

The LNM Institute of Information Technology

Soft Computing

Project

Last Date of Submission: - 20/04/2025

Problem 1: Design a fuzzy logic controller using Mamdani's approach to determine the wash time of domestic washing machine, assume that inputs are dirt and grease on clothes. Use 5 descriptor for dirt (i.e., VSD, SD, MD, HD, VHD) and 3 descriptor for grease (i.e., SG, MG, HG) and 5 descriptors for output variable of wash time (i.e., VST, ST, MT, HT, VHT). Use triangular membership functions for fuzzy classes and CoG method for defuzzification operations. The set of rules for fuzzy logic tables are given below.

	<i>SG</i>	<i>MG</i>	<i>HG</i>
<i>VSD</i>	VST	VST	ST
<i>SD</i>	VST	ST	MT
<i>MD</i>	ST	MT	HT
<i>HD</i>	MT	HT	VHT
<i>VHD</i>	HT	VHT	VHT

The input grease is given in the scale of 0 to 50, whereas dirt is in the scale 0 to 100. Output should be in the range 0 to 60 min. Write a program to find the wash time in minutes for any value of grease and dirt within the range.

Problem2: Solve the travelling salesman problem using GA. The number of cities is 15. The weight matrix will be given as input, and it represents the distance of each city. After 20 iterations you will stop the algorithm. The number of chromosomes is 15. Output is the sequence of cities to travel by the salesman (best solution given by GA). You may consider elitism principle and roulette-wheel based selection procedure. You can go for one point crossover and crossover points will randomly selected. Take extra care so that each city will represent once in the solution.

Implement in Python or in Matlab or any other languages.

You must submit a zip file containing all the programs and a report (pdf file) containing all the details of the corresponding methods and detailed (if applicable stepwise) results. The report should be submitted by April 20, 2025 (11.59pm) through Moodle

You should form a team of 3 to 4 members for this project. (No other team size will be considered)