اونيۏرسيتي مليسيا فهڠ السلطان عبد الله
UNIVERSITI MALAYSIA PAHANG
AL-SULTAN ABDULLAH

Statistical Modelling & Simulation (BSD3443)

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Synopsis :

The course focuses on methods to model and analyse a variety of random phenomena. The analysis will in practice often be done by simulation, but also the theoretical analysis is important. Students shall be able to implement statistical models on a computer, generate, interpret, and present results. Topics that are appropriate to address: the general statistical model building, assessing the goodness of the model, estimation of distribution and parameters of the model and assess the uncertainty of estimates, bootstrap, number generators, variance reduction techniques, modelling and simulation of dependencies. The R statistical package will be used throughout the course.

Course Learning Outcomes (CLO)

1. CLO1 Apply various approaches and knowledge of statistical modelling. (C3, PLO1)

2. CLO2 Formulate statistical models for various problems in science, engineering, and industry. (C5, PLO2)

3. CLO3 Manipulate statistical modelling theory and methodology in solving various applications using appropriate statistical software. (P4, PLO3)

4. CLO4 Demonstrate good interest and initiative for exploring issues in statistical modelling analysis for a given task. (A3, PLO7)

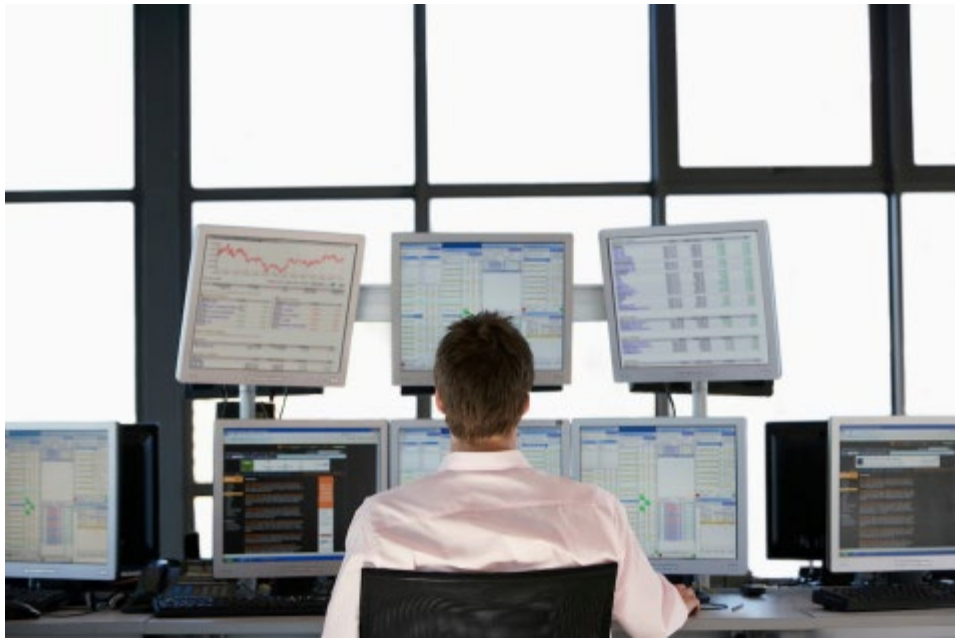
5. CLO5 Plan a business strategy by generating new ideas and innovation in the application of statistical modelling and simulation. (A3, PLO8)

LEARNING METHODS

- Online Lecture & Assessment
- Independent Study
- Assignment
- Face to Face (Final Exam, Lab & Consultation)

ASSESSMENT

Item	Percentage (%)
Group Assignment	10
Lab Report (4)	20
Test	15
Lab Test	15
Final Exam	40
Total	**100**

