BC2407 Analytics II
Advanced Predictive Techniques

Session 1

Course Overview

Assessment Components and Rubrics

Team Project Brainstorm

Sit together with your team members in every class

- Randomly assigned by system.
- Check NTULearn class site > Teams
- Ideally 5 students per team, min 4, max 6.
- Team composition might change due to:
  - Add/Drop
  - Some students away on internship until week 2/3/4.

- Bring your laptop with required software installed in every class.

BC2407 Instructors

- Course Coordinator and Instructor:
  - Neumann <u>Chew</u> C. H. | neumann.chew@ntu.edu.sg
    - Office: S3 B2C 104.

- Co-Instructor:
  - Hyeokkoo Eric <u>Kwon</u> | eric.kwon@ntu.edu.sg
    - Office: S3 B2B 71.

BC2407 Materials on NTULearn

- NTULearn Main Site:
  - Standardized Course Materials for all classes.
  - Course announcements for all classes.
  - CBA Homework Question Paper and Dataset(s). [Graded]
- NTULearn Class Site:
  - Each class has a specific class site. Restricted to the class only.
  - For class-specific announcements.
  - Team based activities.
  - All Graded Submissions:
    - Team Assignment (Project Proposal) submission
    - Team Project submission
    - Individual CBA Homework submission

Course Outline and Course Schedule

- Refer to NTULearn > Content for detailed lists.

Course Learning Objectives

At the end of the module, students will be able to:

1. Identify aspects of business problems that cause standard analytics models to become useless or less effective.

2. Apply advanced techniques to overcome or mitigate the weaknesses of standard analytics models.

3. Evaluate performance of the advanced predictive techniques.

4. Explain the workings and results of the advanced predictive techniques in the context of the business problem to client/employer.

5. Propose business solutions/recommendations based on the advanced predictive techniques.

Complete Pre-Class Learning Activities

- Each topic from week 2 onwards has a list of pre-class learning materials.

- Before Class Session:
  - Complete the required readings/videos.
  - Complete as much as you can, the basic exercises.

- During Class Session:
  - Simple Quiz to check understanding and clarify doubts.
  - Discuss Solutions to basic exercises.
  - Get some students to comment/present their work
  - Do more advanced exercises or team activity.

Assessment Components and Rubrics

Assessment Components

	Component	Weightage	Assessment Rubrics	Deadline
C01-1	Class Participation - 2 Reflection Journal Postings (5%) - Q&A / Discussions - Presentation of work (excl. Project)	15% (Indiv)	Critical Thinking	
C01-2	Individual Presentation (Project)	15% (Indiv)	Critical Thinking	During Project Presentation
C02	Assignment (Project Proposal)	10% (Team)	Problem Solving & Decision Making	End of wk 7 Sun 11:30pm
C03	Project	30% (Team)	Written & Oral Communication	End of wk 11 Sun 11:30pm
C04	Computer Based Assessment (CBA) Homework Assignment	30% (Indiv)	Problem Solving & Decision Making	End of wk 10 Sun 11:30pm
	Total	100%		

Note:
- Detailed Assessment Rubrics and Measures are in a PDF file in NTULearn Main site.

Class Participation 15% (Individual)

- Participation and Q&A in class.

- Attendance in class.
    - Marks maybe deducted for absence without valid reason.
    - Team based activities and Q&A are done in class.
        - You cannot participate in these if you are not in class.
    - Attendance will be taken. Headcount will be checked.
    - If you are absent, please email your instructor asap with a photo of your MC or LOA.
    - Submit your MC to your designated admin office* for official record.
    - Inform your teammates if you will be absent.

    *: UPO for most NBS UG modules.

Post at least 2 entries in Reflection Journal in NTULearn Class Site in the semester.

- Tell instructor what is most useful in that topic to you.
- Tell instructor what is difficult/puzzling to you (if any).
- Instructor will check journals twice a week and reply.

