IM694
Advanced Business Analytics
FALL 2019

Note that I provide brief guidelines of the course in this preliminary version of syllabus. More detail will be provided at the beginning of the semester. Your kind understanding would be appreciated.

Course Information

Class Schedule	M, W 10:30 – 11:50, Classroom: TBD
Instructor	Cho, Daegon (조대곤)
Office Location	S284
Phone / Email	958-3331/ 010-3129-6442 / daegon.cho@kaist.ac.kr
Web	http://dlab.kaist.ac.kr
Office Hour	Walk-in or by appointment

I have an open door policy for student questions. For quick questions, feel free to contact me; I will do my best to respond quickly (mostly in 24 hours). If you would like to meet in person, do not hesitate to e-mail me to make an appointment.

TA	TBD
Office Hour	TBD
Textbook	There is no required textbook. A coursepack will be available.
Prerequisites	IM503 Statistical Analysis, IM561 Business Analytics

Important Note:
I set two prerequisite courses offered by the IMMBA program in the previous semester, because this course is designed by assuming that students have basic knowledge and understanding of statistics and business analytics. If you have taken equivalent courses before and you are confident of them, you can take this course without prerequisites. At the same time, I assume that IMMBA students had an option to take the course, IM623 Data Mining for Intelligent Marketing and IM685 Programming for Business Analytics, offering in spring and summer semester, respectively. In short, basic concepts of statistics will not be thoroughly covered in this course, and we do not dive deeper into data mining techniques.

Course Overview

Business analytics is a set of data analysis and modeling techniques for understanding business situations and improving decisions under uncertainty.

More importantly, I have realized that value-added and practically-actionable data analyses and executions are truly important through my experiences working with firms for the last couple of years. In fact, this cannot be done without creative ideas. So, as another experiment, I focus more on these aspects in this semester.

As a practice, we will cope with a variety of dataset in a given business context. In most cases, outcomes from the data analyses would not provide meaningful benefits. In other words, our intuitions and heuristic approachs are not so wrong. Thus, it is very important to have a right question that can wisely be solved with the data. In this regard, we will examine how data analysis technologies can be used to improve business problem-solving and decision-making. Plus, we will study real-world examples and cases to place data mining techniques in context, to develop data-analytic thinking and, to illustrate proper applications.

Business analytics is *conventionally* divided into three domains:

- **Descriptive** – what is happening now?

  Descriptive methods involve using data to describe the current or recent past situation for an organization. For example, one might use such methods to ask how profits are distributed across regions, or which baseball player contributed the most to a winning season.

- **Predictive** – what will happen in the future?

  Predictive methods also rely heavily on data, although some modeling approaches are usually involved. Here, the focus is on forecasting future outcomes, normally under the assumption that the driving forces in play in the past will continue into the future.

- **Prescriptive** – what should we do?

  Prescriptive methods answer questions related to what decision makers want to happen in the future. Thus, they are most closely tied to the decision making process. Data plays a role in these methods but modeling is the fundamental tool here.

With the increasing availability of broad and deep sources of information (*Big Data!*), business analytics are becoming a more important capability for any organizations.

In this context, this course is designed to provide students with an opportunity to identify, evaluate, and capture value-creating business analytics. Students will apply analytic methods to practical problems and analyze case studies on organizations that did or did not effectively implement the techniques.

Learning Objectives

- Think critically about data and analyze based on those data
- Learn techniques for gathering, transforming, and cleaning data from disparate sources
- Examine and practice parts of the data science pipeline for the use in business decision making
- Develop predictive models and apply them to the real-world cases
- Understand and apply methods to drive value using business analytics

To achieve these objectives we will use a combination of lectures, hands-on exercises, case studies, class discussions, group task & presentations, and special guest speaker lectures.

Course Topics

Module I: (Advanced) Introduction to BA
— Some thoughts on Big Data
— Data-driven thinking & management
— Differences from Data Science

Module II: **Scanning and Visualizing**
— Understanding customers and problems with data
— Overview of Data Life Cycle
— Data preparations and explanatory data analysis
— Glancing at supervised vs. unsupervised data analysis
— Data visualization (using TABLEAU)
— BA Applications

Module III: **Analyzing**
— Predictive modeling
— Multi-level analysis / Survival analysis
— Lasso/Ridge regression
— Application I: Marketing Analytics
— Application II: People Analytics

Module IV: **Evaluating and Others**
— Randomized experiments in the wild
— Optimizations
— Glancing at text mining and social network analysis
— Analytics in various contexts (media, property, finance, etc.)

Note that the suggested topics are subject to change. If something is unclear, if you have questions, or if you have suggestions for improvements, do not hesitate to contact me.