Glenn Uhalado   191011402646   06TPLM004
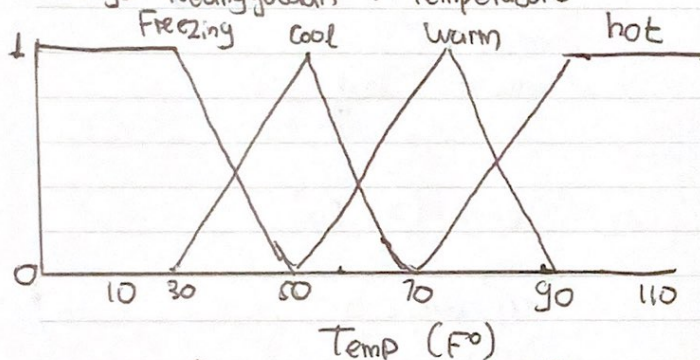
Kecerdasan Buatan

> Menghitung Kecepatan mobil berdasarkan
> Suhu dan kondisi Cuaca

Fuzzification

Terdapat 2 Variabel yaitu temperatur dan Cloud

• temperatur, Punya 4 nilai Linguistik yaitu Freezing, Cool, warm, hot'
• Cloud, mempunyai 3 nilai Linguistik yaitu Sunny, Partly cloudy, overcast

Fungsi keanggotaan : Temperature

Temp (F°)

① Temp $(<=30)$

Freezing = 1
Cool = 0
Warm = 0
Hot = 0

② Temp $(>30$ dan $<50)$

Freezing = $\dfrac{50 - temp}{50-30}$

cool = $\dfrac{temp - 30}{50-30}$

warm = 0
hot = 0

③ Temp $(=50)$

Freezing = 0
Cool = 1
warm = 0
hot = 0

④ Temp $(>50$ dan $<70)$

Freezing = 0
Cool = $\dfrac{70-temp}{70-50}$

Warm = $\dfrac{temp - 50}{70-50}$

hot = 0

⑤ temp $(=70)$

Freezing = 0
Cool = 0
Warm = 1
hot = 0

⑦ temp $(>70$ dan $<90)$

Freezing = 0
Cool = 0
Warm = $\dfrac{90 - temp}{90-70}$

hot = $\dfrac{temp - 70}{90-70}$

⑨ temp $(>=90)$

Freezing = 0   Warm = 0
Cool = 0   hot = 1

①

Fungsi Keanggotan : Cloud Cover

① Cloud (<=20)
Sunny = 1
Purely clody = 0
Overcast = 0

② Cloud (>20 dan <40)
Sunny = $\dfrac{40-Cloud}{40-20}$

Overcast = 0

③ Cloud (>20 dan <50)
Partly Cloudy = $\dfrac{Cloud -20}{50-20}$

④ Cloud (50)
Sunny = 0
Purely clody = 1
Overcast = 0
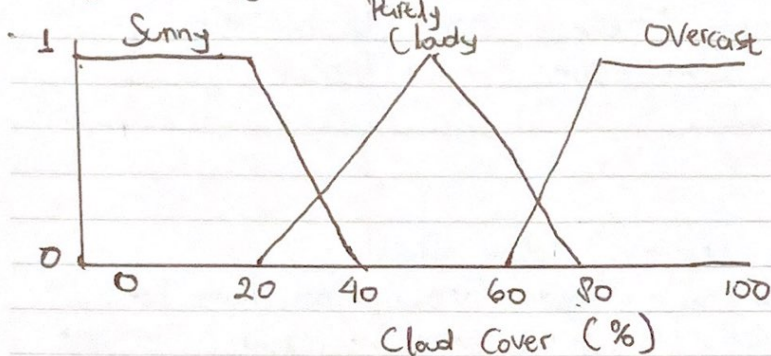
⑤ Cloud (>50 dan <80)
Sunny = 0
Purely Cloudy = $\dfrac{80 -Cloud}{80-50}$

⑥ Cloud (>60 dan <80)
Sunny = 0
Overcast = $\dfrac{Cloud -60}{80-60}$

⑦ Cloud (>= 80)
Sunny = 0
Purely cloudy = 0
Overcast = 1

②

Sistem Inferensi

membuat aturan , Jumlah aturan $= \sum$ var temperature $\times \sum$ var cloud cover

$$= 4 \times 3 = \underline{12}$$

Rules

1. IF Freezing and Sunny then Slow
2. IF Freezing and Partly Cloudy then Slow
3. IF Freezing and overcast then Slow
4. IF Cool and Sunny then Slow
5. IF cool and Partly Cloudy then Slow
6. IF Cool and Overcast then Slow
7. IF warm and Sunny then Fast
8. IF warm and Partly Cloudy then fast
9. IF warm and Overcast then Fast
10. IF Hot and Sunny then Fast
11. IF hot and Partly Cloudy then Fast
12. IF Hot and overcast then Fast

← mengambil nilai minimal

✳ Fungsi Penghubung memakai konjungsi , contoh :

① IF its Sunny and warm , drive Fast

Sunny (Cover) $\wedge$ Warm (temp) $\Rightarrow$ Fast (Speed)

Fast $= ($ min (Sunny (Cover), Warm (Temp)))

Defuzzifikasi

Speed = weighted mean

$$= \frac{(Slow * 25 + Fast * 75)}{(Slow + Fast)}$$
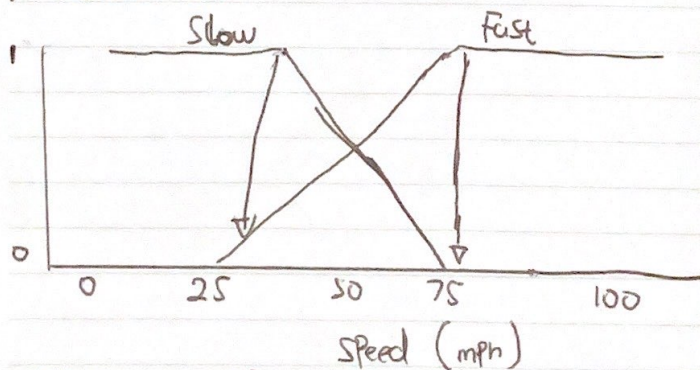
$= 2$ mph

Speed is 20% Slow
And 70% Fast

③

Contoh Perhitungan manual

① Berapa kecepatan jika
 • 65 F°
 • 55%

Jawab

 ✱ 65°F ⇒ Cool = 0,25   Warm = 0,75
 ✱ 55% ⇒ Partly Cloudy = 0,83

   IF Cool and Partly Cloudy then Slow [RULE ke 5]
        0,25 ∧ 0,8 = 0,25 → Slow

   If warm and Partly Cloudy then Fast [RULE ke 8]
        0,75 ∧ 0,83 = 0,75 → Fast

$$Speed = \frac{(Slow \times 25) + (Fast \times 75)}{Slow + Fast}$$

$$= \frac{(0,25 \times 25) + (0,75 \times 75)}{0,75 + 0,25}$$

$$= \frac{6,25 + 56,25}{1} = 62,5 \quad . \text{ Sudah sesuai!!!}$$