

PSG College of Technology
Dept of Applied Maths & Computational Sciences
Soft Computing Lab 15XW87 : Fuzzy Algorithms Problem sheet

1. **To simulate fuzzy logic to be used to infer the time required to run a Washing machine, given the amount dirt and grease on clothes.** We will

formulate a precise mathematical relationship between amount of grease, dirt and the duration of washing time required. The input parameters used to solve the above mention problem are: grease and dirt. The fuzzy logic controller takes two inputs, processes the information and gives output as washing time.

The two crisp inputs, grease and dirtiness vary from 0 to 100 and presented as fuzzy sets defined by their respective membership functions. Let the output: washing time be allowed to have three linguistic values less, medium and high. Similarly, let the input variable: grease be expressed as low, average and large and dirtiness of clothes be described as being less, medium and high. The rules are :

- a) If (dirtiness is less) and (grease is low) then (washingtime is less).
- b) if(dirtiness is less) and (grease is average) then (washingtime is less).
- c) if (dirtiness is less) and (grease is large) then (washingtime is medium).
- d) if (dirtiness is medium) and (grease is low) then (washingtime is less).
- e) if (dirtiness is medium) and (grease is average) then (washing- time is medium).
- f) if dirtiness is medium) and (grease is large) then (washingtime is high).
- g) if (dirtiness is high) and (grease is low) then (washingtime is medium).
- h) if (dirtiness is high) and (grease is medium) then (washingtime is high).
- i) if(dirtiness is less) and (grease is high) then (washing- time is high).

Find appropriate time for dirtiness, grease pairs for A) 30, 75 B) 45, 80 C) 30, 45

Implement Mamdani and TSK models of inference.

For TSK, check if x is A and y is B then z is $2x+3y$ is appropriate or

if x is A and y is B then z is $x+1.5y$ is appropriate.

2. Apply Fuzzy C-Means on the iris data set with $k = 2, 3$. Find the difference between the actual cluster and the computed cluster as a clustering measure. Give appropriate plots.

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