ME 228 - S1 - Assignment 4

Department of Mechanical Engineering, IIT Bombay
Spring 2024
Due Date: 5:00 PM, Mon, Mar 11, 2024, Marks 20

Assignment Date: 11:30 AM, Monday, Mar 11, 2024

Objective and Instructions

1. The objective is to use the notebooks for Decision Tree and Random Forest Models and perform analysis.

2. Upto 50 % points can be deducted if the plots are not neat and are not properly labeled.

3. This needs to be performed using Google Colab Notebook or Jupyter Notebook only.

4. Total 2 files should be uploaded - Python notebook, Python Notebook PDF. Do not submit a zip file.

5. You are *welcome and are encouraged to discuss* with the students of this class.

[**4 points**] Make sure to normalize the data that you are using for the following models.

Q 1. [**8 points**] Perform the following analyses using decision tree notebook that is shared on Moodle:

    (a) Make a decision tree model for electronegativity vs. thermal conductivity. Determine R^2.

    (b) Make a decision tree model for atomic radius vs. thermal conductivity. Determine R^2.

    (c) Make a decision tree model for density vs. thermal conductivity. Determine R^2.

    (d) Make a combined decision tree model for electronegativity, atomic radius, density vs. thermal conductivity. Determine R^2.

    (e) Make a parity plot showing predicted values vs. true values for all the above models (1) - (4). Each graph should have a unique color and a legend should clearly mention a short label for the corresponding graph. The legend should also show the R^2 values of each.

Q 2. [**8 points**] Repeat the above analyses using Random Forest Model using the notebook for Random Forest Model that is shared on Moodle.

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