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Latihan Soal (Kuis)

1. Hitung Entropy dan Gain serta tentukan pohon keputusan yang terbentuk dari contoh kasus keputusan bermain tenis dibawah ini :

OUTLOOK	TEMPERATURE	HUMIDITY	WINDY	PLAY
Sunny	Hot	High	No	Don't Play
Sunny	Hot	High	Yes	Don't Play
Cloudy	Hot	High	No	Play
Rainy	Mild	High	No	Play
Rainy	Cool	Normal	No	Play
Rainy	Cool	Normal	Yes	Play
Cloudy	Cool	Normal	Yes	Play
Sunny	Mild	High	No	Don't Play
Sunny	Cool	Normal	No	Play
Rainy	Mild	Normal	No	Play
Sunny	Mild	Normal	Yes	Play
Cloudy	Mild	High	Yes	Play
Cloudy	Hot	Normal	No	Play
Rainy	Mild	High	Yes	Don't Play

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- a. Rumus Entropy:

$$Entropy(S) = \sum_{i=1}^c -p_i \log_2 p_i$$

- b. Rumus Gain:

$$Gain(S, A) = Entropy(S) - \sum_{v \in Values(A)} \frac{|S_v|}{|S|} Entropy(S_v)$$

Perhitungan NODE 1

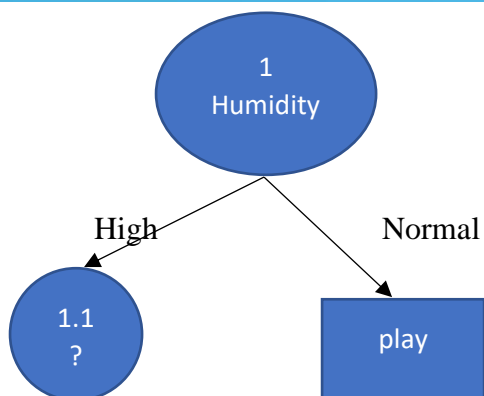
		Jml kasus(S)	Dont Play (S1)	Play (S2)	Entropy	Gain
total		14	4	10	0.863120569	
outlook						0.258521037
	cloudy	4	0	4	0	
	rainy	5	1	4	0.721928095	
	sunny	5	3	2	0.970950594	
temp						0.183850925
	cool	4	0	4	0	
	hot	4	2	2	1	
	mild	6	2	4	0.918295834	
humidity						0.370506501
	high	7	4	3	0.985228136	
	normal	7	0	7	0	
windy						0.005977711
	No	8	2	6	0.811278124	
	Yes	6	4	2	0.918295834	

Gain (Total, Outlook)

$$= \text{Entropy}(\text{Total}) - \sum_{i=1}^n \frac{|\text{Outlook}_i|}{|\text{Total}|} * \text{Entropy}(\text{Outlook}_i)$$

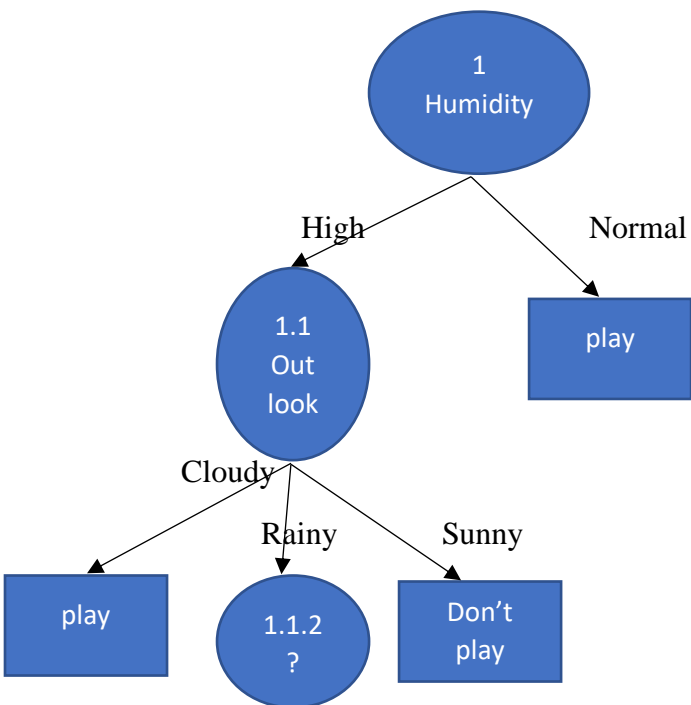
$$= 0,863120569 - ((4/14 * 0) + (5/14 * 0.72) + (5/14 * 0.97))$$

