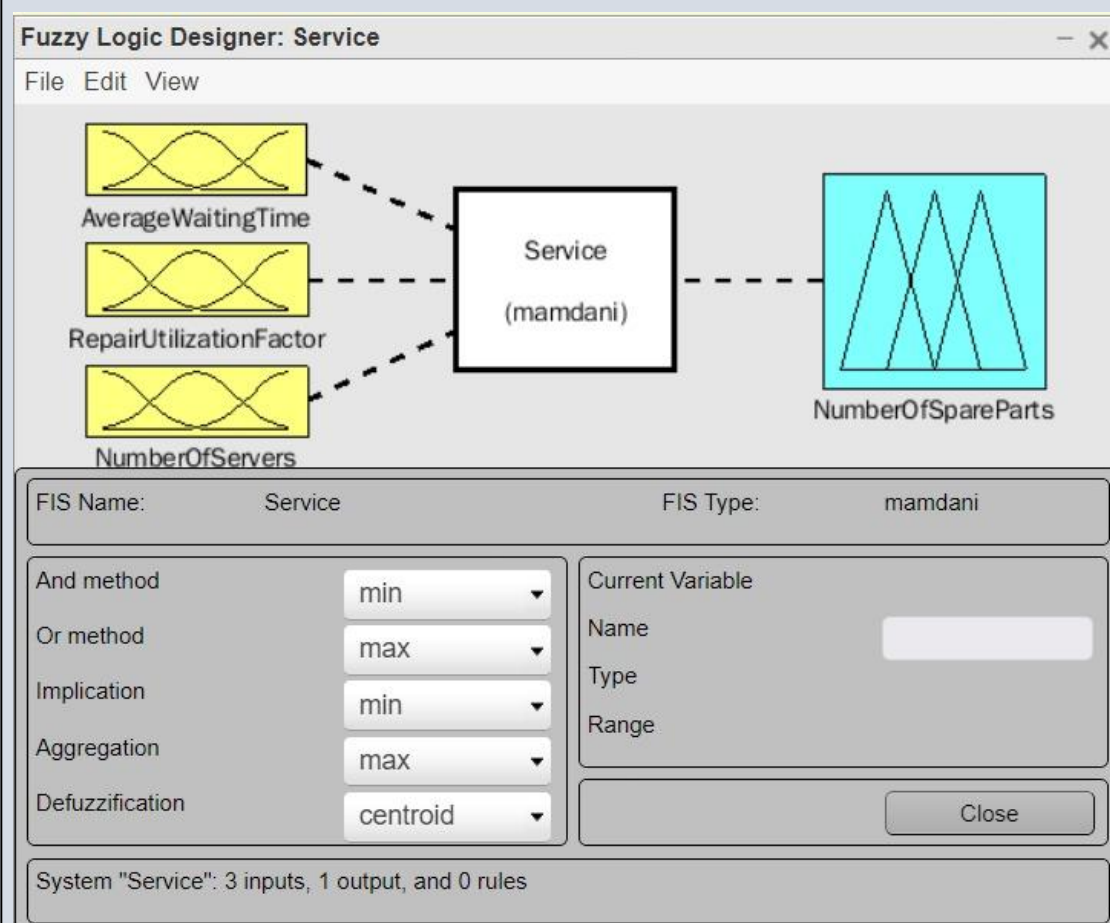


AI ASSIGNMENT

By Nevin Selby
2019BCS0046

I made this using 'Fuzzy logic Designer' in MATLAB

A service centre keeps spare parts and repairs failed ones. A customer brings a failed item and receives a spare of the same type. Failed parts are repaired, placed on the shelf, and thus become spares. The objective here is to advise a manager of the service centre on certain decision policies to keep the customers satisfied.



