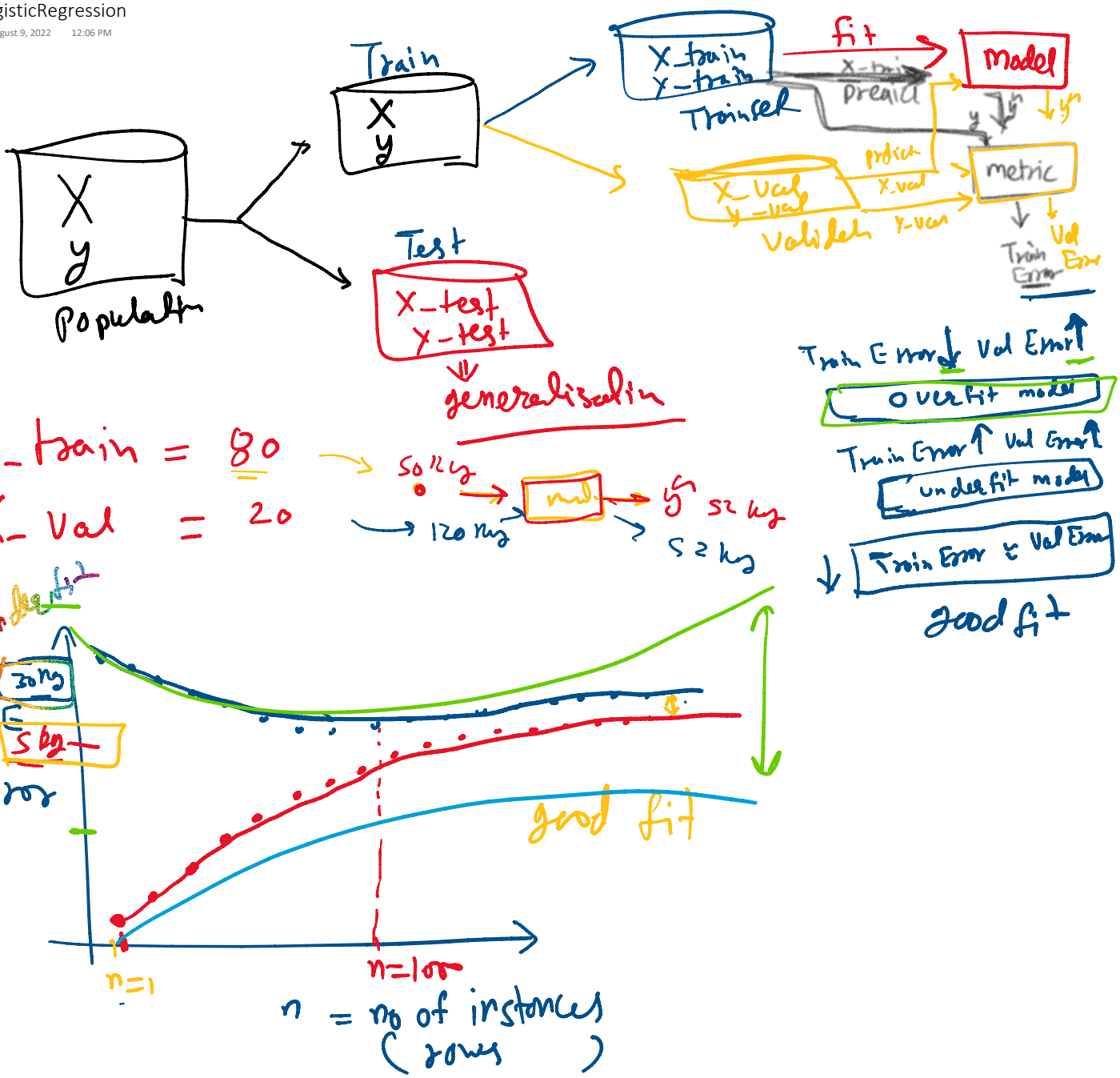
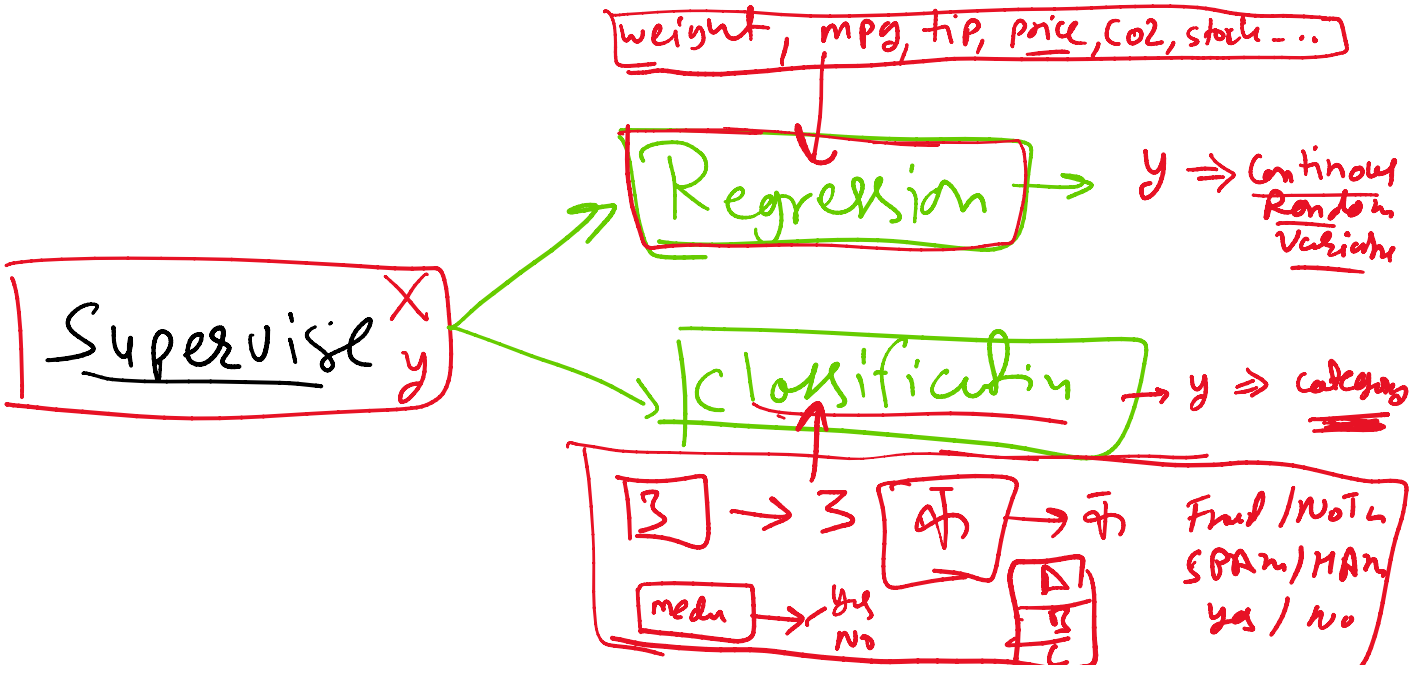
10.LogisticRegression

