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Kelas : Pelaran Komputer – 6D

Certainty Factor

- | | |
|------------------------|--|
| 1. CF (hurting) = 1.0 | 1. IF hurt AND fever THEN infected = 0.6 |
| 2. CF (swollen) = 0.6 | 2. IF hurt AND swollen THEN trauma = 0.8 |
| 3. CF (red) = 0.1 | 3. IF overload THEN infected = 0.5 |
| 4. CF (fever) = 0.4 | 4. IF trauma AND red THEN broken = 0.8 |
| 5. CF (overload) = 1.0 | 5. IF trauma AND moves THEN sprained = 1.0 |
| 6. CF (moves) = 1.0 | |

- Rule dengan satu evidence :

$$CF(H|e) = CF(E|e) * CF(H|E)$$

- Rule dengan beberapa evidence :

$$CF(A \text{ AND } B) = \text{Min}[CF(A), CF(B)]$$

$$CF(A \text{ OR } B) = \text{Max}[CF(A), CF(B)]$$

- Rule dengan hipotesa yang sama :

$$CF_1(Q) + CF_2(Q) - CF_1(Q) \times CF_2(Q) \rightarrow \text{apabila kedua premis bernilai positif}$$

$$CF_1(Q) + CF_2(Q) + CF_1(Q) \times CF_2(Q) \rightarrow \text{apabila kedua premis bernilai negatif}$$

Jawaban :

1. Rule 1 (IF hurt **AND** fever THEN infected)

- CF (hurt) = 1.0
- CF (fever) = 0.4
- CF (IF hurt AND fever THEN infected) = 0.6

$$CF(\text{infected}) = \text{Min}[CF(\text{hurt}); CF(\text{fever})] \times CF(\text{IF hurt AND fever THEN infected})$$

$$CF(\text{infected}) = (\text{Min}[(1.0), (0.4)]) \times 0.6$$

$$= 0.4 \times 0.6$$

$$= 0.24$$

2. Rule 2 (IF hurt **AND** swollen THEN trauma)

- CF (hurt) = 1.0
- CF (swollen) = 0.6
- CF (IF hurt **AND** swollen THEN trauma) = 0.8

$$CF(\text{trauma}) = \text{Min}[CF(\text{hurt}); CF(\text{swollen})] \times CF(\text{IF hurt AND swollen THEN trauma})$$

$$\begin{aligned}
 CF(trauma) &= (Min[(1.0), (0.6)]) \times 0.8 \\
 &= 0.6 \times 0.8 \\
 &= 0.48
 \end{aligned}$$

3. Rule 3 (IF overload THEN infected)

- CF (overload) = 1.0
- CF (IF overload THEN infected) = 0.5

$$CF(\text{infected}) = CF(\text{overload}) \times CF(\text{IF overload THEN infected})$$

$$\begin{aligned}
 CF(\text{infected}) &= 1.0 \times 0.5 \\
 &= 0.5
 \end{aligned}$$

4. Rule 4 (IF trauma **AND** red THEN broken)

- CF (trauma) = 0.48 → **didapat dari rule 2**
- CF (red) = 0.1
- CF (IF trauma **AND** red THEN broken) = 0.8

$$CF(\text{trauma}) = Min[CF(\text{trauma}); CF(\text{red})] \times CF(\text{IF trauma AND red THEN broken})$$

$$\begin{aligned}
 CF(trauma) &= (Min[(0.48), (0.1)]) \times 0.8 \\
 &= 0.1 \times 0.8 \\
 &= 0.08
 \end{aligned}$$

5. Rule 5 (IF trauma **AND** moves THEN sprained)

- CF (trauma) = 0.48 → **didapat dari rule 2**
- CF (moves) = 1.0
- CF (IF trauma **AND** moves THEN sprained) = 0.8

$$CF(\text{trauma}) = Min[CF(\text{trauma}); CF(\text{moves})] \times CF(\text{IF trauma AND moves THEN sprained})$$

$$\begin{aligned}
 CF(trauma) &= (Min[(0.48), (1.0)]) \times 1.0 \\
 &= 0.48 \times 1.0 \\
 &= 0.48
 \end{aligned}$$

6. Perhitungan kembali statement CF(infected) karena terdapat 2 rule yang berhipotesa sama (rule 1 dan rule 3)

- CF (IF hurt AND fever THEN infected) = 0.6
- CF (IF hurt AND swollen THEN trauma) = 0.8
- CF₁ (infected) = 0.24 → **didapat hasil CF dari rule 1**
- CF₂ (infected) = 0.5 → **didapat hasil CF dari rule 3**
- CF (infected) = CF₁(Q) + CF₂(Q) – CF₁(Q) × CF₂(Q)

$$\begin{aligned}
 &= 0.24 + 0.5 - 0.24 \times 0.5 \\
 &= 0.24 + 0.5 - 0.12 \\
 &= 0.62
 \end{aligned}$$

Kesimpulan

Dari hasil perhitungan *Certainty Factor* 3 hipotesa pada pernyataan (infected, broken, dan sprained)

- John's foot is infected = 0,62
- John's foot is broken = 0.08
- John's foot is sprained = 0.48

Dapat disimpulkan bahwa menurut *Certainty Factor* tertinggi yang didapatkan dari rule John's foot is infected dengan hasil perhitungan sebesar 0.62. Oleh karena itu, dapat dikatakan bahwa kaki John sedang mengalami infeksi (John's foot is infected).