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			7		
Day	Weathex	Temperature	Humidity	Wind	Play?
	Sunny	Hot	High	Weak	18 No
2	Sunny		High		No
3		tuiltot la t	~		
4	Rain	Mild		Weak	
5	Rain	Cool	Normal		
6	Rain	Cool	Noxmal	Strong	
70=	Cloudy	Cool	Normal	J.	
8	Sunny	Mild	High	Weak	No
9	Sunny : :		Normal		
10	Rain	Mild	Normal		Yes
1108	Sunny 1	Mild (
12		Mildel	High		Yes
13	Cloudy			Weak	2.1
14		Mild		Strong	
A]	Calculate	I of Weath	e8 89		n to
		Entropy of entir			1
			48.0	A Lost	
		S {+9,-5} = -	9 109 9	_ 5 log	5 = 0.94
	$5 \{ +9, -5 \} = -9 \log_2 \frac{9}{14} - \frac{5 \log_2 5}{14} = 0.94$				
20. 5	Step 2: E	interpy of all	attributes.	n porteil	E P
1255	Entropy of	sunny 2+2, -33:	= -2 log 2	3 109	8 = 0.97
2	Entropy of sunny $\{1+2, -3\} = -\frac{2}{5} \log_2 \frac{2}{5} - \frac{3}{5} \log_2 \frac{3}{5} = 0.97$				
		Cloudy 3+4, -03 =	1		
	Entropy of Rain $\frac{5}{43}$, $-2\frac{3}{5} = -\frac{3}{5} \log_2 \frac{3}{5} = \frac{2}{5} \log_2 \frac{2}{5} = 0.97$				
1	Information Gain = Entropy (whole) - 5/14Ent(s) - 4/14 Ent(0-5/14 R = 0.97 - 5/14 x 0.97 - 4/14 x 0 - 5/14 x 0.97				
3		= 0.246			
The state of the s					The second secon

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Dillo		

B] Calculate I G of Temprature

Step 1 : 0.94

Step 2: Entropy of all attributes

Entropy of Hot $\{+2, -2\} = -\frac{2}{4} \log_2 \frac{2}{4} - \frac{2}{4} \log_2 \frac{2}{4} = 1.0$

Entropy of Mild $\{+4, -2\} = -\frac{4}{6} \log_{\frac{1}{2}} \frac{4}{6} - \frac{2}{6} \log_{\frac{1}{2}} \frac{2}{6} = 0.91$

Entropy of Cold {+3, -13 = -3 $\log_2 \frac{3}{4} - \frac{1}{4} \log_2 \frac{1}{4} = 0.81$

I.G = $E(whole data) - 4 \times 1.0 - 6 D.91 - 4 \times 0.81$

= 0.029

c] Calculate I G of Humidity

Step 1 : 0.94

Step 2: Entropy of all attributes

Entropy of High $\{+8, -4\} = -3 \log_2 \frac{3}{7} - \frac{4}{7} \log_2 \frac{4}{7} = 0.98$

on Pe = 1P- F-F3

Entropy of Normal 2+6,-13 = -6 log 6 1 log 1 = 059

 $T.G = 0.94 - \frac{7}{14} \times 0.98 - \frac{7}{14} \times 0.59$

Laborardica Cain : Friendly (whole) - The Hates - 410 Hates - 3

Cart - plaxos 1 - Stax 0 - 1 00

Scanned with CamScanner

Page No. Date Calculate IG of Wind Step 1: 0.84 up subsequel seemed up 0 Step 2: Entropy of all attributes: Entropy of Strong $\{+3, -3\} = -\frac{8}{6} \log_2 \frac{3}{6} - \frac{3}{6} \log_2 \frac{3}{6} = 1.0$ Entropy of Normal {+6,-2}=1_6 log 6 _ 2 log 2 = 0.8/ $= 0.94 - 6 \times 1.0 - 8 \times 0.81$ = 0.0478 Geain (S. Weather) = 0.246 + man (root node) Gain (s. Temp) = 0.029 Gain (S. Humidity) = 0.15 Gain (5, Wind) = 0.0478 (Weather) France of Mary (Cloudy) yes .