Reflection Journal ⊘

If a Blog or Journal can be graded, a grade assigned to an individual member is applied only to that individual. More Help

Create Journal Entry

Journal Instructions ∧

Journal entries are personal spaces for students to reflect on their learning in each session topic and communicate privately with instructor.

Each student can post new journal entry at the end of each class session by answering 3 questions.

Title: Unit X   [note: X refers to the Unit number e.g. 1, 2, 3,....10]

Questions:
1. What is the most useful thing that you learned in this Unit?
2. What do you still find difficult to understand or do (if any)?
3. Write one question about this unit's content that is still puzzling you (if any).

Journal Details ∨

CoB (NBS) Chew Chee Hua, Neumann (0)

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Individual Presentation (15%)

- ## Presentations and Q&A.
    - Project Presentation.
    - Each student must present their slides.
    - In a corner at each and every slide, state the name of the presenting student.

- ## Rubric for Class Participation & Indiv Presentation: Critical Thinking
    - Identifies and summarizes the issue at hand?
    - Identifies and considers key assumptions and the influence of the context on the issue?
    - Identifies and assesses conclusions, implications and consequences?

Assignments 10% (Team Project Proposal)

- Complete the Project Proposal Document Template.

- Submit by end of week 7 in NTULearn Class site > Team.
  - Refer to How do Students submit team assignments and project in NTULearn.PDF
  - Indicate your preference for project presentation wk (12/13/no preference).

- Rubric: Problem Solving & Decision Making
  - How well does your team:
    - Define the Problem
    - Devise Analytics Strategies to Solve the Problem
    - Review Results/Findings & Evaluate Outcomes

Project 30% (Team)

- Refer to proposal requirements document for requirements, guidelines, deliverables and deadline.

- Team presentations scheduled over last 2 weeks.
  - Submission in NTULearn class site > Teams > File Upload.
  - Come to class at your randomly assigned presentation time slot.
  - Each and every student must present their slides (name stated at a corner.)

- Grading Policy based on quality of response.
  - Rubric: Written & Oral Communication.
    - Presents relevant information.
    - Supports main points & substantiate claims with strong evidence.
    - Has a clear message for audience.
    - Maximizes likelihood of audience accepting the message.

Computer Based Assessment 30% (Individual)

- Do-at-home homework assignment.
- You may consult internet resources & textbooks but quote and cite your references, and write all answers in your own words.
- Do not commit academic dishonesty as defined in NTU Academic Integrity policy.
  - Refer to NTU Honour Code and Academic Integrity Policy.PDF
  - You will submit a declaration together with your CBA submission.
  - Inform your class instructor and course coordinator if you know of someone who committed academic dishonesty.
- Rubric: Problem Solving & Decision Making.

Peer Evaluation

- Team Assignment.

- Team Project.

- Peer Evaluation Form to be completed at end of semester.

- Read Peer Evaluation Rubrics.PDF and sample Peer Evaluation form.
  - Include conditions to downgrade team mate marks for team submitted work!

Traits
1. Roles and Responsibility (RR) Behaves professionally by upholding responsibility and assuming accountability for se and others in progressing towards the team's goal.
2. Communication (CM) Identifies appropriate mechanisms to coordinate and correspond with team members.
3. Conflict Resolution (CR) Resolves conflicts using a variety of approaches.
4. Contributions (CT) Contributes positive input for the team; effectively utilizes one's knowledge and expertise.
5. Relationship (RS) Maintains cooperative interaction with other team members regardless of individual /cultural differences and respects diverse perspectives.