Tuesday, August 9, 2022 12:06 PM





Unsupervised ✗

Regression

models
- * Linear Regression → Normal Eq^n / SGD
- * polynomial
- * Ridge Regression $-\theta^2$
- * LASSO Regression $-|\theta|$ → feature selection
- * Elastic Net

Regularized

$\hat{y} = h\theta(x) = \hat{\theta} \cdot X = b + wx$ → prediction function

$$MSE(\theta) = J\theta = \frac{\sum_{i=0}^{m} (\hat{y}_i - y_i)^2}{m}$$ → cost function

↓

Convex optimization

↓

SGD

→ R2-score = accuracy = $1 - \frac{RSS}{TSS}$

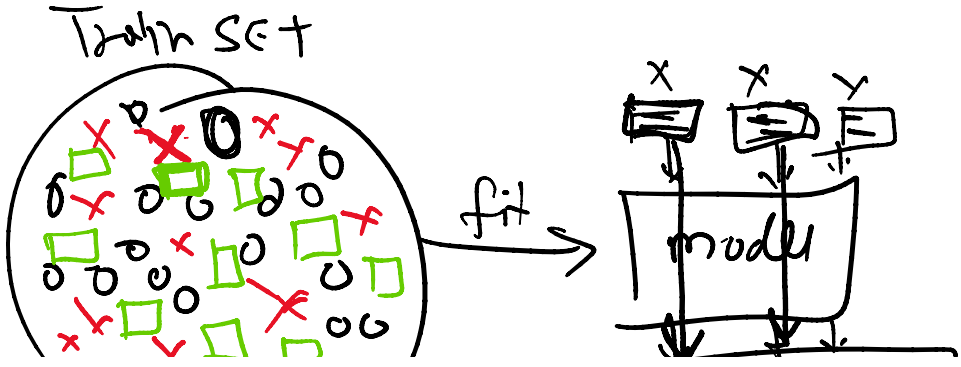
→ RMSE = $\sqrt{\frac{\sum(\hat{y}_i - y_i)^2}{m}}$

