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**Paper Review:**

This paper introduces how to generate fuzzy rules. There are five steps:

1. Input / Output space -> Fuzzy regions (e.g.: small, center, big …), each of which has a fuzzy membership function (e.g.: triangle).
2. Generate rules according to degrees of input & output variables. Each variable has a corresponding degree in one particular region.
3. Handle the conflicted rules and reduce rule number according to degree of each rule.
4. Fill fuzzy rule base boxes (difference between ‘and’ and ‘or’).
5. Defuzzification.

**Application in our project:**

In our project, we can apply this approach to generate fuzzy rules. The input examples are from experiments, the output will be fussy rules (input -> output).

**Membership Functions:**

large

medium

small

large

medium

small/

**Fuzzification**, the input values -> fuzzy set memberships

For example: feature number = 41

=> Membership(SMALL/MEDIUM ) = 0.95

=> Membership(LARGE) = 0.05

**=> Fuzzy rules**

**Inferences**:

**Combine the outputs:**



**Defuzzification**: fuzzy set memberships -> number

Output Membership Function:

Tune to TRUE = 0.9513, Not tune = 0

Tune to TRUE

Not tune

Calculate the fuzzy **centroid**:

centroid = (-100 \* 0 + 100 \* 0.9513) / (0 + 0.9515) = 100

=> Activate tune to TRUE at 100%

Input examples (in Analysis.xlsx):





Fuzzy rule base

For Parameter-7 tuned (A): whether tune ‘spark.shuffle.file.buffer’ from ‘32k’ to ‘16k’ (T-A) or ‘48k’ (T-B)



(Similar for other 11 parameters.)