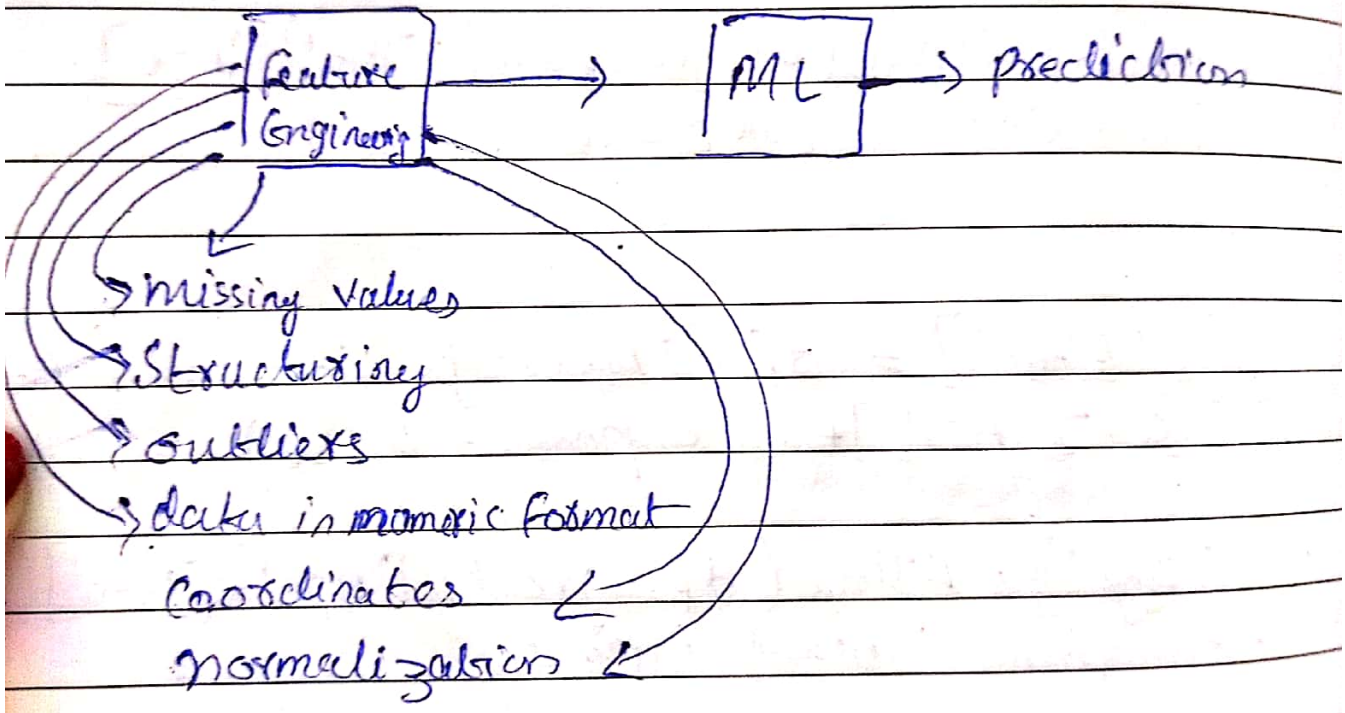
LECTURE 1 (After mid) Date:

1) Intro to ML
2) Classification of regression based problem
3) Example
4) Linear Regression
5) Example
6) python for LR.



Target class → features

table

A_1	A_2	A_3	...	A_n	Tc
-	-	-			Pass
-	-	-		-	Fail

* information ki basis pr result Tc
* Example kiet k 20 attributes batye aeu uska table k ye kiet hui

Date:

* Jab mind train krta hai toh lable aur uskay features hona lazmi hai

experience = features

Train → experience,
Test → outside of training part

* Training features aur lable k hisab se hogi

Definition ML :-
1) Train our machine by using experience (kisi task ka)
2) ~~Learning~~ Task base Training
3) measuring performance on Testing data

* Specific task k liye Training krayenge jaisey prediction bacha pass ya fail or pricing prediction.