Linguistic variables:

Average Waiting Time:

Very short - 0.0 to 0.3

Short - 0.15 to 0.6

Medium - 0.45 to 1.00

Number of servers:

Small - 0 to 0.4

Medium - 0.3 to 0.7

Large - 0.6 to 1.0

Repair Utilisation Factor:

Low - 0 to 0.35

Medium - 0.25 to 0.75

High - 0.65 to 1.00

Number of Spare parts:

Very Small - 0.0 to 0.15

Small - 0.1 to 0.25

Rather small - 0.2 to 0.4

Medium - 0.35 to 0.6

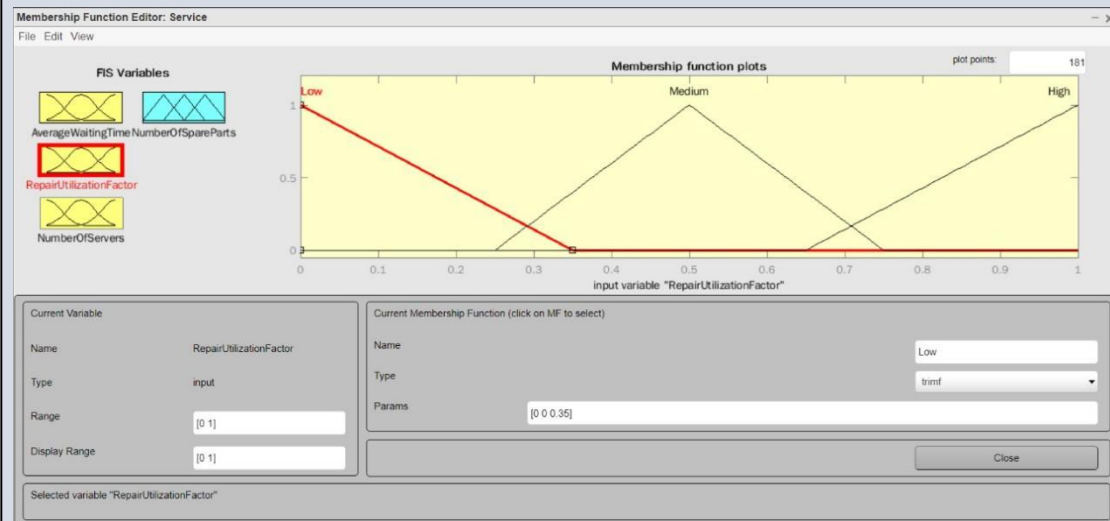
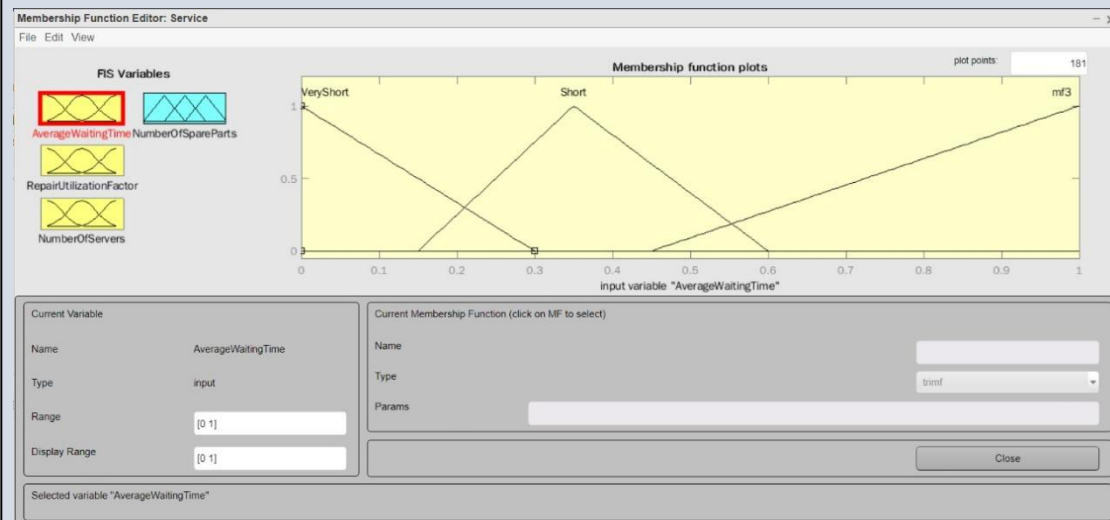
Rather Large - 0.5 to 0.8