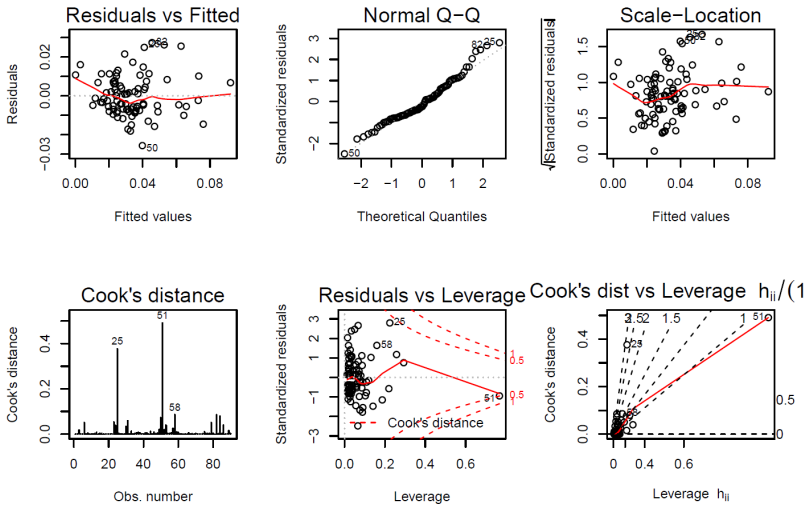


REFERENCES

1. Dobson, A.J. & Barnett, A., (2018). An Introduction to Generalized Linear Models, Fourth Edition. Chapman & Hall/CRC Texts in Statistical Science. (Latest edition) (Main reference)
2. Gelman, Andrew, and Jennifer Hill. (2006). Data analysis using regression and multilevel/hierarchical models. Cambridge university press. (Latest Edition)
3. Wood, Simon N. (2017). Generalized additive models: an introduction with R. Chapman and Hall/CRC.
4. Faraway, Julian J. (2014). Linear models with R. CRC press. (Latest Edition)
5. Miller, Thomas W. (2014). Modeling techniques in predictive analytics: business problems and solutions with R. Pearson Education. (Latest Edition)
6. Davison, A.C. (2008). Statistical Models. (Latest Edition)

Chapters

- Chapter 1: Introduction to Statistical Modelling
- Chapter 2: Generalised Linear Model (GLM)
- Chapter 3: Logistic Regression Model
- Chapter 4: Beyond the GLM
- Chapter 5: Process in Statistical Modelling
- Chapter 6: Synthetic Data Generation



Industrial Visit/Lecture from Industry

- Date : 25/12/2023 – 29/12/2023
- Time : One Day
- Company : TBI

General Example – Group Project

DEVELOPMENT OF PREDICTIVE HEART RISK SCORE

$$NLHRS = w_1(f_1) + w_2(f_2) + \ldots + w_{13}(f_{13})$$

$$P(CVDs = 1) = 1/1+e^{-(zi)}$$

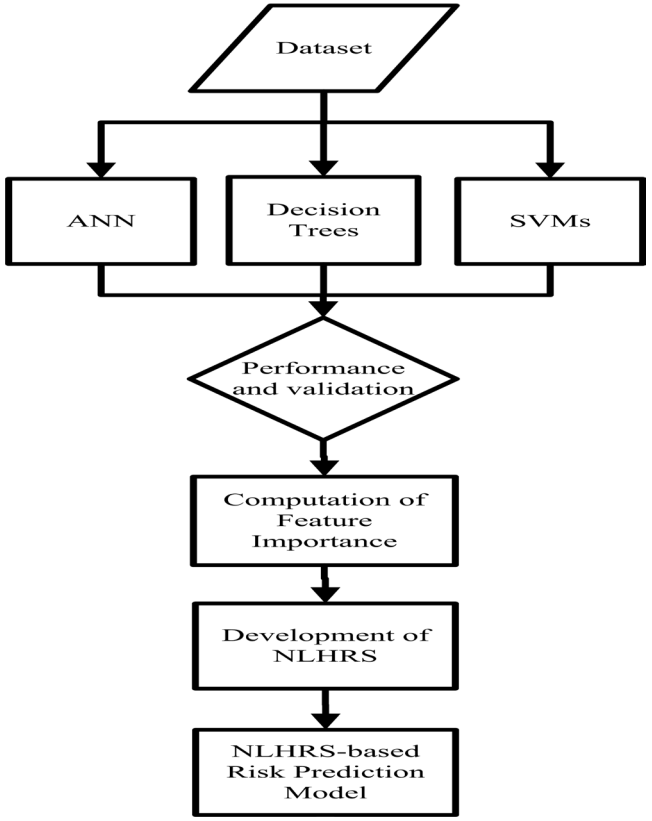
$$Zi = -6.131+0.415(Male)+0.174(NLHRS)$$

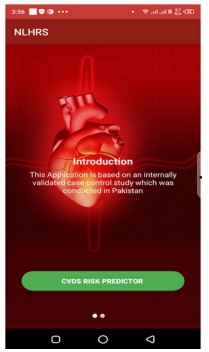
$$Zi = -6.131+0(Female)+0.174(NLHRS)$$

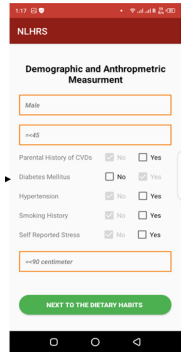
$$P(CVDs = 1) = 1/1+e\text{^}(-(-3.152)$$

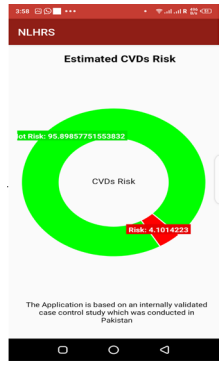
$$P(CVDs=1) = 0.041$$

$$\%\ of\ Risk\ of\ CVDs = 0.041*100 = 4.10\%$$










Thank You!