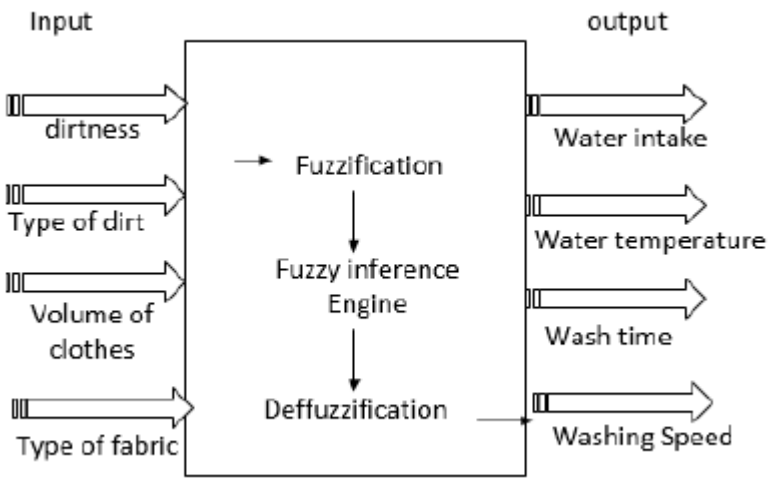
Fundamentals of Soft Computing
Assignment-1
Last date of submission-5th March, 2023

Note-
1. Do the Assignment yourself. Do not copy paste from internet or peers.
2. Submit on time other marks will be deducted for late submission.
3. Questions which require to be solved from pen paper should be submitted in your writing.
4. Submit assignment in classroom only.

Course outcome covered: CO1, CO2

CO1: Understand vagueness, ambiguity and uncertainty in different type of real world problems.
CO2: Analyze the fuzzy inference system and their applications in different set of problems.

Q1. [10Marks][CO1, CO2] Implement a Fuzzy logic based washing machine. You have been given input and output variables.



Input and output variable and range of membership functions are given below:

INPUT VARIABLE	MEMBERSHIP VALUE	MEMBERSHIP RANGE
Dirtiness of clothes	[Small,Medium, Large]	[0 100]
Type of Dirt	[Notgreasy, Medium, Greasy]	[0 100]
Type Of fabric	[Silk, Woolen, Cotton]	[0 100]
Volume of Clothes	[Small, Medium, Large]	[0 100]

OUTPUT VARIABLE	MEMBERSHIP VALUE	MEMBERSHIP RANGE
Washing Time	[Veryshort, Short, Medium, Long, VeryLong]	[0 100]
Washing Speed	[VeryLow, Slow, Medium, Fast, VeryFast]	[0 1200]
Water Intake	[Little, Normal, A lot Of]	[0 100]
Water Temperature	[Low, Normal, High]	[0 80]

Rules of Inference system are

1. If (Dirtiness is Small) and (TypeOfDirt is Not greasy) and (TypeOfFabric is Silk) and (volume of clothes is Small) then (WashingSpeed is VeySlow)

2. If (Dirtiness is Large) and (TypeOfDirt is Greasy) and (TypeOfFabric is Cotton) and (volume of clothes is Large) then (WashingSpeed is very fast)

3. If (Dirtiness is Large) and (TypeOfDirt is Not greasy) and (TypeOfFabric is Woolen) and (volume of clothes is Medium) then (WashingSpeed is Medium)

Assume triangular membership function for each linguistic variable; compute each output variable for given input variable.
For example when the type of clothes is 21.5, type of dirty is 20.8, Dirtiness of Clothes is 50 and volume of clothes is 28, determine what is washing time, water intake, washing speed and water temperature.
Solve this above case study on paper pen as well as code the complete problem on python. Compare the results of both.