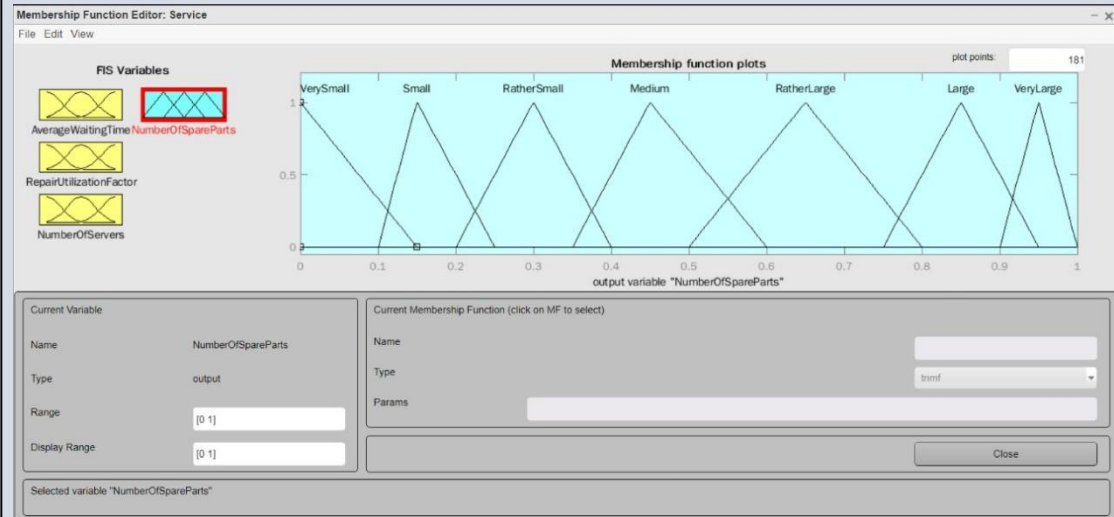
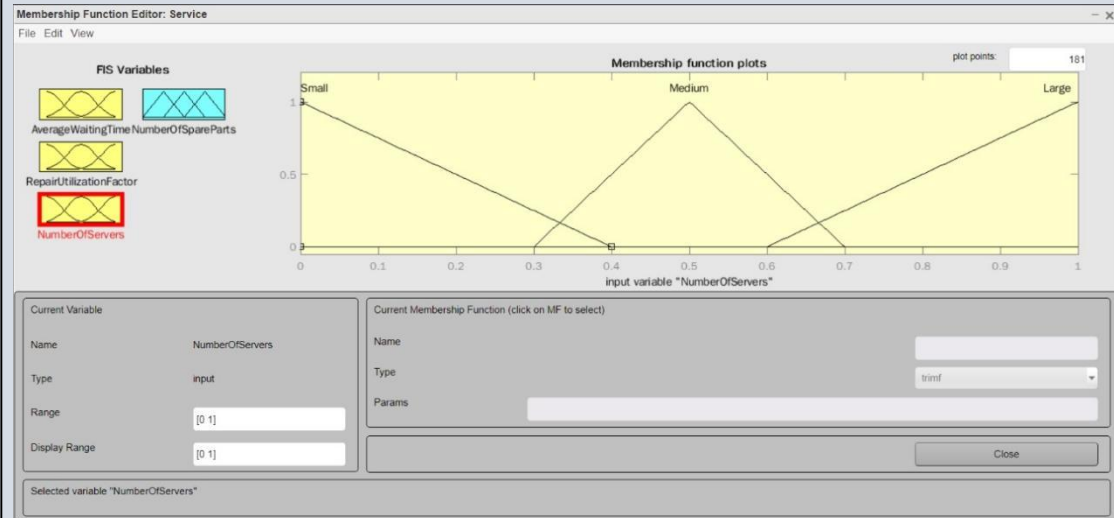
Large - 0.75 to 0.95

Very Large - 0.90 to 1.0

Membership functions - Triangular

Membership functions:





Rules

Rule Editor: Service

File Edit View Options

1. If (RepairUtilizationFactor is Low) then (NumberOfSpareParts is Small) (1)

2. If (RepairUtilizationFactor is Medium) then (NumberOfSpareParts is Small) (1)

3. If (RepairUtilizationFactor is High) then (NumberOfSpareParts is Small) (1)

4. If (AverageWaitingTime is VeryShort) and (NumberOfServers is Small) then (NumberOfSpareParts is VerySmall) (1)

5. If (AverageWaitingTime is Short) and (NumberOfServers is Small) then (NumberOfSpareParts is Large) (1)

6. If (AverageWaitingTime is Medium) and (NumberOfServers is Small) then (NumberOfSpareParts is Medium) (1)

7. If (AverageWaitingTime is VeryShort) and (NumberOfServers is Medium) then (NumberOfSpareParts is RatherLarge) (1)

8. If (AverageWaitingTime is Short) and (NumberOfServers is Medium) then (NumberOfSpareParts is RatherSmall) (1)

9. If (AverageWaitingTime is Medium) and (NumberOfServers is Medium) then (NumberOfSpareParts is Small) (1)

10. If (AverageWaitingTime is VeryShort) and (NumberOfServers is Large) then (NumberOfSpareParts is Medium) (1)

11. If (AverageWaitingTime is Short) and (NumberOfServers is Large) then (NumberOfSpareParts is Small) (1)

12. If (AverageWaitingTime is Medium) and (NumberOfServers is Large) then (NumberOfSpareParts is VerySmall) (1)

If

AverageWaitingTime is

VeryShort

Short

Medium

none

☐ not

and

RepairUtilizationFactor is

Low

Medium

High

none

☐ not

and

NumberOfServers is

Small

Medium

Large

none

☐ not

Then

NumberOfSpareParts is

VerySmall

Small

RatherSmall

Medium

RatherLarge

Large

VeryLarge

☐ not

Connection

☐ or

☒ and

Weight:

1

Delete rule

Add rule

Change rule

<<

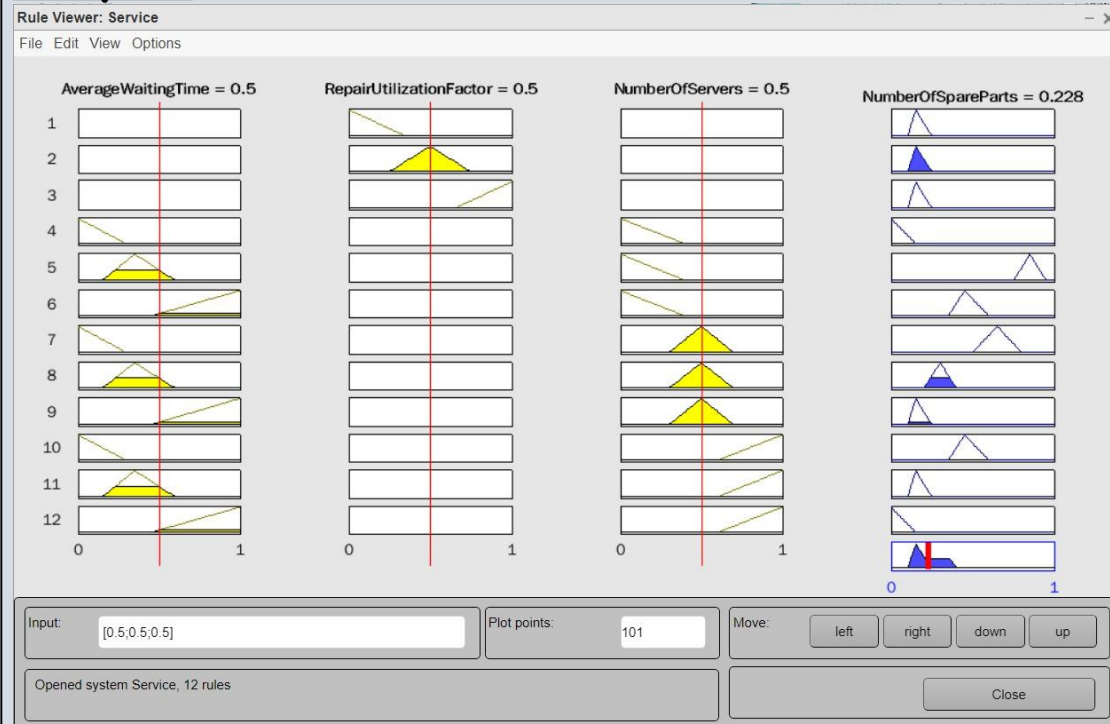
>>

The rule is added

Close

Sample input: [0.5 0.5 0.5]

Output:



Surface Plot

MATLAB automatically generates a surface plot for our fuzzy inference system.

