Home Assignment - 1

Submit soft copy at *https://hello.iitk.ac.in/course/me698asem12324*

Due on or before: 16.08.2023

Samples of solid rocket propellants will be used if their shear strengths are adequate. Shear strength is found to be a function of propellant age and storage temperature. The propellants are accepted or rejected, based on shear strength measurements, as shown below.

Test	Propellant age (Weeks)	Storage temperature (°C)	Pass/fail for application
1	15.5	40	fail
2	23.75	23.25	fail
3	8	17	pass
4	17	21	fail
5	5.5	10	pass
6	19	12	pass
7	24	20	fail
8	2.5	12	pass
9	7.5	15	pass
10	11	26	fail

Write a computer program (preferably in python) to compute and plot a pass/fail decision boundary using kNN with k = 5. Write the solution algorithm and discuss the possible validation procedure. Put your code, plot, and the written document (maybe scanned) in a folder; zip the folder and submit in Mookit.

Extra Credit (20%): Conduct a leave one out cross-validation (LOOCV), plot the validation result, and find the optimum value of K. LOOCV is a special case of K-fold cross validation with $K=1/n$, for n training data.