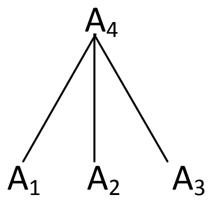
Sample calculation of the Methodology



Ref. value of:

$A_1 =>$ H M L (3)

$A_2 =>$H M L (3)

$A_3 =>$ H M L (3)

Input for:

$A_1 =>$ 0.8;

$A_2 =>$ 0.6;

$A_3 =>$ 0.4.

Here ,

Total Rule =(Ref. value)$^{\text{attribute no.}}$

$=3^3 = 27$

Initial sub Rule base Ay => sheet (*) [Sazzad vai]

Assume that,

All antecedent attributes (High, Medium, Low) in any rule have equal weight (Rule weight)

$S_k^i = 1;$ for k = 1…….27; 11

i =1,2,3

Input transformation:

Let For H =1.0 ; M =0.5 ; L =0.0

h_{i3} =High

h_{i2} = Medium

h_{i1} = Low

$\mathcal{E}_i$=Input value

If $h_{i3} \geq \sum i \geq h_{i2}$ Then $\propto_{i2} = \frac{hi3-\sum i}{h_{i3}-h_{i2}}$

$\alpha i_3 = (1-\alpha_{i2})$

$\alpha i_1 = 1-(\alpha_{i2} + \alpha_{i3})$

If $h_{i2} > \sum i \geq h_{i1}$ Then .

$$\alpha_{i1=} \frac{h_{i2-\sum i}}{h_{i2-} h_{i1}}$$

$$\alpha_{i2=} (1-\alpha_{i1});$$

$$\alpha_{i3=} 1-(\alpha_{i1}+\alpha_{i2})$$

Now, For $\underset{A_1}{(\Sigma_i)}$ =0.8:

$h_3 \geq 0.8 \geq h_2$; Then α_{i2}(M) $=\frac{1-0.8}{1-0.5}=\frac{0.2}{0.5}=0.4$

α_{i3}(H) =(1-0.4) =0.6

α_{i1}(L) =0.0

For $\underset{A_{12}}{(\Sigma_i)}$ =0.6::

$h_{i3} \geq 0.6 \geq h_{i2}$; Then .

α_{i2}(M) $=\frac{1-0.6}{1-0.5}=\frac{0.4}{0.5}=0.8$

α_{i3}(H) =(1-0.8) =0.2

α_{i1}(L) =0.0

For $\underset{A_3}{(\Sigma_i)}$ =0.4:

$h_{i2} \geq 0.4 \geq h_{i1}$; Then

α_{i1}(L) $=\frac{0.5-0.4}{0.5-0.5}=\frac{0.1}{0.5}=0.2$

α_{i2}(M) =(1-0.2) =0.8

α_{i3}(H) =0.0

Hence

Input for:

A_1 = {(H, 0.6); (M, 0.4); (L, 0.0)}

A_2= {(H, 0.2); (M, 0.8); (L, 0.0)}

A_3= {(H, 0.0); (M, 0.8); (L, 0.2)}

#Activation Weight: **Matching Degree:**

$$w_k = \frac{\theta_k \alpha_k}{\sum_{i=1}^{k} \theta_i \propto_i}$$

$$\therefore \sum_{i=1}^{k} \theta_i \propto_i = (\theta_i \propto_i + \cdots + \theta_{27}\alpha_{27}$$

$$\propto_{\mathrm{k}} = \prod^{T_k} (\propto_i^k)^{\overline{\delta_{ki}}}$$

$\propto_1 = (0.6)^1 * (0.2)^1 * (0.0)^1 = 0.0$	$w_1 = \frac{0.0}{1} = 0.0$
$\propto_2 = (0.6)^1 * (0.2)^1 * (0.8)^1 = 0.096$	$w_2 = 0.096$
$\propto_3 = (0.6)^1 * (0.2)^1 * (0.2)^1 = 0.024$	$w_3 = 0.024$
$\propto_4 = (0.6)^1 * (0.8)^1 * (0.0)^1 = 0.0$	$w_4 = 0.0$
$\propto_5 = (0.6)^1 * (0.8)^1 * (0.8)^1 = 0.384$	$w_5 = 0.384$
$\propto_6 = (0.6)^1 * (0.8)^1 * (0.2)^1 = 0.096$	$w_6 = 0.0096$
$\propto_7 = (0.6)^1 * (0.0)^1 * (0.0)^1 = 0.0$	$w_7 = 0.0$
$\propto_8 = (0.6)^1 * (0.0)^1 * (0.8)^1 = 0.0$	$w_8 = 0.0$
$\propto_9 = (0.6)^1 * (0.0)^1 * (0.2)^1 = 0.0$	$w_9 = 0.0$
$\propto_{10} = (0.4)^1 * (0.2)^1 * (0.0)^1 = 0.0$	$w_{10} = 0.0$
$\propto_{11} = (0.4)^1 * (0.2)^1 * (0.8)^1 = 0.064$	$w_{11} = 0.064$
$\propto_{12} = (0.4)^1 * (0.2)^1 * (0.2)^1 = 0.016$	$w_{12} = 0.016$
$\propto_{13} = (0.4)^1 * (0.8)^1 * (0.0)^1 = 0.0$	$w_{13} = 0.0$
$\propto_{14} = (0.4)^1 * (0.8)^1 * (0.8)^1 = 0.256$	$w_{14} = 0.256$
$\propto_{15} = (0.4)^1 * (0.8)^1 * (0.2)^1 = 0.064$	$w_{15} = 0.064$
$\propto_{16} = (0.4)^1 * (0.0)^1 * (0.0)^1 = 0.0$	$w_{16} = 0.0$
$\propto_{17} = (0.4)^1 * (0.0)^1 * (0.8)^1 = 0.0$	$w_{17} = 0.0$
$\propto_{18} = (0.4)^1 (0.0)^1 * (0.2)^1 = 0.0$	$w_{18} = 0.0$
$\propto_{19} = (0.0)^1 * (0.2)^1 * (0.0)^1 = 0.0$	$w_{19} = 0.0$
$\propto_{20} = (0.0)^1 * (0.2)^1 * (0.8)^1 = 0.0$	$w_{20} = 0.0$
$\propto_{21} = (0.0)^1 * (0.2)^1 * (0.2)^1 = 0.0$	$w_{21} = 0.0$
$\propto_{22} = (0.0)^1 * (0.8)^1 * (0.0)^1 = 0.0$	$w_{22} = 0.0$
$\propto_{23} = (0.0)^1 * (0.8)^1 * (0.8)^1 = 0.0$	$w_{23} = 0.0$
$\propto_{24} = (0.0)^1 * (0.8)^1 * (0.2)^1 = 0.0$	$w_{24} = 0.0$
$\propto_{25} = (0.0)^1 * (0.0)^1 * (0.0)^1 = 0.0$	$w_{25} = 0.0$
$\propto_{26} = (0.0)^1 * (0.0)^1 * (0.8)^1 = 0.0$	$w_{26} = 0.0$
$\propto_{27} = (0.0)^1 * (0.0)^1 * (0.2)^1 = 0.0$	$w_{27} = 0.0$

