HOMEWORK-1

1 Points: (C-2,-1), (1,1), (3,2)3

a) Least square regression line:

Let us begin to find the best m (slope) and b (y-intercept) that suits the data for

y = m x + bFor each (x,y), let us calculate x^2 and xy and get the mean values prospectively

x y x^{2} xy -2 -1 4 2 1 1 1 1 3 2 9 6 5x=2 5y=2 $5x^{2}=14$ 5xy=9

Now, $m = N \leq xy - \leq x \leq y$ $N \leq x^2 - (\leq x)^2$

$$= 3(9) - (2)(2) = 27 - 4 = 23 = [0.605]$$
$$3(14) - (2)^{2} + 42 - 4 = 38$$

 $b = \frac{2y - m \times \infty}{N}$ $= \frac{2 - (0.605)(2)}{3} = \frac{2 - 1.2}{3} = |0.763|$

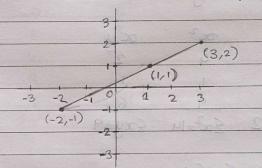
Assemble the equation of the line, y=moc+b
y=0.2630c+0.605

Now, earnow for the line can be calculated as,

y=0.263x+0.605 enrog

-2 -1 0.079 -1.079 11 0.868 0.132

3 2 01.295 0.705



= 3(9) - (2)(2) - 21 - 4 - 23 - 10 60

(abos) = 151-5 - (5)(80da)

2. \(\alpha \) \(\text{o} \) \(\t
y 2 3 5 4 6 CS + DOP O = W
(a) For the least square regression line y = ax+b, let's
find the best solution for slope a and intercept b.
Foor each or 14, let us calculate oc2 and only, then their
Hespective mean sylvageste
$x y x^2 xy$
0 2 00 0 0 0
1 3 1 3
2 5 4 10 0/= 50 (10)
3 4 9 12 4 6 16 24 CC+(OD(PO) = N
$\xi x = 10 \ \xi y = 20 \ \xi x^2 = 30 \ \xi x y = 49$
Now, $a = N \leq (\alpha y) - \leq t \leq y$
$NE(x^2) - (\xi x)^2$
$= 5(49) - (10)(20)$ $5(30) - 10^{2}$
= 245 -200 = 45 = 0.9
150-100 60
And the second of the second s
$b = \underline{\xi}y - m\xi x$
$= 20 - (0.9)(10) = 11 = \boxed{2.2}$
= 20 - (0.9)(10) = 11 = 2.2 5

Assemble +	the equa	lion of the lin	e, y=aoctb
			1 3 3 5 1
			e calculated as,
			a) for the least square a
a	y b	y = 0.9x + 2.2	egglogy the least the large
0	0	5 2 2 4 3 4 3 4 3	Foot each or LA, 190-n
1	3	3.1	
2	5	4.0	
3	4	4.9	-0.9
4	6	5.8	
(b) oc = 10		DI	2 5 4
			P 8 4 8
y = (0.	4)(10)+	2.2	6 6 6
y = 11.	2.	Pr-Brg	8x=10 =4= 10 =x3
		Ballanda Laboratoria	
			How as NE(set)
			8) = (4a) 8 h
			0 - (911) > =
			1 - (or) à
		21 = 51 =	245-200
			061-061
			NEW-TREES.
	Joseph .	11 - (01)	(Fa)-02 - 5
			No. 10 Personal Property of the Party of the

