MNO4716 USING R FOR HR ANALYTICS AND MACHINE LEARNING

AY2022/2023 Semester 1

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MODULE DESCRIPTION

Companies have recognized the benefits of applying HR analytics and machine learning in recruitment, performance and retention. Human resource (HR) functions are increasingly adopting AI and machine learning as tools to solve many problems such as talent management and organizational design. Yet, research revealed that there is a lack of readiness to adopt HR analytics and machine learning due to deficiency in computing skills. This course will introduce the use of R to help HR professionals implement HR analytics and machine learning solutions.

This module introduces students to the key concepts in human resource (HR) analytics and machine learning. The module also introduces R programming for data analytics in HR and performing basic machine learning analysis. The course will increase managers' readiness to utilize HR analytics and AI in talent management, organizational design and other business applications.

LEARNING OUTCOMES

By the end of this module you should be able to understand:

- What is the importance of analytics in HR functions?
- How do HR professionals use R for HR analytics?
- What is machine learning in HR analytics?
- What are the key ways that machine learning advances HR analytics?
- How can HR processes benefit from HR analytics and machine learning?
- What is the future of work and how should HR be preparing for it?

TOPICS

- Understanding of HR analytics and machine learning and barriers to adoption
- HR use cases for analytics and machine learning
- Using R for HR analytics and machine learning
- Implementing Supervised Learning
- Implementing Unsupervised Learning
- Privacy and Ethics Issues in using AI in HR

READINGS

Recommended Textbook

Daugherty, P. R., & Wilson, H. J. (2018). Human+ machine: Reimagining work in the age of AI. Harvard Business Press. (DW hereafter)

Supplementary Material

Jamsa, Kris. (2020). Introduction to Data Mining and Analytics. Burlington: Jones & Bartlett Learning, LLC (JK hereafter).

Caughline, David. (2022). R for HR: An introduction to Human Resource Analytics Using R. Accessible at <https://rforhr.com/>

Additional reading materials will be provided through the online NUS library portal or through LUMINUS. Slides will be posted after class.

PRECLUSION

NIL

PREREQUISITE

Please bring a laptop to class for using R and/or programming languages. The instructor will provide guidelines for installation and teach programming techniques.

ASSESSMENTS

Component	Weightage
Class Participation (individual)	30%
Quiz (individual)	20%
Case Analysis (group)	20%
Final Project & Presentation (group)	30%
Total	**100%**

This course requires students to participate actively in class. You are expected to attend each class session prepared. It is designed so that the work-load is commensurate with the scheduling and is completed with the last class. Please advise the instructor in advance of any absence. Throughout the semester, you will work with two other students (3-person groups) to complete group assignments—the Case Analysis, Final Project, and Presentation. You are also encouraged to work outside of the classroom as a group to discuss programming and other issues. You can form your

own workgroup and send in your group information no later than August 9, 2022, noon (12:00pm). The instructor will finalize the groups and may allow one to two 4-person groups according to the final roster.

Class Participation (30%) The goal of class participation is that we should all learn from one another. As a consequence, the instructor expects active participation from everyone and will grade accordingly. Being able to raise thoughtful questions, share insights from thinking, and build on others knowledge and opinions will be major components of the participation grade.

Quiz (20%) There will be two quizzes in total. Each quiz will include multiple choice questions and/or short answers and will be around 20 minutes in length. The quizzes focus on technical readings and slides but may include questions based on the textbook.

Group Case Analysis (20%) Your group will complete and submit (as a group) an analysis on the use of AI in a company. The length of this analysis is expected to be between 800 – 1200 words. Additional guidelines will be provided in class.

Group Final Project & Presentation (30%) You will receive a dataset based on a company's real situations in the duration of the semester, and as a group, conduct machine learning to provide answers for the issues they are facing. Your group will prepare a 10- to 15-minute presentation during the last two sessions of the course to share your findings and solutions, as well as addressing questions raised from your peers. Apart from the presentation, your group will submit a report on your discovery. You should utilize the contents and techniques covered in the whole course. Details of the final project will be elaborated during the course. The goal of the group final project is a first stab at real-world problems to ensure that you have obtained sufficient understanding of people analytics tools for future use for your organizations and being able to effectively communicate with data scientists with whom you will work.

SCHEDULE

Session	Description
1	Technical topic: Installing R and R studio. Conceptual topic: Introduction: HR analytics and Age of AI Reading: What's Our Role in the Age of AI? (DW)
2	Technical topic: Using R for data analytics 1 Reading: Chapter 8 from JK, p.376-399 Conceptual topic: Standardization, automation and adaption Reading: The Self-Aware Factory Floor (DW)
3	Technical topic: Using R for data analytics 2 Reading: Chapters 1 & 12 from JK, p.10-12, p.538-543 Conceptual topic: Augmenting human capabilities Reading: Accounting for Robots (DW)

4	Technical topic: Using R for machine learning 1 Reading: Chapter 2 from JK, p.53-55 Conceptual topic: Improving the R&D process with AI Reading: The Ultimate Innovation Machine (DW)
5	Technical topic: Using R for machine learning 2 Reading: https://www.datacamp.com/community/tutorials/machine-learning-in-r#r Conceptual topic topic: AI embodiment of companies Reading: Say Hello to Your New Front-Office Bots (DW)
6	Technical topic: Supervised learning 1 Reading: Chapters 2 and 11 from JK Conceptual topic: New job roles to extend AI power Reading: Rearing Your Algorithms Right (DW)
Recess Week	
7	Technical topic: Supervised learning 2 Reading: Chapters 2 and 11 from JK Conceptual topic: New types of human-machine relationships Reading: Super Results from Everyday People (DW)
8	Technical topic: Unsupervised learning 1 Reading: Chapters 1, 10 from JK, p.23, 452-460 Conceptual topic: Managerial challenges in AI management Reading: A Leader's Guide to Reimagining Process (DW)
9	Technical topic: Unsupervised learning 2 Reading: Chapters 1, 10 from JK, p.23, 452-460 Conceptual topic: Skills for human-machine collaboration Reading: Extending Human + Machine Collaboration (DW)
10	Technical topics: Deep learning, comparing machine learning models Reading: https://www.rstudio.com/blog/getting-started-with-deep-learning-in-r/ Conceptual topic: Future of AI Reading: Creating Your Future in the Human + Machine Era (DW)
11	Preparation for group project and presentation. Office hours will be held during regular class time. Please make appointments ahead of time.
12	Project Presentations 1
13	Project Presentations 2 Wrap-up: Reflection—How can AI help managers?

ACADEMIC HONESTY & PLAGIARISM

Academic integrity and honesty is essential for the pursuit and acquisition of knowledge. The University and School expect every student to uphold academic integrity & honesty at all times. Academic dishonesty is any misrepresentation with the intent to deceive, or failure to acknowledge the source, or falsification of information, or inaccuracy of statements, or cheating at examinations/tests, or inappropriate use of resources.

Plagiarism is 'the practice of taking someone else's work or ideas and passing them off as one's own' (The New Oxford Dictionary of English). The University and School will not condone plagiarism. Students should adopt this rule - You have the obligation to make clear to the assessor which is your own work, and which is the work of others. Otherwise, your assessor is entitled to assume that everything being presented for assessment is being presented as entirely your own work. This is a minimum standard. In case of any doubts, you should consult your instructor.
Additional guidance is available at:
http://www.nus.edu.sg/registrar/administrative-policies-procedures/acceptance-record#NUSCodeofStudentConduct
http://nus.edu.sg/osa/resources/code-of-student-conduct