COMP 7810 Quantitative Methods for Data Analytics and Artificial Intelligence

Course Instructors: Dr. LAN, Liang

Dr. LIU, Yang

Teaching Assistants:

Mr. HE, Xin

Mr. REN, Jinfu

About Me

Dr. LAN Liang

- Assistant Professor in Department of Computer Science
- Senior Researcher in Lenovo Machine Intelligence Research Center
- Scientist II, I2R, ASTAR, Singapore
- Researcher, Huawei Noah Ark Lab
- Ph.D., Temple University

Contact information

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- Office hours: 2:00pm 4:00pm (Wednesdays) or by appointments



About LIU Yang

Dr. LIU Yang

- Research Assistant Professor in Department of Computer Science
- Postdoc Research Associate from Yale University; PhD from HK PolyU
- Machine learning, decision making, visual content analysis, data analytics, healthcare, brain modeling, ...

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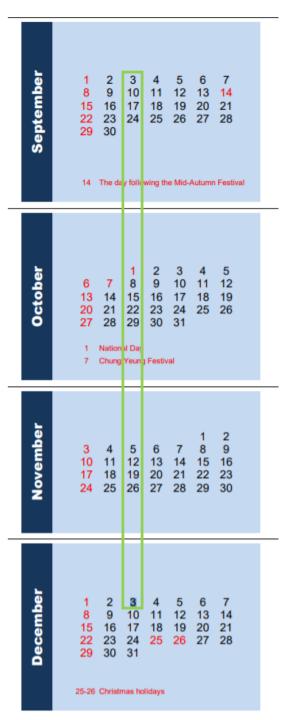
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Outline

- Timetable
- Course Contents
- Learning Outcomes
- Assessment Methods

Timetable

- Time of our classes
 - 13 weeks from Sep 3 to Dec 3
 - Time: 18:30 ~ 21:20 (Tuesdays)
- Classroom of our class
 - Lectures: OEE1017
 - Labs: FSC801C, FSC801D, RRS638



Course Contents

- Part One
 - Instructor: Dr. LAN Liang

- Part Two
 - Instructor: Dr. LIU Yang

Course Contents

Python for Data Analytics

 Introduction to data analytics; Python fundamentals; Python libraries for data analytics: NumPy and Pandas

Linear Algebra

Basic vector and matrix operations; Matrix properties (e.g., trace, rank); Eigenvalues and Eigenvectors;
 Python libraries for linear Algebra

Multivariable Calculus

 Introduction to artificial intelligence and machine learning; Partial derivatives and gradients; Multivariable chain rule; Jacobian and Hessian matrices; Python libraries for multivariable calculus

Probability and Statistics

 Conditional probability and independence; Discrete and continuous random variables; Expectation and variance; Multiple random variables; Descriptive statistics; Parameter estimation and hypothesis testing; Regression Analysis; Python library for probability and statistics

PART1 Class Arrangement

Week	Lecture/ Lab
W1	Introduction to Data Analytics Python Fundamentals
W2	Python libraries for data analytics: NumPy and Pandas
W3	Lab 1: Python basics and Introduction to Pandas
W4	 Linear Algebra Basic vector and matrix operations Matrix properties: trace, range, and determinant
W5	Linear AlgebraEigenvalues and EigenvectorsPrincipal Component AnalysisLinear Regression
W6	Lab 2: Linear Algebra using Numpy
W7	April 18, 2019 Quiz and Revisit Part I of COMP7180

- Both Lectures and Lab Tutorials will be conducted in OEE1017.
- For the week of lab, we will first have 1.5 hour lab tutorial in OEE 1017 and then move to labs (RRS638, FSC801C, FSC801D and FSC901E).

Learning Outcomes

Course Aims:

- To learn the various quantitative methods
- Gain hands-on programming skills necessary for data analytics and artificial intelligence

Knowledge:

- Describe the essential concepts in linear algebra for data analytics and artificial intelligence
- Understand fundamental multivariable calculus for data analytics and artificial intelligence
- Explain the essential concepts in probability and statistics for data analytics and artificial intelligence

Professional Skills (based on Python Programming):

- Apply quantitative methods for data analytics
- Implement quantitative methods via a programming language

Assessment methods

- Continuous Assessment (40%)
 - Lab exercises + Quizzes
- Examination (60%)
 - Final examination
- Import Notices
 - Plagiarism: Students who plagiarized and who were plagiarized will be given zero mark.
 - Final Exam: In order to pass this course, students should attain at least 30% of the final examination mark.
 - A cumulative GPA at least 2.50 for graduation