Classification of TC
1) Countable – categorical → Classification
2) meaurable → Regression

TC
Pass
Fail

– Classification base

Tc
35.5 °C
40.5 °C

– Regression

Date:

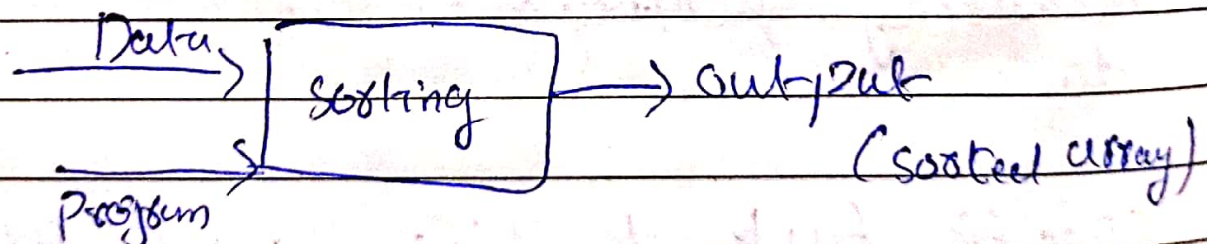
* Regression => values base
Classification =>

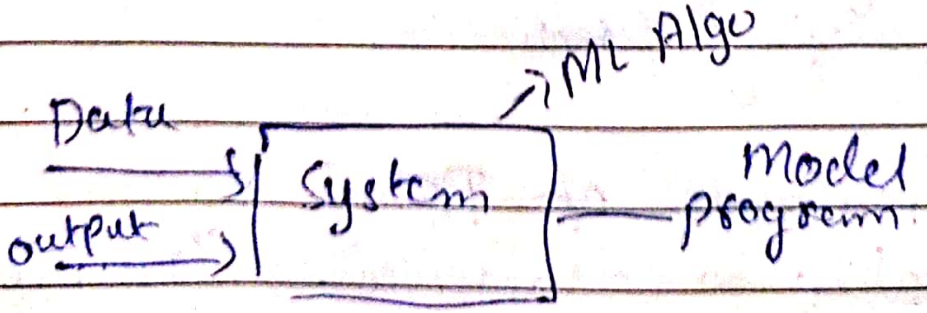
Classification
1 supervise
2 unsupervise
3 reinforcement
4 Semisupervise

Supervise : Jismein lable given ho

Unsupervise : Jismein lable na ho

Conventional model





* Regression is a line

Date:

Regression

1) Linear Regression
2) Knn (nearest neighbour)
3) DT
4) SVM
5) Random Forest
6) gradient boosting
7) XB

1) Logistic Regression
2) Knn
3) DT
4) SVM
5) R.F
6) gradient boosting
7) XB

*

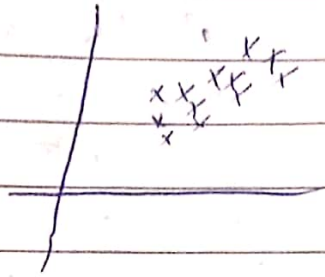
X	TC
6	3.5
6.2	24
7.1	6
!	
!	
5	?

→ best fit line bnaegen gy yeni linear Regression model

* Linear Regression mein line hoti hai non linear mein

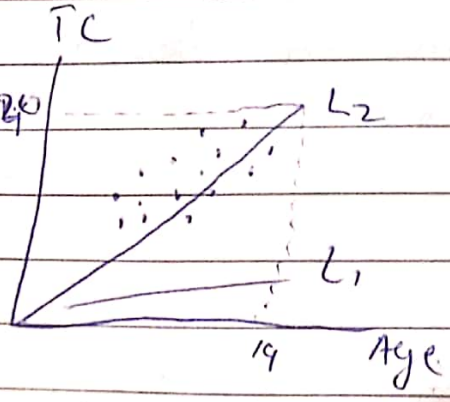
Makeup Class

Date:



linearly
LR lga sktay hain

x Age	y Height Tc
12	4.5
14	3.5
15	4.8
19	2.0



* Best fit line mein hr dabra ka distance line se kut kum ho
* ~~Dis~~ Distance zada hai toh line best hai