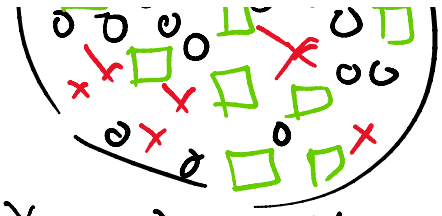
→ performance metrics

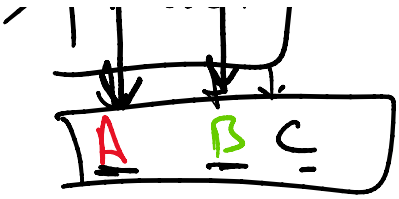
Evaluation Metrics

Classification →

- A
- B
- C





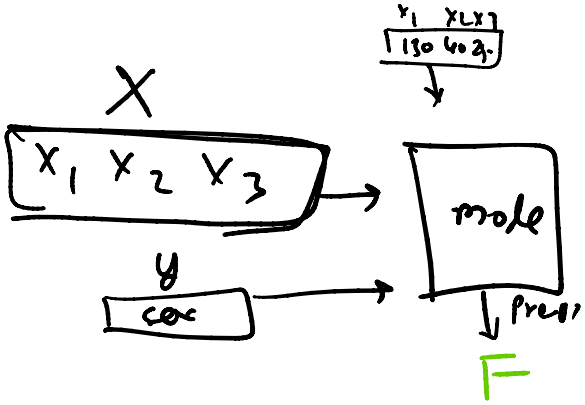


X_1 Hein	X_2 wein	X_3 sal	y sex	grad
120	60	20	m	UG
130	30	35	NA?	PG
160	60	40	F	PHD
140	30	25	NA?	drop

X-new

missing

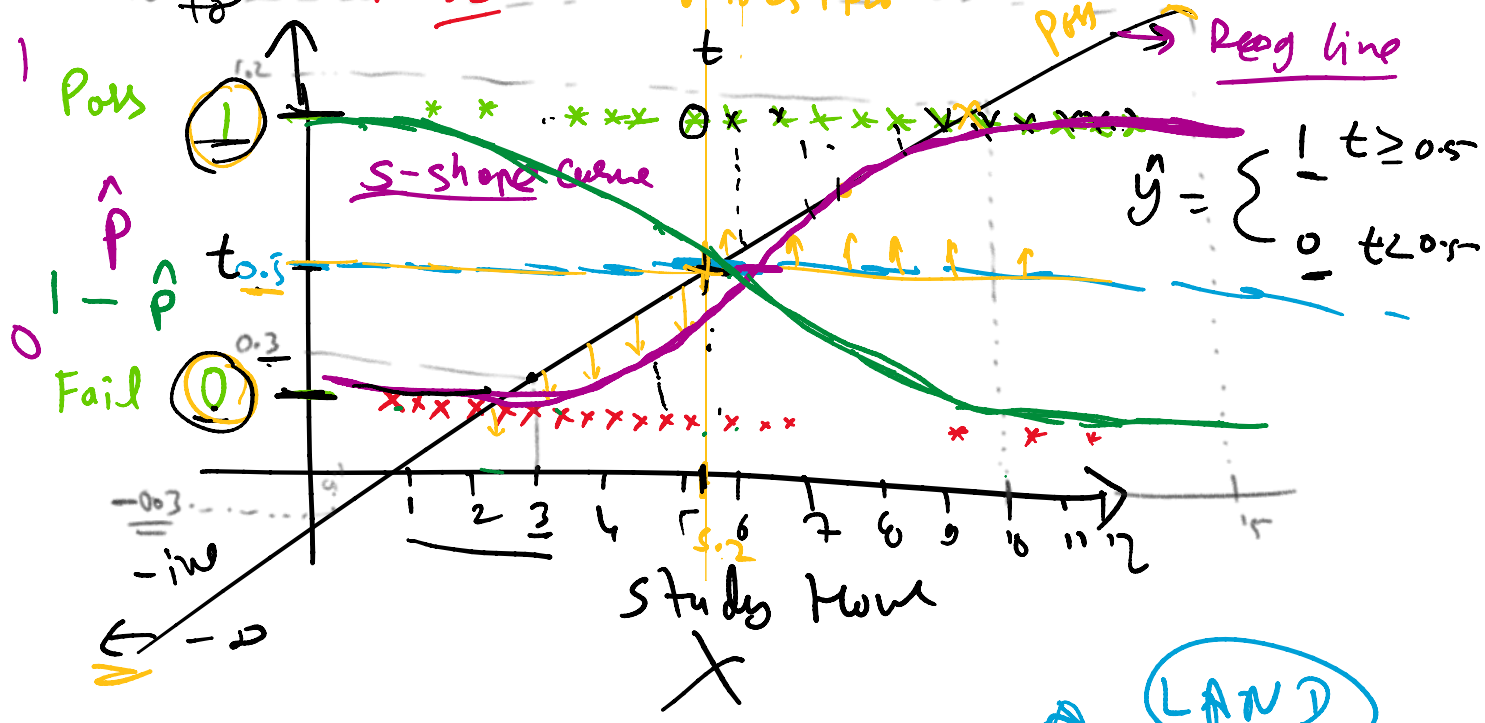
z_0



Drop centroid terms

$\hat{p}$ = Probability of passing

$X = [\text{study hours}]$ $y = [\text{pass fail}]$



Logistic Regression

Regression

$$t = b + wx = \theta \cdot X$$

$$\hat{y} = \begin{cases} 1 & t \geq 0.5 \\ 0 & t < 0.5 \end{cases}$$

→ prediction fn

↓

classifier

$$\text{sigmoid} = \frac{1}{1 + e^{-t}}$$