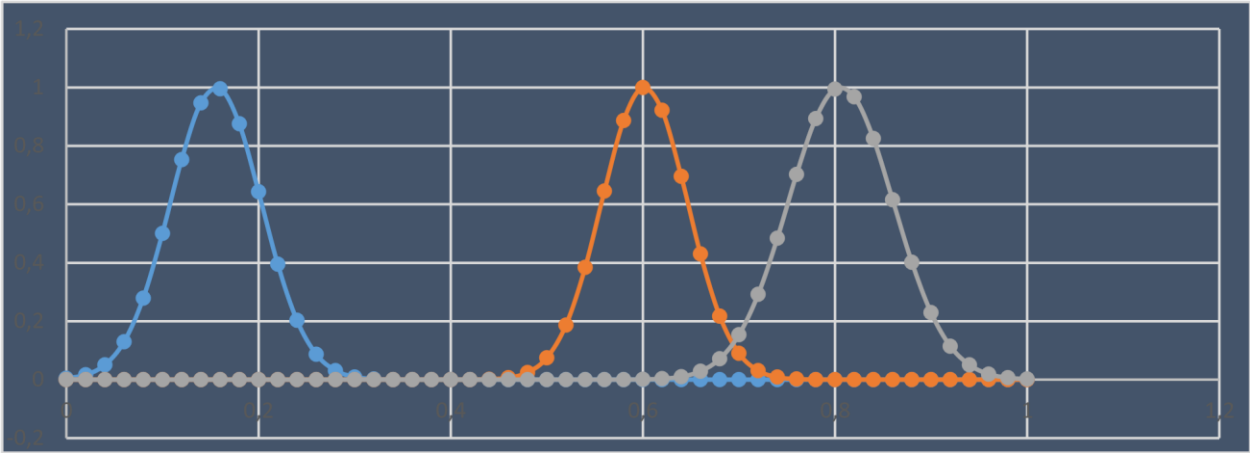


# Contemporary Data Processing Technology(CCOD)

## Task 7

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### Membership Function (Gaussian):



### Rules for each family:

**Rule 1:** If  $x_1$ =medium;  $x_2$ =large;  $x_3$ =small;  $x_4$ =medium, then Family **A**.

**Rule 2:** If  $x_1$ =large;  $x_2$ =large; $x_3$ =medium; $x_4$ =medium, then Family **B**.

**Rule 3:** If  $x_1$ =large;  $x_2$ =large;  $x_3$ =large;  $x_4$ =large, then Family **C**.

### Evaluate rules:

Data №:	Family A	Family B	Family C	Result
№1	A	B	C	Good
№2	A	B	C	Good
№3	A	B	C	Good
№4	A	B	C	Good
№5	A	B	C	Good
№6	A	B	C	Good
№7	A	B	B	Not Good
№8	A	B	C	Good
Success Rate:	100%	100\$	87.5%	87.5%

Flower Data:



Setosa(A)				Versicolor(B)				Virginica(C)			
X1	X2	X3	X4	X1	X2	X3	X4	X1	X2	X3	X4
0.68	0.89	0.25	0.16	0.72	0.64	0.65	0.52	0.96	0.68	0.96	0.84

For example take Versicolor (B):

Versicolor(B)			
X1	X2	X3	X4
0.72	0.64	0.65	0.52

**Rule 1:** If x1=medium; x2=large; x3=small; x4=medium, then Family **A**.

**Rule 2:** If x1=large; x2=large;x3=medium;x4=medium, then Family **B**.

**Rule 3:** If x1=large; x2=large; x3=large; x4=large, then Family **C**.

Than Find  $\mu$  for 3 rules:

Rules:	$\mu_1$	$\mu_2$	$\mu_3$	$\mu_4$
Nº1	0.03	0.01	0.00	0.17
Nº2	0.29	0.01	0.56	0.19
Nº3	0.29	0.01	0.02	0.00

Now calculate M:

$M = \mu_1 * \mu_2 * \mu_3 * \mu_4;$

Rules:	M
Nº1	0
Nº2	0.00031
Nº3	0

$$y = \begin{cases} 1 & \dots \text{ if } \hat{y} < 1.5 \\ 2 & \dots \text{ if } 1.5 \leq \hat{y} < 2.5 \\ 3 & \dots \text{ if } 2.5 \leq \hat{y} \end{cases}$$

And finally calculate Y:

$$y = \frac{1 * M_1 + 2 * M_2 + 3 * M_3}{M_1 + M_2 + M_3} = \frac{1 * 0 + 2 * 0.00031 + 3 * 0}{0 + 0.00031 + 0} = 2$$

$y = 2$

So we check that flower really belongs to Versicolor family.