	1
3.27	3.52	2

X(A)(Class 1)	
X1	X2
2.95	6.63
2.53	7.79

X(A)(Class 2)	
X1	X2
3.27	3.52

X (Bob)		
X1	X2	Y
3.57	5.65	1
3.16	5.47	1
2.58	4.46	2
2.16	6.22	2

X(B)(Class 1)	
X1	X2
3.57	5.65
3.16	5.47

X(B)(Class 2)	
X1	X2
2.58	4.46
2.16	6.22

$$C = \frac{1}{n_1 + n_2}(n_1 C_1 + n_2 C_2) = \begin{bmatrix} 10495 & -718 \\ -718 & 322 \end{bmatrix}$$

$$\beta = C^{-1}(\mu_1 - \mu_2) = \begin{bmatrix} -0.0095 & -0.1408 \end{bmatrix}$$

$$\text{Variance} = \sum_{i=1}^{n} (Xi - \mu)^2$$

They should collaboratively compute bellow formulas for each Class :

1- Covariance 2- Variance 3- Mean

Alice					
#C1	#C2	Sum(C1)		Sum(C2)	
2	1	5.48	14.42	3.27	3.52

Bob					
#C1	#C2	Sum(C1)		Sum(C2)	
2	2	6.73	11.12	4.74	10.68

Train:

For calculating Mean we can **use Secure Weighted Average** protocol

Then Variance and Covariance are computed locally and sum together to obtain “C” and “Beta”

Classify:

Compute bellow formula

$$\beta^T\left(x - \left(\frac{\mu_1 + \mu_2}{2}\right)\right) > \log\frac{p(c_1)}{p(c_2)}$$