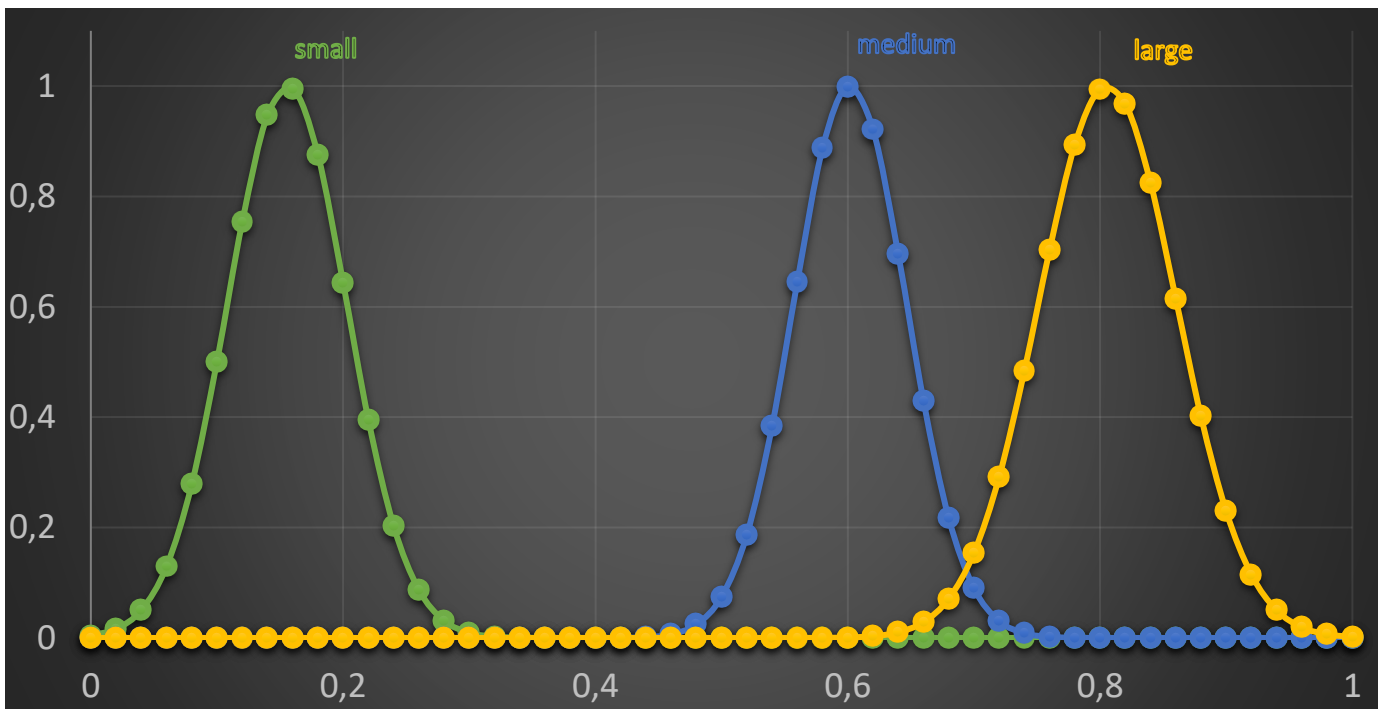


The Gaussian membership functions of small, medium, and large:



My 3 rules for each family:

1. If x_1 =Medium and x_2 =medium and x_3 = small and x_4 =small then A.
2. If x_1 =large and x_2 =medium and x_3 =medium and x_4 =medium then B.
3. If x_1 =large x_2 =medium x_3 =large x_4 =large then C.