The Grading Curve

A+ A A-   D+   D   F
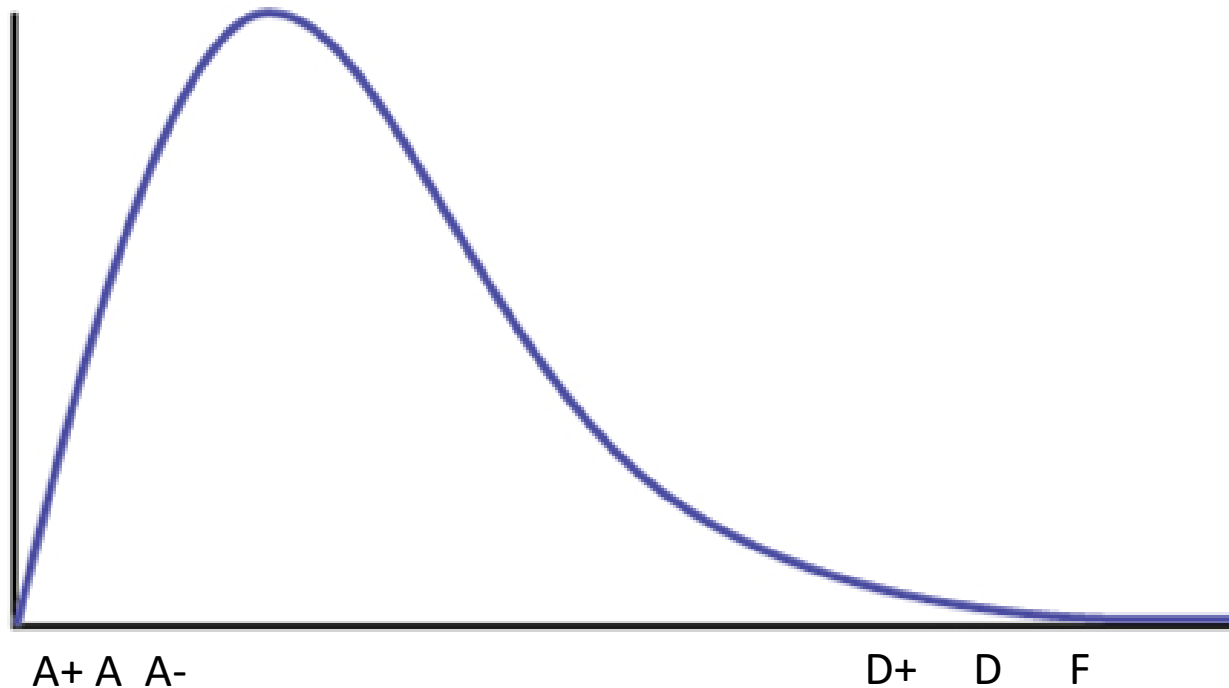
- Hard and Competitive to get A or A+ due to moderation.
- The majority could be B+.

Note: Above image not drawn to scale. Exact distribution is confidential.

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Intention of the Assessment Components

- Class Participation & Individual Presentation
  - To think and express your analysis concisely and clearly to business mgt.
- Assignment (Project Proposal)
  - Project is flexible, open-ended and to be proposed by team.
  - Proposal template word doc provides a framework to plan ahead and consider important issues early.
  - Allows your class instructor to provide feedback about your proposed project during mid-term break.
- Project
  - Work with your assigned team to <u>co-define</u> and achieve <u>a common goal</u>.
  - Team members have different strengths, weakness, interests, motivation. Learn how to work together.
  - Focus on:
    1. What is the business problem/opportunity?
    2. How well did Analytics/ML/AI solve it?
- Computer Based Assessment (Homework in week 10)
  - To test your individual conceptual understanding and ability to analyse and solve a specific problem.

Brainstorm Project Proposal

In-Class Activity

Project: Research and explain a successful/potential application of Analytics/Data Science/Machine Learning/AI

- Research and explain a real world application of Analytics in Business, Government or Social Good.

- Refer to BC2407 Project Requirements and Guidelines.PDF.

- Possible data sources:
  - Kaggle
  - Company, Govt, institutions' websites.

- You may use similar data elsewhere to demo the technique.
  - Submit the dataset or link to dataset.

- You may use any techniques in the permitted techniques list.

- Do not write any cases from the exclusion list (unless approved by instructor).

- You may use Python or/and R. Submit your scripts too.

