SAYT1016 Unlocking the Secrets of Randomness: from Paradoxes
to Sport Predictive Modeling to Algorithmic Trading
解開未知的秘密：由悖論到運動預測模型到算法交易

Introduction:
Uncertainty exists in many real-life problems, ranging from stock returns to sport results to medication effects to election outcomes. Statistics offers methods to handle uncertainty with a higher precision. Improving a decision with 50-50 certainty to 60-40 certainty makes a huge difference in many practically problems. This course introduces ways to (i) define, (ii) model and (iii) forecast uncertainty through real-life examples and counterintuitive phenomena. Topics include (i) birthday paradox, Simpson's paradox; (ii) linear regression model, auto-regressive regression model, logistic regression model, non-parametric regression model; and (iii) historical simulation, and k-mean clustering.

不確定性存在於許多現實生活中的問題，例子涵蓋股票回報、運動結果、藥物效果、選舉結果等。統計科學提供了具更高準定性的方法，以處理不確定性的問題。在許多實際問題中，將 50-50 的不確定性提高至 60-40，可令數據分析變得更精確。本課程以實際示例和違反直覺的現象引導，來 (i) 定義、(ii) 模型和 (iii) 預測不確定性。主題包括 (i)生日悖論，辛普森悖論；(ii) 線性迴歸模型，自迴歸模型，邏輯迴歸模型，非參數迴歸模型；(iii) 歷史模擬法，k 平均演算法。

Medium of Instruction: Cantonese supplemented with English

Organising Unit:
Department of Statistics, CUHK

Teacher:
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Course Content:

Date / Time	Topic
26 July 2021 (Monday) 9:30am – 12:30pm 2:30pm – 5:30pm	**Basic statistics and statistical paradoxes**
27 July 2021 (Tuesday) 9:30am – 12:30pm 2:30pm – 5:30pm	**R-programming and historical simulation**
28 July 2021 (Wednesday) 9:30am – 12:30pm 2:30pm – 5:30pm	**Simple linear regression model and multiple linear regression model**
29 July 2021 (Thursday) 9:30am – 12:30pm 2:30pm – 5:30pm	**Autoregressive model and Logistic regression model**
30 July 2021 (Friday) 9:30am – 12:30pm 2:30pm – 5:30pm	**Nonparametric regression model and k-mean clustering**
2 August 2021* (Monday) 9:30am – 12:30pm 2:30pm – 5:30pm	**Make-up class**

Duration	5 whole day sessions (total 30 contact hours)
Date	26 – 30 July 2021 2 August 2021* (make-up class)
Time	9:30am – 12:30pm, 2:30pm – 5:30pm
Teaching Mode#	Face to Face (The Chinese University of Hong Kong)
Enrollment	50
Expected applicants	Students who are promoting to S4-S5 with good knowledge in mathematics and with strong interest in solving real problems
Tuition Fee	HKD 3,900.00 (Students who have attended all sessions will be granted a HKD 1,000 scholarship)
Credit	1 University Unit Certificates or letters of completion will be awarded to students who attain at least 75% attendance.

* This date is reserved for make-up classes in case there is any cancellation of classes due to unexpected circumstances.

This course is offered face-to-face lessons at CUHK campus. It may switch to online teaching in accordance with the pandemic development and the policy of the university.