BIM3008 2022 Term 1

Assignment #1

Deadline: 2022/10/9, 23:59
(This is a strict deadline. Submissions are not acceptable after the deadline)
Percentage: 8%

Purpose: to enhance the learning outcomes for the topics in "Basic concept of machine learning, model evaluation, naïve Bayes, and supervised learning"

Please give brief descriptions or answers to the following exercises in the Text Book, entitled "Introduction to Machine Learning, third edition"

Reading and Exercises of Chapter TWO (Problem 3, 7, and 11); Chapter THREE (Problem 2, 3, 4, and 11)

1. Please conduct a literature survey on the experimental principles and the performance of the Nucleic Acids Test or Antigen Test for COVID-19 SARS-CoV-2 infections. Briefly describe the principles and the predictive model performance using some measures, including precision, sensitivity, and specificity.
2. Answers to Chapter ONE (Problem 4)
3. Answers to Chapter THREE (Problem 6 and 11);
4. In a two-class, two-action problem, if the lost function is $\lambda_{11}=\lambda_{22}=0$, $\lambda_{12}=8$, and $\lambda_{21}=4$, write the optimal decision rule. How does the rule change if we add a third action of reject with $\lambda=1$?
5. Provide three examples of machine learning applications to biological or biomedical data sets. Citations and brief descriptions of the references are required in the report.

Data plotting can be implemented by R, Matlab, other tools or just hand drawing.

Assessment criteria: Correctness of the answers (100%)