Session 29 ML

27 September 2024 07:07 PM

Agenda

- → Logistic Regression
- → LR with Regularization (L1, L2, elasticnet)
- → Performance metrics

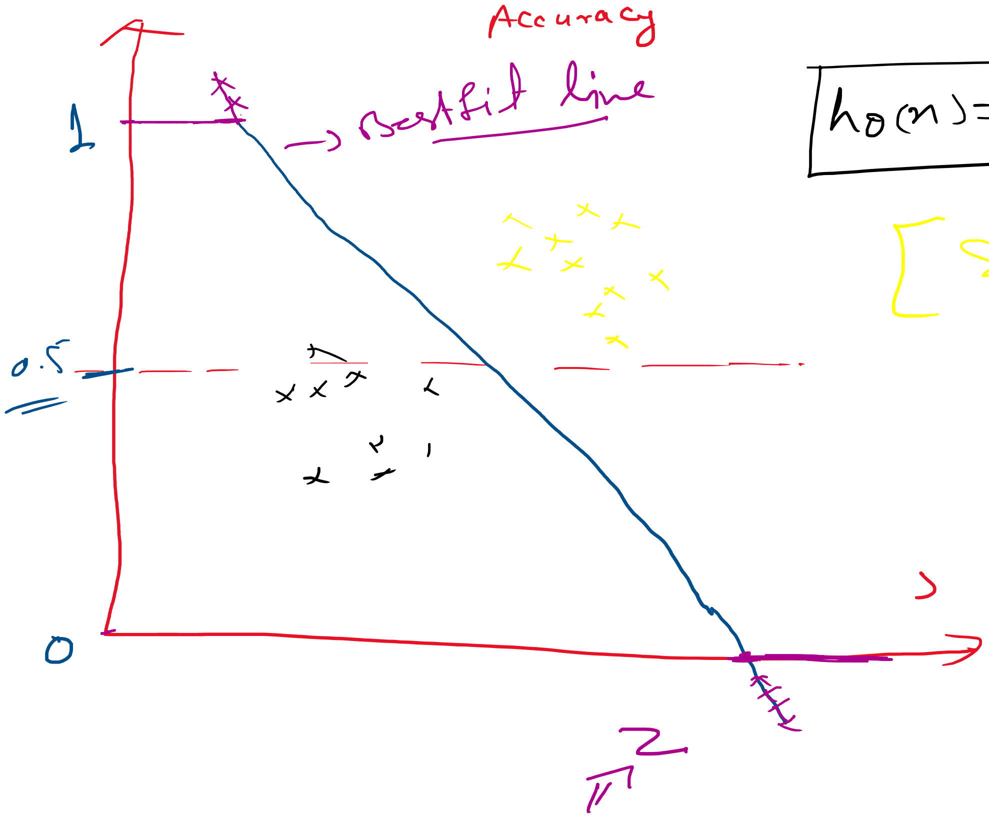
Logistic Regression

→ To solve classification Problem
- → Binary classification → (0, 1) (yes or No)
- → multiclass "

Train

I/P → model → 0/1 Prediction

Accuracy



$$\boxed{h_\theta(x) = \theta_0 + \theta_1 x_1}$$

[Sigmoid Activation fn]

⇓

[0 to 1]

$$\boxed{\sigma = \frac{1}{1+e^{-z}}}$$

⇓

(0 to 1)

$$h_\theta(x) = \sigma(\theta_0 + \theta_1 x_1)$$

$$\boxed{h_\theta(x) = \frac{1}{1+e^{-z}}} \Rightarrow z = \theta_0 + \theta_1 x_1$$

Logistic Regression

$$\boxed{h_\theta = \frac{1}{1+e^{-(\theta_0+\theta_1 x_1)}}}$$

Log loss

$$J(\theta_0, \theta_1) = \begin{cases} -\log(h_\theta(x)) & \text{if } y=1 \\ -\log(1-h_\theta(x)) & \text{if } y=0 \end{cases}$$

$$\boxed{J(\theta_0,\theta_1) = -y\log(h_\theta(x)) - (1-y)\log(1-h_\theta(x))}$$

convex function

if $y = 1$

$$-\log(h_\theta(x))$$

if $y = 0$

$$-\log(1-h_\theta(x))$$

Reducing overfitting

1

$\log(1-h_\theta(x)) + L_2$ Regul.

1

$$J(\theta_0, \theta_1) = -y \log(h_\theta(x)) - (1-y) \log(1 - h_\theta(x)) + L_2 \text{ Regul.}$$

2

$$J(\theta_0, \theta_1) = -y \log(h_\theta(x)) - (1-y) \log(1 - h_\theta(x)) + L1 \text{ Regularization}$$

feature selection