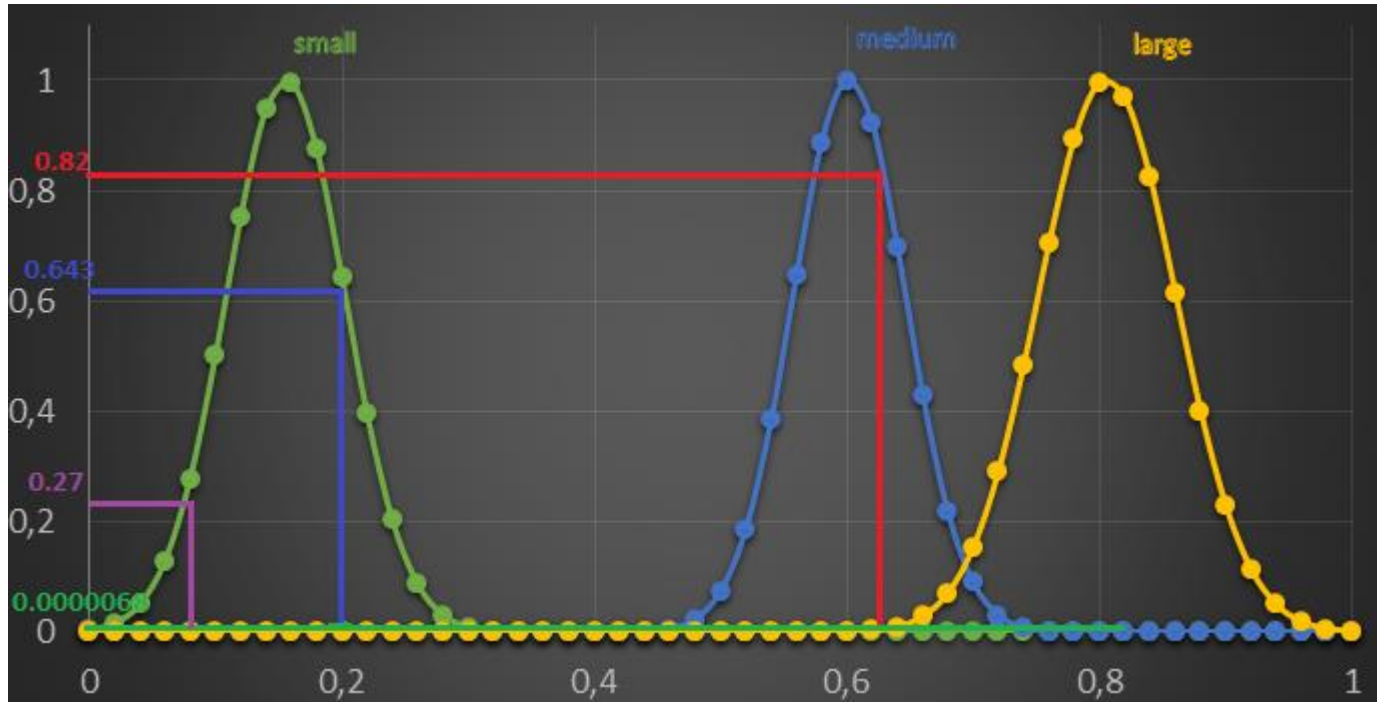
Checking own rules , good or not:

Family A		Family B		Family C	
Rule 1		Rule 2		Rule 3	
No.	A or B or C or other	A or B or C or other		A or B or C or other	
No1	A	B		C	good
No2	A	B		C	good
No3	A	B		C	good
No4	A	B		C	good
No5	A	B		C	good
No6	A	B		C	good
No7	A	B		B	good
No8	A	B		C	not good
success rate	100%	100%		87,5%	87,50%

Setosa				Versicolor				Virginica			
x_1	x_2	x_3	x_4	x_1	x_2	x_3	x_4	x_1	x_2	x_3	x_4
0.63	0.82	0.20	0.08	0.82	0.64	0.67	0.60	0.82	0.68	0.84	0.88

Three rules to classify:

R1: If x_1 =Medium and x_2 =medium and x_3 = small and x_4 =small



$$M1 = \mu_1 * \mu_2 * \mu_3 * \mu_4 = 0.82 * 0.0000068 * 0.643 * 0.27 = 0.00000968;$$

R2: If x_1 =large and x_2 =medium and x_3 =medium and x_4 =medium

The same

$$M2 = \mu_1 * \mu_2 * \mu_3 * \mu_4 = 0.00057 * 0.0000068 * 2.9 * 10^{-18} \sim 2.67 * 10^{-30} \approx 0;$$

R3: If x_1 =large x_2 =medium x_3 =large x_4 =large

$$M3 = \mu_1 * \mu_2 * \mu_3 * \mu_4 = 0.00057 * 0.0000068 * 7 * 10^{-39} \sim 2.62 * 10^{-27} \approx 0;$$

$$y = \frac{1 * M1 + 2 * M2 + 3 * M3}{M1 + M2 + M3} = \frac{1 * 0.00000968 + 2 * 0 + 3 * 0}{0.00000968 + 0 + 0} = 1;$$

$$\hat{y} = \frac{\sum_{k=1}^3 M_k \cdot g^k}{\sum_{k=1}^3 M_k} \quad \text{while} \quad y = \begin{cases} 1 & \dots \text{ if } \hat{y} < 1.5 \\ 2 & \dots \text{ if } 1.5 \leq \hat{y} < 2.5 \\ 3 & \dots \text{ if } 2.5 \leq \hat{y} \end{cases}$$

$Y \approx 1$ so x_1, x_2, x_3, x_4 0.63 0.82 0.20 0.08 is Setosa.