3. According to the Enjoy Sports learning task,				
NAP = aspastai stoideng so resorma				
Attributes Values Court				
SV. Capital de Dia				
1. Sky Sunny, Cloudy, Rainy 3 10 dogs.				
2. The Temp Wasun, Cold 2				
3. Humid Normal, High 2				
4. Wind Strong, Weak 1				
5. Water Warm, Cool 2				
6. Forecast Same, Change 1 > (12)				
S, = (Longe brown tail us x female black short us) = 3				
So, the distinct observations in $X = 3 \times 2 \times 2 \times 2 \times 2 \times 2 = 96$				
and then, for hypothesis representation, value of each				
attribute can either be "?" on "p"other than the				
Hence, STASSASSASSASSASSASSASSASSASSASSASSASSAS				
District hypothesis in $H = 5(4^5) = 5120$				
DOMICY INDOGRAPS ALL SIND (TO COLOR) = 9				
These 5120 combinations are syntactically different				
but when the attributes have null (1) / empty values				
the combinations will be same semantically				
Sings of the second				
so, semantically distinct hypothesis in H = 4(3)5 = 972				
Additionally, we consider an empty/null set, so $M = 972 + 1 = 973$.				
when we add another attribute "Water current" which				
can take three values (light, Moderate, Strong),				
the possible observations = 96 x 3 = 288 and				
hypothesis in H = 972×4=3888. and an empty set				
Hus H= 3889.				

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In general, number of possible intances = 96K where K is the possible values foor additional attribute Hypothesis in H = 973 (KH) +1 40 Candidate - Elimination Algorithm So= { < 0, 0, 0, 0 > } Si = { < male, brown, tall, US> < female, black, short, US> } 52= { < male, brown, ?, ? > < female, black, short, US> } 53=5=1 < male, brown, ?, ?> < female, black, short, US>3 Sy = { < male, brown, ?, ?> < female, ?, short, ?>} Gy = { < male, ?? ?> < ?, ?, ?, ?>> G3 = E < male, ?,?,?><?,?,?,?, E<?,?,?,?,?,?,US>} G2 = { <? ? ? ? ? ? ? ? ? ? ? } Atalouter have and (b) Le (b) [Smale, black, short, Abrilyers) (female, blonde, tall, Indian) The above hypothesis space with the given training example (positive) will have the following distinct hypothesis 28 = 1256. W studetto For the positive training data, the eight attributes can either have the given value supperdively on? thus 2 values fog 8 attributes. & BAS = NXSIA

1888 = H cut

a Assuming that the learner has encountered only the positive example from's part (b), for the learner to converge to single connect hypothesis he will need a query for each attribute, meaning 8 queries for 8 attributes. The queries are as follows: { (female, black, short, Portuguese> (female, blonde, tall, Indian)}

[(male, brown, short, Portuguese) (female, blonde, tall, Indian)] [(male, black, tall, Portuguese) (female, blonde, tall, Indian) (male, black, short, Indian) (female, blande, tall, Indian) { (male, black, short, Portuguese) (male, blonde, tall, Indian) [(mole, black, short, Portuguese) (female, black, tall, Indian) [(male, black, short, Portugueser < female, blonde, short, Indians) (male, black, short, Portuguese) (female, blonde, tall, fortugueses)

The number of valid hypothesis will reduce to half after each query, (where hypotheses are from part b)

d. Considering that there are n number of instances in our observation space x. The hypothesis spaces will be total tested by the following number of queries.

5. of Foor function: X -> You are and remore and took primary
where x = < x, x2 m xn) 4 xi, y are boolean valued
variable, let us consider a hypothesis space H where
attribute meaning 8 quesus for 8 attributes
y[(xi=a) n(xj=b)] then Y=10910.
The guesties are as tollows:
let i=1 & j=2,
Elfomale, black, short, Portugueres (Formale, bloodextell 1x lians)
Exemple brown short Partugues (formale blood o tout ondian)
I (male, black, tall, Portugueses (female blande hall Todings)
(male, black, shoot, todiens & famale, bloode, to 1, Indiana)
Knoth & Hot shoot stands stands that & thank &
for each choice of X; & X; we have 4 choices
Temple trooks should stomet & consulation frode should stome
For each choice of i and j (2 variables) there are a total
of noptions, which is nC2.
Distinct hypotheres in H= 14 nC2/11 and wall from the
Drang Mahoriers as a series
d' Considering that there are a number of instances in
X SONGE nothernexide hum
The hupothesis spaces will be wetted by the
following numbers of quention
CHA C