$$Tc = m\,data + c$$
$$y = mx + c$$

best-fit karnay hain m ya c pr depend ktay hain

m = slope / gradient
c = y intercept

yehan tk height

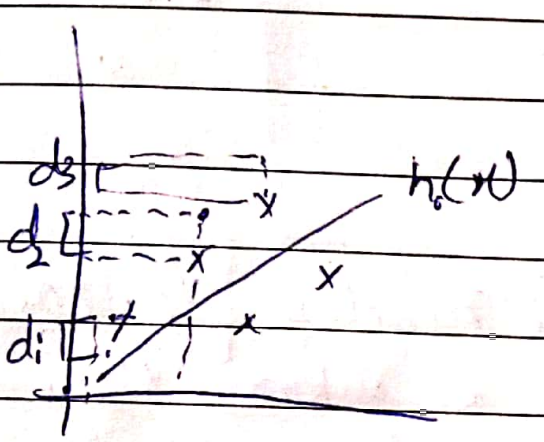
$$h_\theta(x) = \theta_0 + \theta_1 x$$

$y = 2m + 5$
$y = 2m + 7$

Scanned with CamScanner

Date:

* So our θ_1 mein change aaye ga
aur best fit dekhi nikli



$$= d1 + d2 + d3 \cdots dn$$

$$= \sum_{i=1}^{n} di$$

$$J(\theta_0, \theta_1) = \sum_{i=1}^{n} (h_\theta(x^i) - y^i)^2$$

↓ cost function

min

* we are minimizing cost function

* Cost function mein hai

Cost function of Linear Regression

$$J(\theta_0, \theta_1) = \frac{1}{2n} \sum_{i=1}^{n} (h_\theta(x^i) - y^{(i)})^2$$

↓ hypothesis value

↓ actual value

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x	y
2	1.5
3	5.5
4	

$\therefore h_\theta(x) = 1 + 1.5x$

$= 1 + 1.5(2)$

$0 + 1.5(0)$

0

issue :-

* issue agr θ random le rahey hein toh suitty ni k sukna kahan hei aur best fit konsa hei

gradient decent

loop

{

$\theta^{new} = \theta^{(old)} - \alpha \frac{\partial J(\theta_0, \theta_1)}{\partial \theta}$

}

$\therefore \partial$ partical derivative

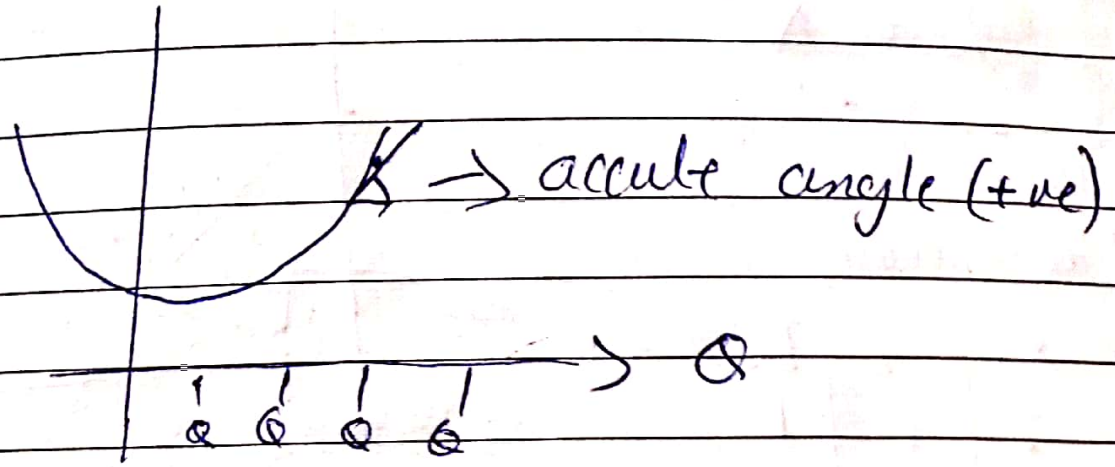
+ Til ko converge ki taf le k janey hei

* ab ha θ purany walay se min aye ga.

