CENG 483 – BEHAVIORAL ROBOTICS

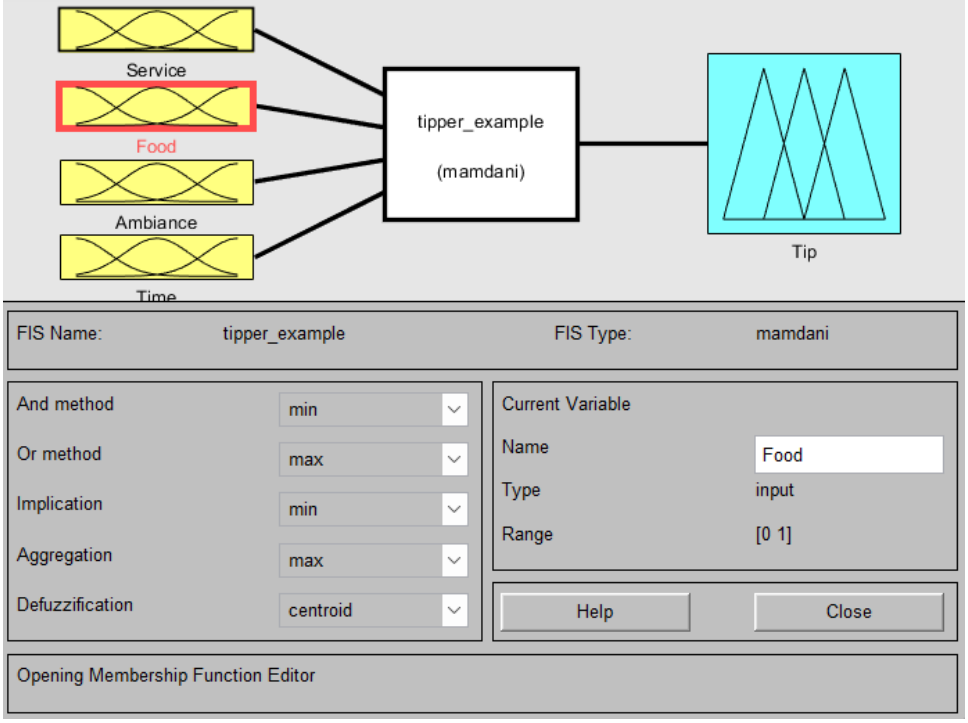
Homework Set #8 ***Due : 11.12.2023***

Name : Cem Tolga MÜNYAS

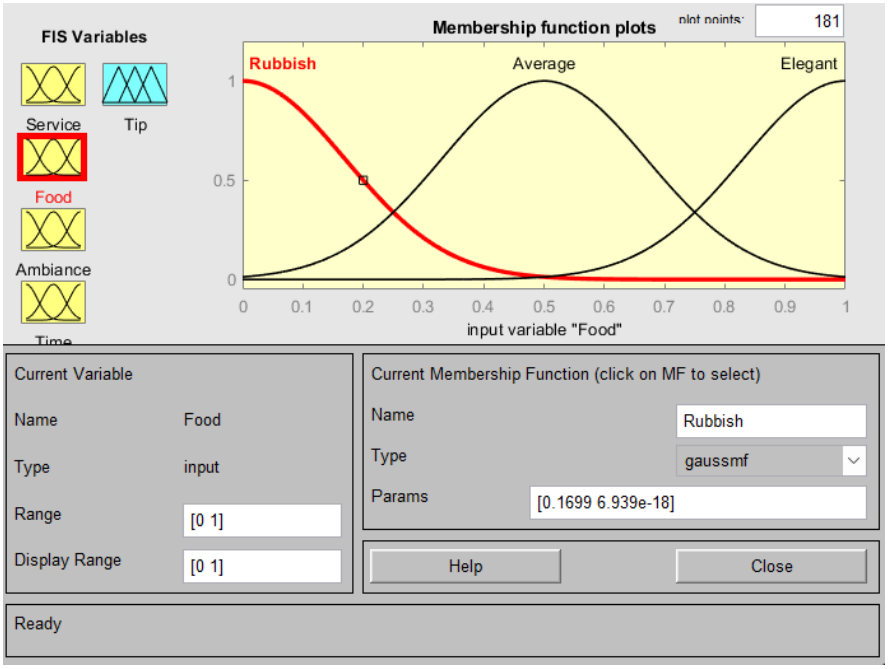
Student ID : 270206042

We will be designing a tipping calculator based on some parameters such as service quality, food quality, ambiance, and timing using Fuzzy Logic.

I started with typing the command window “fuzzy”. Here is the Fuzzy Logic Designer.