	Page No. Date				
<u>}</u>	Calculate for Sunny bail to all substances				
	Day Weather Temperature Humidity Wind Play				
0.1 = 8	9 Sunny Cool Normal Weak Yes				
Cabon	Step 1: Entropy of whole dataset $5\frac{3}{12}$, $-3\frac{3}{5}$ = $\frac{2}{5} \log_2 \frac{2}{5}$ = $\frac{3}{5} \log_2 \frac{3}{5}$ = 0.97 Step 2: Entropy of all attributes				
	a) Temperature - This (ball a) mind				
	• Entropy of Hot $(+0, -2] = -0 \log_2 \frac{0}{2} - \frac{2}{2} \log_2 \frac{2}{2} = 0$ • Entropy of Mild $\{+1, -1\} = -1 \log_2 \frac{1}{2} - \frac{1}{2} \log_2 \frac{1}{2} = 1.0$				
	· Entropy of Cool 2+1,-03 = - 1 log 1 - 0 log 0 = 0				
	• I. $G = 0.97 - 2 \times 0 - 2 \times 1.0 - 21 \times 0$ $= 0.57$				

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	b) Humidity painy Sainy PtibimuH (d
Y	Step 2': utibimul za tozagnal santaaid und
	· Entropy of High {+0, 3}= 10 109 0 13 109 3=0
	· Entropy of Normal 2+2,0?= 2 log 2 10g 0=0
	· T.G = 0.97 - 2 x 0 - 2 x 0
	Eagraph of whole delice 78.0 =
13.5	c) Wind
	· Entropy of Strong \(\frac{1}{1}, -1\frac{3}{2} = -1 \log_2 \frac{1}{2} -1 \log_2 \frac{1}{2} = 1
	· Entropy of Weak \[\frac{1}{1} \cdot - 2\frac{1}{3} \log_2 \frac{1}{3} \log_2 \frac{1}{3} \log_2 \frac{2}{3} \log_2 \log_2 \frac{2}{3} \log_2 \log_2 \frac{2}{3} \log_2 \log_2 2
0 - 1	• $T.G = 0.97 - 2 \times 1 - 3 \times 0.918 =$ $= 0.019$
1 1	= 0.019
20	Friend of Mile 2 18 - 18 100 8 - 1 100
	Gain (Sounny, Temp) = 0.57
H = 1	Gain (Ssunny, Humidity) = 0.97
	Gain (Ssunny, Wind) = 0.019 (Weather)
0	1x 2 - 8190 x 8 - 0 x 0 - 18/7 = 2 x 1
	Sunny Cloudy Rain
-	
-	Humidity Yes
-	
1	High Normal
	NIO Yes

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7	Calculate for Rainy
Day	Weather Temperature Humidity Wind Play?
04	Rain Mild High Weak Yes Rain Cool Normal Weak Yes
5	Rain Cool Normal Weak Yes
0-6	Rain Cool Normal Strong No
10	Rain Cool Normal Strong No Rain Mild Normal Weak Yes
14	Rain Mild High Strong No
	Entropy of whole dataset Entropy of Rain $\{+3, -2\} = -3 \log_2 \frac{3}{5} - \frac{2}{5} \log_2 \frac{2}{5} = 0.97$
151	Entropy of all attributes
5	a) Temperature
	Temperature C
	Entropy of Hot \$to, -0 } = -0 $\log_2 \frac{0}{2} - \frac{0}{2} \log_2 \frac{0}{2} = 0$
	Entropy of Mild $\frac{3+2}{-1} = \frac{2}{3} \log_2 \frac{2}{3} - \frac{1}{3} \log_2 \frac{1}{3} = 0.918$
	$\frac{1}{2}$ $\frac{109}{2}$ $\frac{1}{2}$ $\frac{109}{2}$ $\frac{1}{2}$ = 1.0
	$T.Ge = 0.97 - \frac{0}{5} \times 0 - \frac{8}{5} \times 0.918 - \frac{2}{5} \times 1.0$
(alos)	0.019
	Alimin D
	- Chrescop Colle

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b) Humidity

c) Wind

Entropy of Strong
$$\{\pm \theta, -2\} = -0$$
 $\log_2 \frac{0}{2} - \frac{2}{2} \log_2 \frac{2}{2} = 0$

$$I.G = 0.97 - \frac{2}{5} \times 0 - \frac{3}{5} \times 0$$

Weather

