

Three are the input variables (Wind Speed, Intensity of the Sun Irradiation, Rainfall) of a Fuzzy Inference System (FIS).

Name of linguistic variable	name of fuzzy variable	Universe of discourse
Wind Speed	LOW	[15 - 102]
	NORMAL	[58.5 - 145.5]
	HIGH	[102 - 189]
Intensity of the Sun Irradiation	LOW	[11 - 50]
	NORMAL	[30.5 - 69.5]
	HIGH	[50 - 89]
Rainfall	LOW	[-5 - 61]
	NORMAL	[28 - 94]
	HIGH	[61 - 127]

- (i) How many fuzzy rules you can write using the input variables and fuzzy variables of the table?

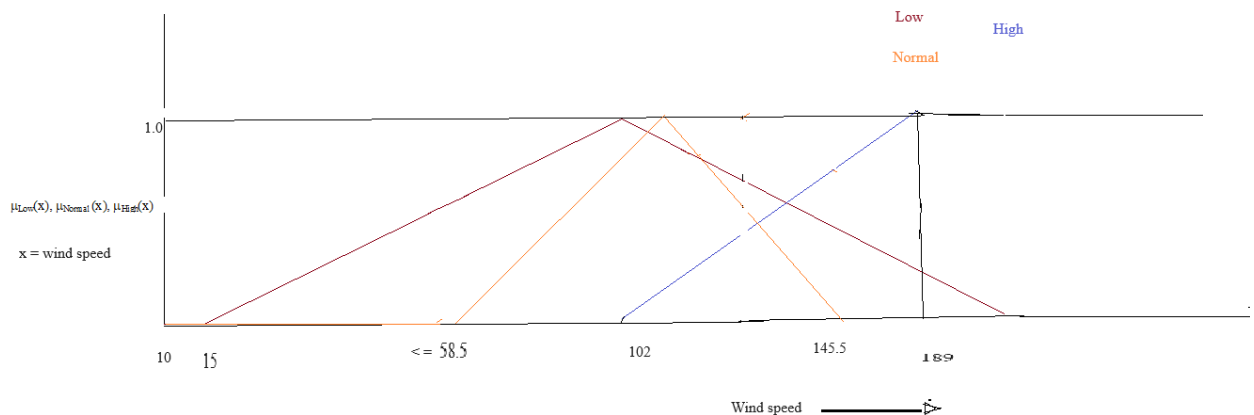
This is a three input FIS and each input have three fuzzy variables. So number of rules

$$|T(\text{wind speed})| \times |T(\text{Intensity of the Sun Irradiation})| \times |T(\text{Rainfall})| = 3 \times 3 \times 3 = 27$$

T stands for Term Set of corresponding Input/Linguistic variable.

- (ii) Say, **average production in farming** is the output, which is constant.
What model do you use for developing the Fuzzy inference system?
Since output is not a fuzzy variable, Sugeno Model of Zero-order is suitable.

- (iii) Say, Input: wind speed = 106.4, Intensity of the Sun Irradiation = 64.9, Rainfall = 1.
Find out Degree of membership of different fuzzy variables for the given inputs.
Draw fuzzy membership curves intuitively or using equations.



Draw membership curves for other variables.

$\mu_{\text{low}}(\text{wind speed} = 106.4) = 0.4$, $\mu_{\text{Normal}}(\text{wind speed} = 106.4) = 0.7$, $\mu_{\text{High}}(\text{wind speed} = 106.4) = 0.3$.

Calculate the same way for other two input variables.

- (iv) What are the differences between Mamdani and Sugeno model in building FIS? 3+3+9+5