Assignment 12

Due on 2023-04-26, 23:59 EST.

1. For a Mamdani fuzzy model with two inputs and one output, the fuzzy rule base is defined as:
   r
   IF x1 IS A1 AND x2 IS B1 THEN y IS C1
   IF x1 IS A2 AND x2 IS B2 THEN y IS C2
   r
   (a) Find the membership values μA1(x1), μB1(x2), and μC1(y), respectively, which one of the following will be the value of y using Mamdani Composition for the consequent membership function to be satisfied?
   (b) Extract the rules from the above fuzzy rule base.

2. For a Fuzzy Sets model described in G.3, if the membership values μA(x) = 0.6 and μB(x) = 0.7, respectively, which one of the following will be the value of y using Max-Product Composition for the consequent membership function to be satisfied?

3. For a Mamdani fuzzy model described in G.1, if the input membership functions are as follows:
   μA(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μB(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μC(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   (a) Find the output membership function for each rule.
   (b) No, the answer is incorrect.
   (c) No, the answer is incorrect.
   (d) Acceptable response!

4. For a Mamdani fuzzy model described in G.3, which one of the following will be the value of y using Max-Min Composition for the consequent membership function to be satisfied?

5. For a Mamdani fuzzy model described in G.1, if the input membership functions are as follows:
   μA(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μB(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μC(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   (a) Find the output membership function for each rule.
   (b) No, the answer is incorrect.
   (c) No, the answer is incorrect.
   (d) Acceptable response!

6. The Mamdani fuzzy model described in G.3, which one of the following will be the value of y using Max-Min Composition for the consequent membership function to be satisfied?

7. For a Mamdani fuzzy model described in G.3, if the input membership functions are as follows:
   μA(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μB(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μC(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   (a) Find the output membership function for each rule.
   (b) No, the answer is incorrect.
   (c) No, the answer is incorrect.
   (d) Acceptable response!

8. For a Mamdani fuzzy model described in G.3, if the input membership functions are as follows:
   μA(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μB(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μC(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   (a) Find the output membership function for each rule.
   (b) No, the answer is incorrect.
   (c) No, the answer is incorrect.
   (d) Acceptable response!

9. For a Mamdani fuzzy model described in G.3, if the input membership functions are as follows:
   μA(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μB(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   μC(x) = \begin{cases} 
   0 & \text{if } x < 0 \\
   1 - x & \text{if } 0 \leq x \leq 1 \\
   0 & \text{if } x > 1 
   \end{cases}
   (a) Find the output membership function for each rule.
   (b) No, the answer is incorrect.
   (c) No, the answer is incorrect.
   (d) Acceptable response!