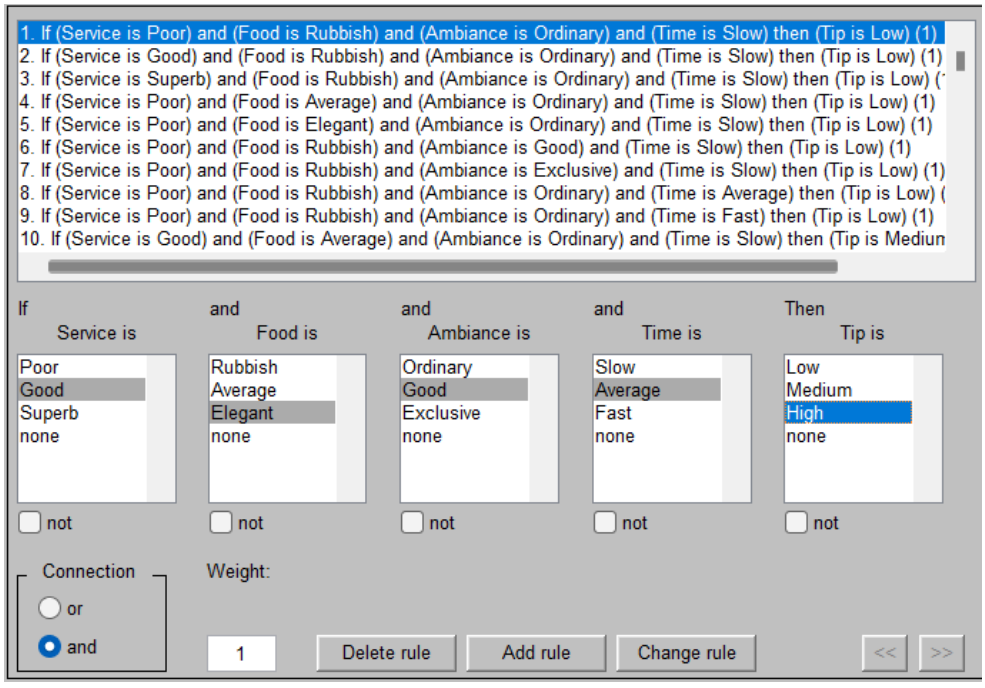


Then, I determined the membership functions for all 4 parameters. The parameters have different input variables as you can see in the figure below.

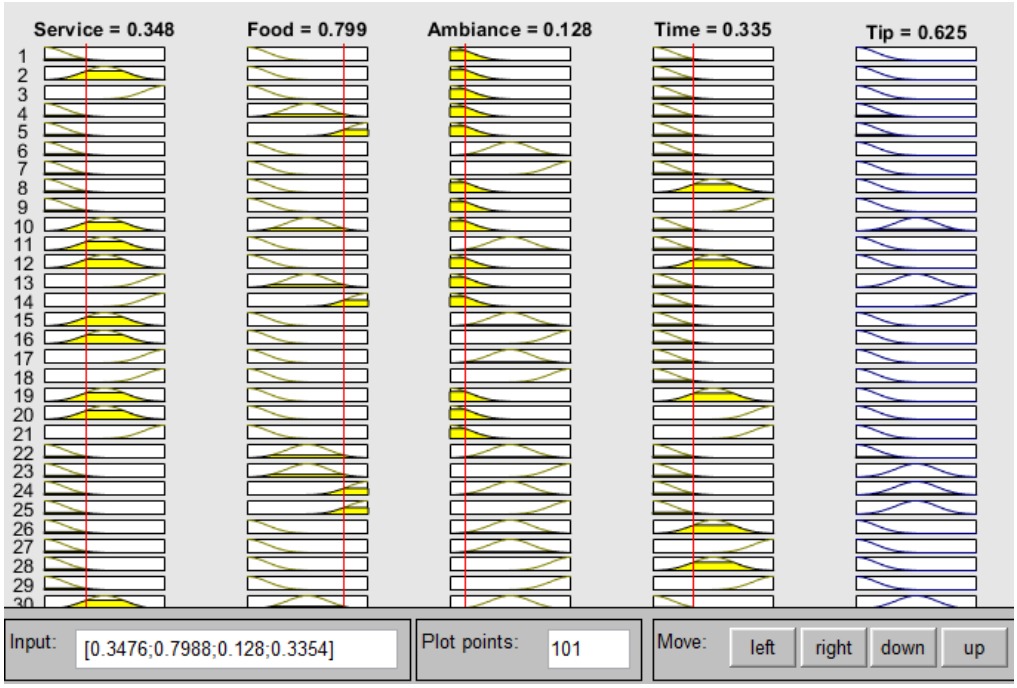


I determined the type of membership functions as Gaussian distribution. So, the inputs and the output membership functions are seen in this form. The input variables that I chose for input parameters are 3. For service, those are poor, good, and superb; for food, those are rubbish, average and elegant; for ambiance, those are ordinary, good, and exclusive and for time, those are slow, average and fast.