Example Case 1: Guarantee Interviews with Leap AI
https://leap.ai

- 22 Oct 2016: Headhunters promise better job fits with artificial intelligence. Source: http://www.todayonline.com/business/better-job-matching-ai-and-data-analytics

- 19 May 2017: How AI Is Changing Your Job Hunt. Source: http://fortune.com/2017/05/19/ai-changing-jobs-hiring-recruiting/

- 22 Aug 2017: Leap.ai launches job matching platform after raising $2.4 million. Source: https://venturebeat.com/2017/08/22/leap-ai-launches-job-matching-platform-after-raising-2-4-million/

- 26 Aug 2017: Two ex-Googlers are using AI to guarantee interviews for tech job seekers. Source: https://techcrunch.com/2017/08/26/two-ex-googlers-are-using-leap-ai-guaranteed-job-interviews-tech-companies/

Example Case 2: Forced to Change AI Strategy for Job Search – JobTech
https://jobtech.sg/

- 7 Oct 2017: Find Your Dream Job, Thanks To JobTech. Source: http://www.asiaone.com/corporate-news-media-outreach/find-your-dream-job-thanks-to-jobtech

- 26 Oct 2017: Job-matching website Jobseeker [JobTech] shut down after legal warning. Source: http://www.straitstimes.com/tech/job-matching-website-jobseeker-shut-down-after-legal-warning

- 6 Nov 2017: How AI helps job seekers land their dream job. Source: https://venturebeat.com/2017/11/06/how-ai-helps-job-seekers-land-their-dream-job/

Discussion: Leap AI and Jobtech

- What is the business problem/opportunity?
- What techniques (do you think) were used?
- What other techniques could be useful?

Example Case 3: Analytics-Optimised Scheduling saves $2 million per year at DBS

https://www.dbs.com/newsroom/DBS_awarded_most_innovative_use_of_infocomm_technology

Leverages analytics to reduce ATM out-of-cash occurrences by over 90%

SINGAPORE, 24 November 2014 - DBS has received top honours in the National Infocomm Awards ("NIA") for the "Most Innovative Use of Infocomm Technology (Private Sector – General)".

Discussion: DBS

- What is the business problem/opportunity?

- What techniques (do you think) were used?

- What other techniques could be useful?

FAQ about Project Requirements

- Is it necessary to interview the company or persons involved?

Ans: Good but not necessary. It will be good if they are willing to share via zoom or email Q&A, but it is fine to use publicly available sources. Remember to quote your sources properly.

- Is it necessary to get datasets?

Ans: Highly recommended. You need to show how the Analytics work on a sample dataset. You can use similar datasets from another entity to illustrate the techniques. If you do not have any datasets to demo, it will be very hard to get high marks.

Class Activity: Brainstorm and shortlist a few cases for Project

1. Read websites, news or browse thru the Kaggle for datasets and good applications.

2. Brainstorm with your team mates on potential cases.

3. Shortlist a few cases for further exploration.
   - Each student can research on one application/case of interest and then try to convince all teammates that it is the best case.

4. Start drafting the Project Proposal document.

- In subsequent weeks:
  - Decide on the final case to be used for Project.
  - Update Project Proposal Document (template provided).
  - Submit the Project Proposal by end of wk 7 in NTULearn Class site.
  - If there are major changes after week 7, please inform instructor and submit latest version. Do not delete the previously submitted version on NTULearn.

If you are away on internship…

- Inform instructor and all your teammates on expected date of return to class.
- Check and follow up with your team mates on the Project brainstorm and exploration activities now.
    - Contact them now (Mass email via NTULearn Class Site > Team > Email). Do not wait till you are back in school.
    - What can you do to contribute now even if you are still away on internship?

Summary

- Attendance is important for class participation.

- Assessment components and rubrics.PDF

- BC2407 Course Schedule.PDF includes Submission Deadlines.

- Project Requirements and Guidelines.PDF

- Project Proposal
  - Brainstorm and shortlist a few potential cases to discuss.
  - Project Proposal (template word document provided) to submit by end of week 7.
    - This is the graded assignment (10%).

- Complete Pre-class learning activities before class from week 2 onwards.

Reminder

Please complete the Pre-Class Learning Activities before next class.