



Vizle

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MULTI CRITERIA DECISION MAKING

FUZZY- ANALYTIC HIERARCHY PROCESS (FAHP) for weight calculation

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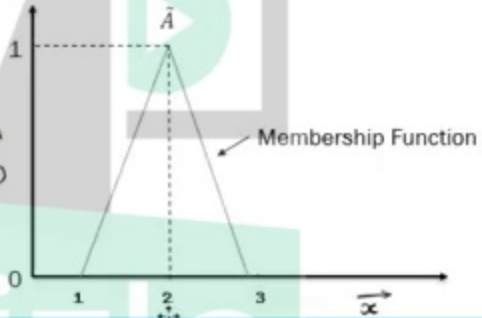
Fuzzy

Fuzzification

$$\mu_{\tilde{A}}(x) = \tilde{A} = (1, 2, 3)$$

Fuzzy Number

$\mu_{\tilde{A}}(x)$



Fuzzification

Pair-wise comparison matrix

	Price or Cost	Storage Space	Camera	Looks
Price or Cost	(1,1,1)	(4,5,6)	(3,4,5)	(6,7,8)
Storage Space	$\frac{1}{5}$	(1,1,1)	$\frac{1}{2}$	(2,3,4)
Camera	$\frac{1}{4}$	(1,2,3)	(1,1,1)	(2,3,4)
Looks	$\frac{1}{7}$	$\frac{1}{3}$	$\frac{1}{3}$	(1,1,1)

Equal

1

(1, 1, 1)

Moderate

3

(2, 3, 4)

Strong

5

(4, 5, 6)

Very strong

7

(6, 7, 8)

Extremely strong

9

(9, 9, 9)

2

(1, 2, 3)

4

(3, 4, 5)

6

(5, 6, 7)

8

(7, 8, 9)

Intermediate values

FAHP

Fuzzified Pair-wise comparison matrix

	Price or Cost	Storage Space	Camera	Looks	Fuzzy geometric mean value \tilde{r}_i
Price or Cost	(1,1,1)	(4,5,6)	(3,4,5)	(6,7,8)	(2.91, 3.44, 3.94)
Storage Space	$(\frac{1}{6}, \frac{1}{5}, \frac{1}{4})$	(1,1,1)	$(\frac{1}{3}, \frac{1}{2}, \frac{1}{1})$	(2,3,4)	(0.58, 0.74, 1)
Camera	$(\frac{1}{5}, \frac{1}{4}, \frac{1}{3})$	(1,2,3)	(1,1,1)	(2,3,4)	(0.80, 1.11, 1.41)
Looks	$(\frac{1}{8}, \frac{1}{7}, \frac{1}{6})$	$(\frac{1}{4}, \frac{1}{3}, \frac{1}{2})$	$(\frac{1}{4}, \frac{1}{3}, \frac{1}{2})$	(1,1,1)	(0.30, 0.35, 0.45)

$$\tilde{r}_1 = \left((1 \cdot 4 \cdot 3 \cdot 6)^{\frac{1}{4}}, (1 \cdot 5 \cdot 4 \cdot 7)^{\frac{1}{4}}, (1 \cdot 6 \cdot 5 \cdot 8)^{\frac{1}{4}} \right) = (2.91, 3.44, 3.94)$$

FAHP

	Fuzzy weights \tilde{w}_i
Price or Cost	$(2.91, 3.44, 3.94) \otimes \left(\frac{1}{6.80}, \frac{1}{5.64}, \frac{1}{4.58}\right)$ (0.428 , 0.610 , 0.859)
Storage Space	$(0.58, 0.74, 1) \otimes \left(\frac{1}{6.80}, \frac{1}{5.64}, \frac{1}{4.58}\right)$ (0.085 , 0.131 , 0.218)
Camera	$(0.80, 1.11, 1.41) \otimes \left(\frac{1}{6.80}, \frac{1}{5.64}, \frac{1}{4.58}\right)$ (0.117 , 0.196 , 0.309)
Looks	$(0.30, 0.35, 0.45) \otimes \left(\frac{1}{6.80}, \frac{1}{5.64}, \frac{1}{4.58}\right)$ (0.044 , 0.063 , 0.099)

$$\tilde{A}_1 \otimes \tilde{A}_2 = (l_1, m_1, u_1) \otimes (l_2, m_2, u_2) = (l_1 * l_2, m_1 * m_2, u_1 * u_2)$$



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