$$= 0,258521037$$



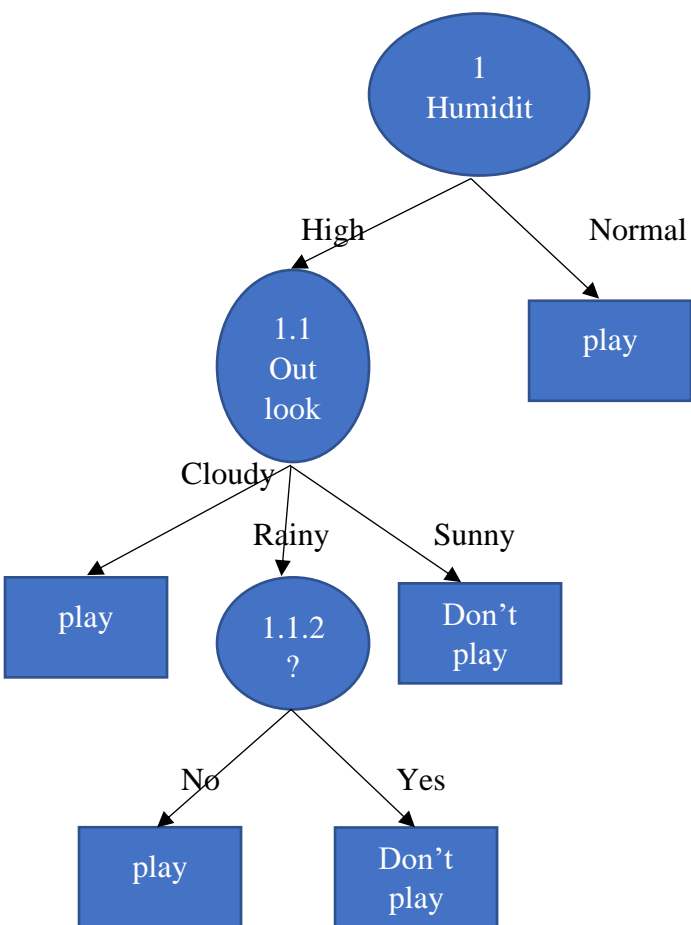
Perhitungan NODE 1.1

		Jml kasus(S)	Dont Play (S1)	Play (S2)	Entropy	Gain
Humidity	High	7	4	3	0.985228136	
outlook						0.69951385
	cloudy	2	0	2	0	
	rainy	2	1	1	1	
	sunny	3	3	0	0	
temp						0.020244207
	cool	0	0	0	0	
	hot	3	2	1	0.918295834	
	mild	4	2	2	1	
windy						0.020244207
	No	4	2	2	1	
	Yes	3	2	1	0.918295834	



Perhitungan NODE 1.1.2

Node 1.1.2		Jml kasus(S)	Dont Play (S1)	Play (S2)	Entropy	Gain
Humidity High and Outlook Rainy		2	1	1	1	
temp						0
	cool	0	0	0	0	
	hot	0	0	0	0	
	mild	2	1	1	1	
windy						1
	No	1	0	1	0	
	Yes	1	1	0	0	



Latihan Soal (Kuis)

2. Kerjakan latihan tahapan klasifikasi dengan Decision Tree pada latihan sebelumnya, dataset bisa diganti / dimodifikasi, simpan dalam ***decisiontree.py*** atau ***decisiontree.ipynb***, repositorikan file pada **github.com** dan kirimkan URL github melalui Assignment pada kulino (Pada blok Minggu ke-7).

Link Github : <https://github.com/ilyasskurnia/Datamining-2022/tree/main/tugas-minggu7>