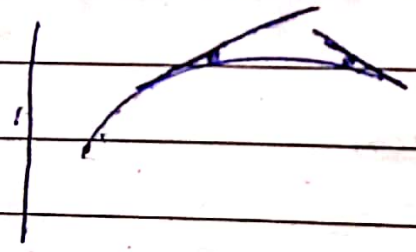
*

Date:

$J(\theta_0, \theta_1)$



* curve pr ho point pr slope change



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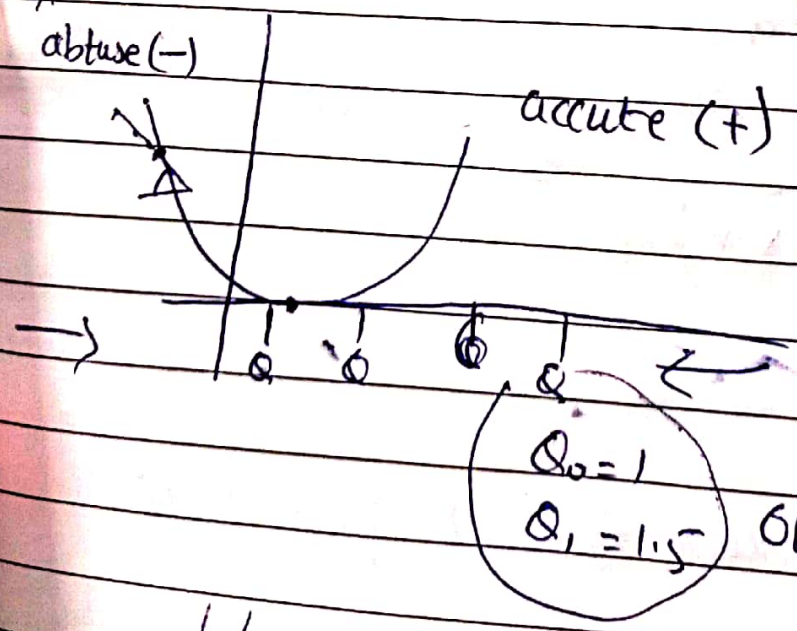


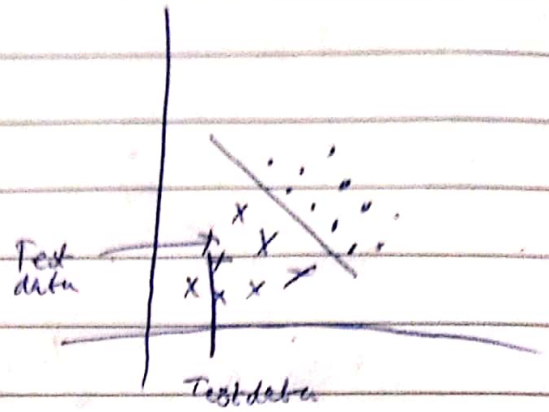
2nd Last Class

Date:

Presentation :- Classification

1) = "X"

2) "."



2 dimention

X_1	X_2	Tc
3	4	1
2	3	1
5	7	0
3	1	1

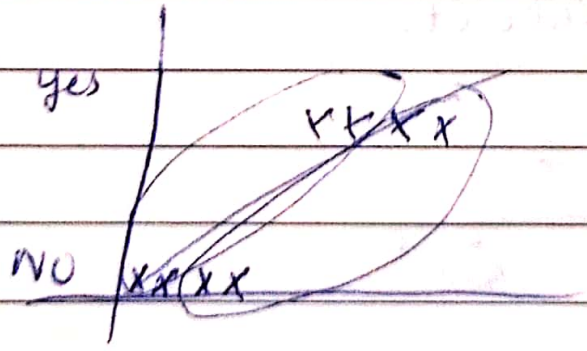
boundry line logistic Regression Categorical Tc

* Boundry k neechay ya upr

To achive boundry yeay need cost function

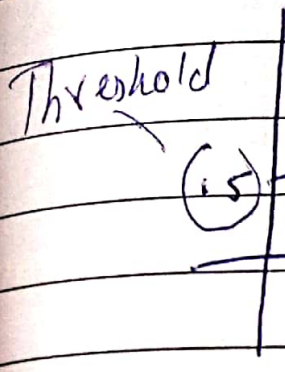
1) Cost function

Problem in linear Regression on Categorical data



* Donon Class demo kaf mojood hoti hain

Date:



→ To Point boundary pr aayen gay wo yes ya No Choice

* probability nikal kr

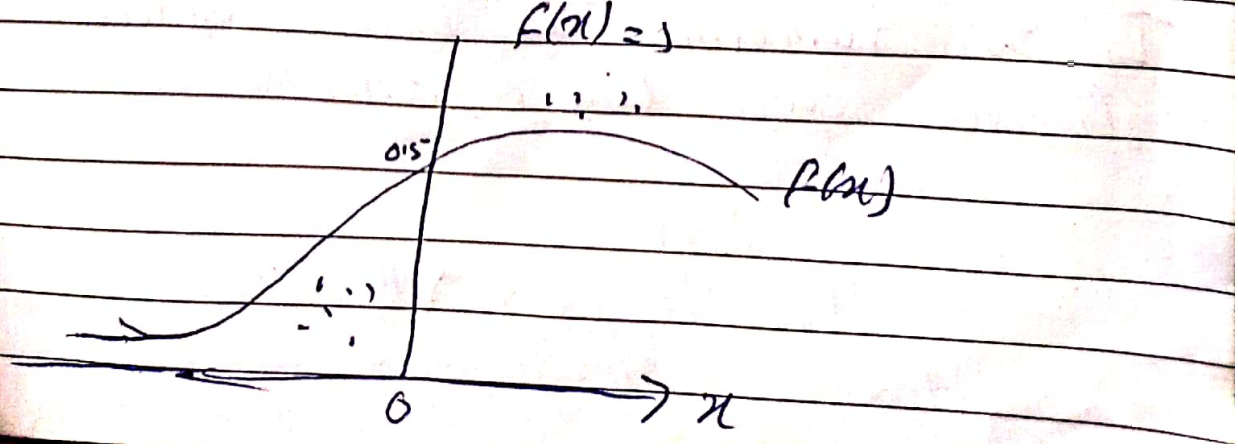
2) Threshold value for line making

Maths
[0, 1]
[0, 0.5, 1]

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

* Sigmoid function hamesha 0, 1 mein ans return

$$f(0) = \frac{1}{1+e^{-0}} = \frac{1}{2} = 0.5$$



Date:

Two blue One Brown

Testing

Text but negative positive both

$x = [\ 0 - 100 \text{ -- curr - values}\ ]$

$Y = [\ \ ]$

$h_\theta(x) = \theta_0 + \theta_1 x = \theta^T x$

Boundry $\frac{1}{1+e^{-h_\theta(x)}} = 0.75$

Boundry se value

value se decision

new logistic

$$h_\theta(x) = \frac{1}{1+e^{h_\theta(x)}} = \frac{1}{1+e^{-\theta^T x}}$$

In this function we have Sigmoid function and line equation.

Linear

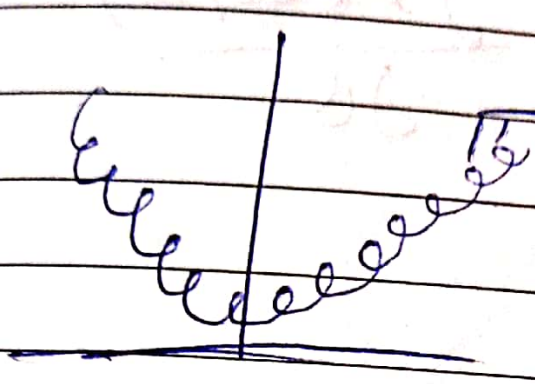
$h_\theta(x) = \theta_0 + \theta_1 x$

* hypothesis = imaginary.

Date:

Cost function Logistic Reg

$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (h_\theta(x^i) - y^i)^2$$



issue :-

The reason of ~~differe~~ we not apply of linear Reg in it because ~~th~~ there are several local ~~mima~~ minimas that are not allow θ to converge

New Cost Function

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

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

Date:

Gradient decent

Repeat {

$$\theta^{new} = \theta^{old} - \alpha \frac{\partial J(\theta_0, \theta_1)}{\partial \theta}$$

}