1) Given training set

Information gained by knowing whether on not the value of feature C is text than 475 is:

$$H(class/c) = (2/5) + (class/c = 375) + (3/5) + (class/c = 375) + (3/5) + (class/c = 375)$$

$$= (2/5) + (class/c) + (3/5) + (class/c = 375) + (3/5) + (class/c = 375) + (3/5) + (class/c) +$$

Information gained about the class whether or not the (b) Value of features A&B are different.

from the previous ametton we know

let's assume X - A&B Same

H(class /xx) = (2/5)(H(class / y))+(3/5)(H(acuss /x))

POZP-0 - (3/847) H

the princes and

1	C	-		
1	J))	
	_		,	

1,712	feature 1	feature 2	class
Instance 1	a	3	Positive
Instance 2	4	4	Positive
Enstance 3	4	5	Negative
Enstance 4	6	3	Positive
	8	3	Negative
Instance S	8	4	negative
anstance 6.	0 8		1

KNN with K=1		5	classification
K=1 =	17	In the second	Clarente
Inst: 1 alass = +ve		clarest instance is 2	correct.
-(1.00mm) (d)	.5	Manhallan distance 3	314 A
Enst: 2 days = +ve		cloyest instance is 3 Manhaltan distance 1	correct.
Inst: 3 class = -ve	1	Manhatan distance 1	Incorrect.
Inst: 4 class = +ve		manhallan dustance a	incorrect.
Inst:S class = -ve	1	closest instance us 6 Manhallan distance 1	correct.
Inst:6 class = -ve	3 8	closest instance is 5	correct.

bricket.

Instan	(e das	dosest anstance	Manhattan okstance	classification.
1	+ve	a	3	Correct
		3	, 4	incorrect.
•	Lua	3	1	rncorrect
a	+ve .	1	3	correct
3	-46	a	1	In correct
		1	4	incorrect
		,• · · ·		
	+ve	5 S	a	in correct
4		2	3	correct.
	*.1	L	· 1	Correct
5	-Ve	i it i i net.	2	incorrect.
n 2 5	4.1	4		
. 6	y •			
	-ve	5	-	Correct
		4 2.30 ·	. 3	incorrect.

No. of correctly clays fied = 3

Instance	class	closest Instance	Manhallan dutance	Classification.
ı	-1 Le	ą	3	Correct-
		3	4	Mcorrect
		4	H	consect
		-1		
			1	incorrect
2	tve	3	3	correct
		4	3	correct.
		7		
2	-ve	Z	1	incorrect
3		1	4	incorrect.
		4	4	"IMIOECC
			a	moment
	1./4	5	3	correct
4	+ve	a	3	In correct.
		6	· ·	
				correct
		۵	(mosrect
5	-ve	4	4 2 4 4	incorrect.
4		a 2	S	mimer as
				Correct
	-ve.	5	1	
6	-	4	3	incorrect
		a	. 4	incorrect.
		·		

Scanned by CamScanner

K=1 & K=2 both gave same results.

Mutual information between
$$z \& x$$
 i.e I (x,z)

$$P(x=T,z=T) \log \frac{P(x=T,z=T)}{P(x=T)} = 0.38 \log \frac{0.28}{0.5 \times 0.55}$$

$$= 0.177$$

$$P(x=T,z=P) \log_2 \frac{P(x=T,z=P)}{P(x=T) P(z=P)} = 012 \log_{0.5,8045} \frac{0.12}{0.5,8045}$$

$$P(x=F,z=T) \log_2 \frac{P(x=F,z=T)}{P(x=F) \cdot P(z=T)} = 0.17 \log_2 \frac{0.17}{0.05 + 0.55}$$

$$P(x=F,z=F) \log_2 \frac{P(x=F,z=P)}{P(x=F)} = 0.33 \log_2 \frac{0.33}{0.5 \times 0.45}$$

(d=2)d (1-A)d

$$I(x,z) = 2P(x,z) log_2 \frac{P(x,z)}{P(x) P(z)}$$

$$\Sigma(x,z)=0.133$$

2 (SIZ) a 0.898

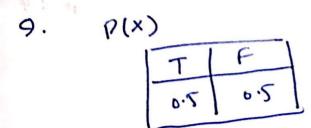
$$P(y=T, z=T) \log_{x} \frac{P(y=T, z=T)}{P(y=T) P(z=T)} = 6.45 \log_{x} \frac{0.45}{6.5 \times 0.55}$$

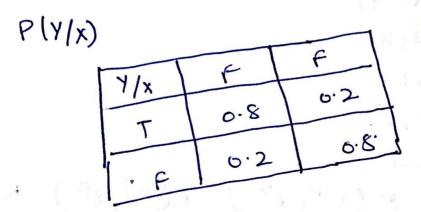
$$P(y=T, z=P) \log_2 \frac{p(y=T)z=P)}{p(y=T) p(z=P)} = 0.05 \log_2 \frac{0.05}{0.5*0.45}$$

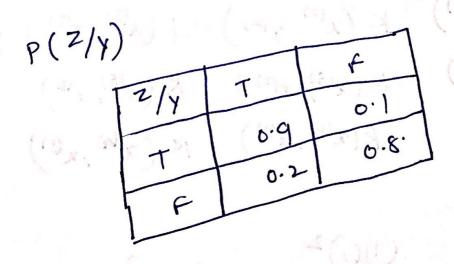
$$P(y=F,Z=T)$$
 log, $P(y=F,Z=T) = 0.1 log_2 \frac{0.1}{0.6 \times 0.6 \times 0.6$

$$P(y=F,Z=F) \log_2 \frac{p(y=F,Z=F)}{p(y=F)} = 0.4 \log_2 \frac{o.y}{o.5 \times o.u.}$$

y should be selected as the compenent for Z by than as It has better mutual information between Z by than Z bx.







(4)
$$\chi$$
 (20) directed by the contract of degree 2.

(12) $\chi^{(1)} = (\chi^{(1)}, \chi^{(1)})$

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(19) $\chi^{(1)} = (\chi^{(1)}, \chi^{(1)$

$$K(2)^{2} = (2\cdot 2 + 1)^{d}$$

$$= (2\cdot 2 + 1)^{2}$$

$$K = ([01)^{2} ([09)^{2} ([17)^{2} (81)^{2})$$

$$([09)^{2} (534)^{2} ([217)^{2} ([06)^{2})$$

$$([17]^{2} ([217)^{2} ([59)^{2} ([86)^{2})$$

$$([81)^{2} ([06)^{2} ([86)^{2} ([51)^{2})$$

c) RBF Kernel with
$$8=1$$
 $|C(7/2)| = \exp(-1||2-2||^2)$
 $= \exp(-1(||1||)^2 - 1(||2||)^2 + 2(1-2))$
 $= \exp(-1(||1||)^2) = \exp(-1(||2||)^2)$
 $= \exp(2(2^{2}/2^2)^2)$

as let y to be in loss the durings to

Continued in last page.

$$||x_{1}||^{2} = ||x_{2}||^{2} = ||x_{3}||^{2} = ||x_{1}||^{2} = ||x_{1}||^{2$$

The 12 -dimension of hypothesis space=2

Sample complexity grows polynomially in /E. 18.

we can specify a polynomial time algorithm for finding.

consistant hypothesis:

1. Soit training initiancy by distance from origin.

2. Let r to be less than the dutance to

first por in sorted lux.

3. Set ryato be greater than distance from the

· Jo XI W

("(usp)1-1940 + ("(un)1-) yes =

(+ & Exp (2 - E, x) -)