#Belief Degree weight Update:

$$\beta_{ik} = \bar{\beta}_{ik}\frac{\sum_{t=1}^{Tk}\left(\tau(t,k)\sum_{j=1}^{Jt}\alpha_{tj}\right)}{\sum_{t=1}^{Tk}\tau(t,k)}$$

i= Attribute value   k= Rule No

j= Referential Value

β_{ik}= Update Belief u_t= Set of antecedent

T(t,k) $\{ \begin{matrix} 1; if\ u_t \text{ is used in defining } R_k(t = 1, \_, T_u) \\ 0; otaeanse \end{matrix}$

$\bar{\beta}_{ik}$= Original belief degree

#β_{11}=($\bar{\beta}_{11}$) $\frac{\sum_{t=1}^{3}\left(\tau(t,k)\sum_{j=1}^{jt}\alpha_{tj}\right)}{\sum_{t=1}^{3}\tau(t,k)}$

$=1\times\frac{(1.\sum_{1}^{3}\alpha_{tj})}{\tau(1,k)+\tau(2,k)+\tau(3,k)}$

$=\frac{(\alpha_{11+\alpha_{12}+\alpha_{13}})+(\alpha_{21+\alpha_{22}+\alpha_{23}})+(\alpha_{31+\alpha_{32}+\alpha_{33}})}{1+1+1}$

$=\frac{(0.6+0.4+0.0)+(0.2+0.8+0.0)+(0.0+0.8+0.2)}{3}$

$=\frac{1+1+1}{3}$

$=\frac{3}{3}$

=1

Recursive Method/ Evedential Reasoning

#Aggregation:

		$D_1(M_{1+27})$	$D_{2(M_{2+027})}$	$D_{2(M_{3,1+27})}$	$M_{D(M_{D,1+027})}$
A_1	$M_{1,1}$	$= 0.0$	$M_{2,10.0}$	$M_{3,10.0}$	$M_{4,11.0}$
	$M_{1,2}$	$= 0.0768$	0.0192	0.0	0.940
A_2	$M_{1,3}$	$= 0.0192$	0.0	0.0048	0.966
A_3	$M_{1,4}$	$= 0.0$	0.0	0.0	1.0
A_4	$M_{1,5}$	0.15536	0.2304	0.0	0.626
A_5	$M_{1,6}$	0.048	0.0288	0.0192	0.904
A_6	$M_{1,7}$	0.0	0.0	0.0	1.0
A_7	$M_{1,8}$	0.0	0.0	0.0	1.0
A_8	$M_{1,9}$	0.0	0.0	0.0	1.0
A_9	$M_{1,10}$	0.0	0.0	0.0	1.0
A_{10}	$M_{1,11}$	0.0256	0.0384	0.0	0.936
A_{11}	$M_{1,12}$	0.0008	0.0048	0.0032	0.948
A_{12}	$M_{1,13}$	0.0	0.0	0.0	1.0
A_{13}	$M_{1,14}$	0.0	0.256	0.0	0.744
A_{14}	$M_{1,15}$	0.0	0.0512	0.0128	0.936
	$M_{1,16}$	0.0	0.0	0.0	1.01
	$M_{1,17}$	0.0	0.0	0.0	1.0
	$M_{1,18}$	0.0	0.0	0.0	1.0
	$M_{1,19}$	0.0	0.0	0.0	1.0
	$M_{1,20}$	0.0	0.0	0.0	1.0
	$M_{1,21}$	0.0	0.0	0.0	1.0
	$M_{1,22}$	0.0	0.0	0.0	1.0
	$M_{1,23}$	0.0	0.0	0.0	1.0
	$M_{1,24}$	0.0	0.0	0.0	1.0
	$M_{1,24}$	0.0	0.0	0.0	1.0
	$M_{1,25}$	0.0	0.0	0.0	1.0
	$M_{1,26}$	0.0	0.0	0.0	1.0
	$M_{1,27}$	0.0	0.0	0.0	1.0