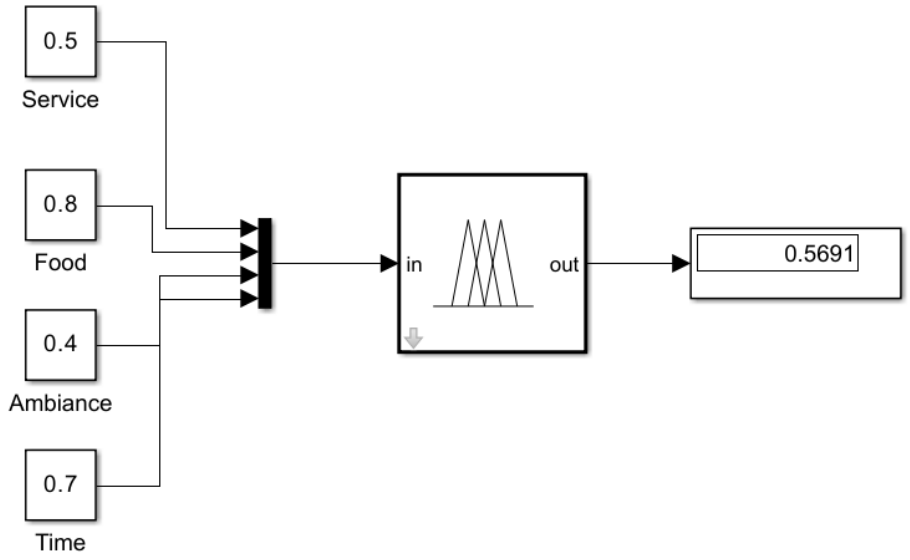
Then, I adjusted the middle block which is “mamdani” in order to add rules in the rule editor. Here is what we can see in the rule editor.



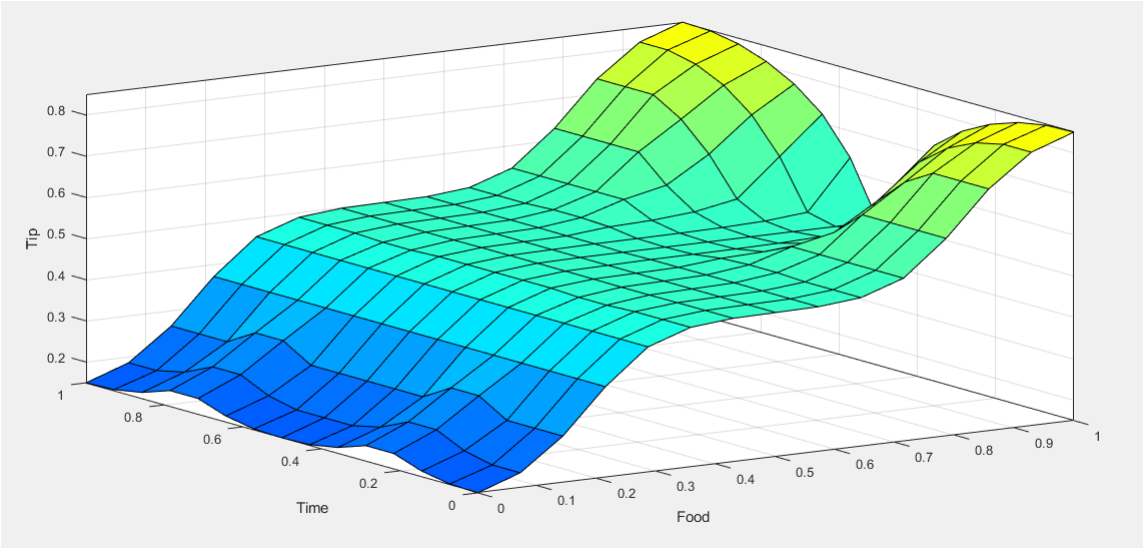
In the rule viewer section, we can adjust the ratios of the features on our wish as you can observe from the figure. Every time when I change the input parameters, the output tip parameter is changing according to our expert knowledge.



For the final duty of this homework, I have built a Simulink model that includes this Fuzzy logic rules. The input parameters are the parameters that we determined earlier which are service, food, ambiance, and time.



Here, we can change the parameters weights as our wish and the output should be the tipping cost based on our expert knowledge.



Here is the surface viewer for the x input parameter as “Food” and y input parameter as “Time”. The output is the tipping cost within 0 and 1.

REFERENCES

- **https://www.youtube.com/watch?v=GQE0mW6WWjU**