

CEG5103/EE5024 Assignment

Anomaly Detection and Prediction

Google Colab notebook

Follow the instructions in the Google Colab skeleton file.

Each student and group member should implement a failure classification or prediction method and evaluate its performance in a similar manner to that shown in the skeleton file for k Nearest Neighbours.

Write the code to Implement the method and generate the diagnostic data graph and performance results in the Colab notebook.

Note: One of the proposed classification methods to be studied by one member in the group should be the Maximum Likelihood Gaussian Classifier that was covered in Lecture 2. *Hint:* use Numpy. If there is a person in the group who has not yet implemented any method yet, he/she should study and implement the Maximum Likelihood Gaussian Classifier method. If all group members have already started writing the code for proposed classification methods other than the Maximum Likelihood Gaussian Classifier, then the group does not need to explore the Maximum Likelihood Gaussian Classifier method.

Tabulate the 6 classification metrics (Accuracy, GMean, Recall, Specificity, Precision and F-score) in the form of a number between 0 and 1, with 3 decimal points, for all the failure prediction methods studied by the group.

Report

The top of the first page should have the group number and the names and student (matriculation) numbers of all group members.

Use 11 point font.

Page limit: $2 \times (\text{no. of group members}) + 3$ (excluding References)

Each student (indicate name and student no.) should:

1. With the aid of a diagram(s), explain in 1 page the concept and operational principles of the method being studied, and its parameter settings. Cite relevant papers in the References section at the end of the report. (1 page)
2. Comment on the performance of the method for the anomaly detection and prediction task and its computational complexity. (max 1 page)

The entire group should:

1. Explain the choice of the window size and step size for the sliding mean. (0.5 page)
2. Tabulate the 6 classification metrics (Accuracy, GMean, Recall, Specificity, Precision and F-score) in the form of a number between 0 and 1, with 3 decimal points, for all the failure prediction methods studied by the group. (copy from Colab notebook) (0.5 page)
3. Compare the performance of the different failure classification or prediction methods for the anomaly detection and prediction task. (0.5 page)
4. Explain why certain methods work well and others not so well. (1 to 1.5 pages)

Submission Instructions

Deadline: 6.00pm on Friday 14 April 2023

Based on your Group no., share the Google Colab notebook with code and results with CK Tham at cktham3@gmail.com and the GA indicated below:

Group	Advising GA	Group	Advising GA
1	Yan Ge E-mail: geyan@u.nus.edu Google account: dududududulu@gmail.com	2	Yuan Xun E-mail: e0919068@u.nus.edu Google account: yx985308385@gmail.com
3		4	
5		6	

Do not make further changes to the Colab notebook after submission.

The file name of the report should be **CEG5103-EE5024-Groupxx_Report.pdf** (where xx is your group no, e.g. 01 to 05). Use the upload link in **UPLOAD LINK.txt** in the **Canvas-Files-Part 2-Assignment** folder.