NISOM 3330 – Data Visualization and Visual Analytics
(2024-25 Fall Term)

General Information

- 1 Credit (Pass or Fail Grades)

- Teaching Mode: Face-to-Face

- Lecture + Lab (L1): 8 classes in total
    - Tue   3:00pm – 4:20pm   LSK-G021
    - Thu   3:00pm – 4:20pm   LSK-G021

- Instructor: Prof. Jean WANG <jeanwang@ust.hk>   Rm: LSK 5050A (office hour by appointment)

- TA: Miss Anson WAN <imanson@ust.hk>   Rm: LSK 4065 (office hour by appointment)

Course Description

A clear and concise communication of results is essential to a successful business analytics endeavor. In the context of business communication, data visualization could help deliver analytics results or tell stories by curating data into a representation easy to understand and navigate, with the valuable information and insights explicitly highlighted. Furthermore, interactive visualization could also be combined with automated analysis to provide business decision makers an effective way to explore a large data set, make interpretation, drill down to uncover hidden patterns and deeper insights, so as to leverage their domain knowledge to guide the data analytics process.

This course is intended to train students to understand and learn the human-centered approach in designing static or interactive visual presentation materials. Students will learn basic design principles to produce their own visual stories that address the business need of reporting and performance monitoring. Students will also be introduced with basic visual analytics techniques that integrate with machine learning models to reveal insights from large datasets. By completing the weekly hands-on exercises, students will also gain some practical experience of using modern Business Intelligence tools for data visualization and visual analytics.

Course Intended Learning Outcomes
- Understand the impact of data visualization for business decision making and strategic planning
- Identify the design principles in data visualization
- Recognize the applicability of different types of visual elements in various application scenarios
- Apply exploratory and explanatory data analysis to real business data sets and provide meaningful interpretation by relevant and effective visualization

Assessments and Weighting

- **Attendance and Class Participation (10%)**
  Students are required to attend all lectures and are strongly encouraged to interact with the instructor and peers during the lectures.

- **Lab Submission (40%):** 4 submissions in total
  These are individual continuous assessments. Each week, students are given real-world business data sets and a series of instructions. They are required to follow the instructions to complete some data visualization tasks, which utilize visual elements to provide an accessible way to see and understand trends, outliers, and patterns. After finishing, students need to demonstrate in class or submit the design to present the visualization/analytics results.

- **Group Projects (50%):** end of semester
  Students will work in a group of 2 to 3 to create an interactive dashboard that explores a real business data set in depth and derives meaningful insights. The groups also need to submit a slide deck to present the business scenario, a description of the data set in use, the needs of the intended audience, the

intended outcomes of such data visualization, and the applied visual analytics techniques. The assessment criteria are based on business values, the dashboard design, and the type of analytics used. Each group should also include a workload distribution table in the slides indicating the contribution of each member in %.

The project submission deadline is Nov 10 (Week 11 Sunday) 11:59pm.

Teaching Schedule (tentative)

WK	Lecture Topic	Lab Exercise
1	*[Sep 3, 5]* - Course Overview - Data Visualization: What, Why and When - Data Visualization: Input, Output and Tools - Tableau Overview	Lab1 – Basic Chart Types in Tableau Exercise 1– Employee Retention
2	*[Sep 10, 12]* - Effectiveness of Data Visualization - Visual Encoding: Marks and Channels - Use of Color in Visualization - Tableau Marks and Colors	Lab2 – Advanced Chart Types in Tableau Exercise 2 – Airbnb Listing
3	*[Sep 17, 19]* - Dashboards and Examples - Dashboard Design Principles - Choosing the Right Chart Type - Tableau Dashboards	Lab3 – Dashboards in Tableau Exercise 3 – Shared Bike Rentals
4	*[Sep 24, 26]* - Visual Analytics: What and When - Visual Analytics for Data Exploration - Visual Analytics for Model Building and Understanding - Visual Analytics Techniques in Tableau	Lab4 – Visual Analytics in Tableau Exercise 4 – Flight Delay
	Project Consultation (by appointment)	

Books & References

- Visualization Analysis & Design
  Authors: Tamara Munzner and Eamonn Maguire (Iiiustrator)
  Publisher: A K Peters/CRC Press
  Release Date: 2014
  ISBN: 978-1-4665-0891-0

- Fundamentals of Data Visualization
  Author: Claus O. Wilke
  Publisher: O'Reilly Media
  Release Date: 2019
  ISBN: 978-1-4920-3108-6

- The Big Book of Dashboards: Visualizing Your Data Using Real-World Business Scenarios
  Authors: Steve Wexler, Jeffrey Shaffer, Andy Cotgreave
  Publisher: Wiley
  Release Date: 2017
  ISBN: 978-1-1192-8308-9

- Tableau - Data Visualization Beginner's Guide: a Definition, Examples, and Learning Resources
  https://www.tableau.com/learn/articles/data-visualization