

BC2406 Analytics I

Unit 1: Analytics Introduction

Based on Chew C. H. (2020) textbook AAD1.

Most of the content (excluding R software) in this unit is also covered in the interactive video hosted in NTULearn Main site > Content

Objectives

- Gain awareness of the abundance of business opportunities/problems that can be “solved” by Analytics.
- Understand how Analytics strategies and applications work, at a high level.
- Learn to focus on the business problem/opportunity, rather than the mathematical/statistical/computing issues.

Analytics

- Analytics is the discovery, interpretation, and communication of meaningful patterns in data (Wikipedia).
- Analytics is defined as the scientific process of transforming **data into insight** for making better decisions (Informs.org).

Analysis vs Analytics

- Analysis

- Looks backwards over time
- A historical view of what has happened
- How many customers responded to a marketing campaign?
- Who are our top customers, last year?

- Analytics

- Looks forward to the future
- Always Data-driven, often model-based, prediction
- What will happen next? What will happen if a trend continues?
- How many customers will respond to a marketing campaign?
- Who will be our top customers, next year?

BC2406 Analytics include Business, Data Science and Machine Learning

Figure: Intersections of Business, Data Science and AI.

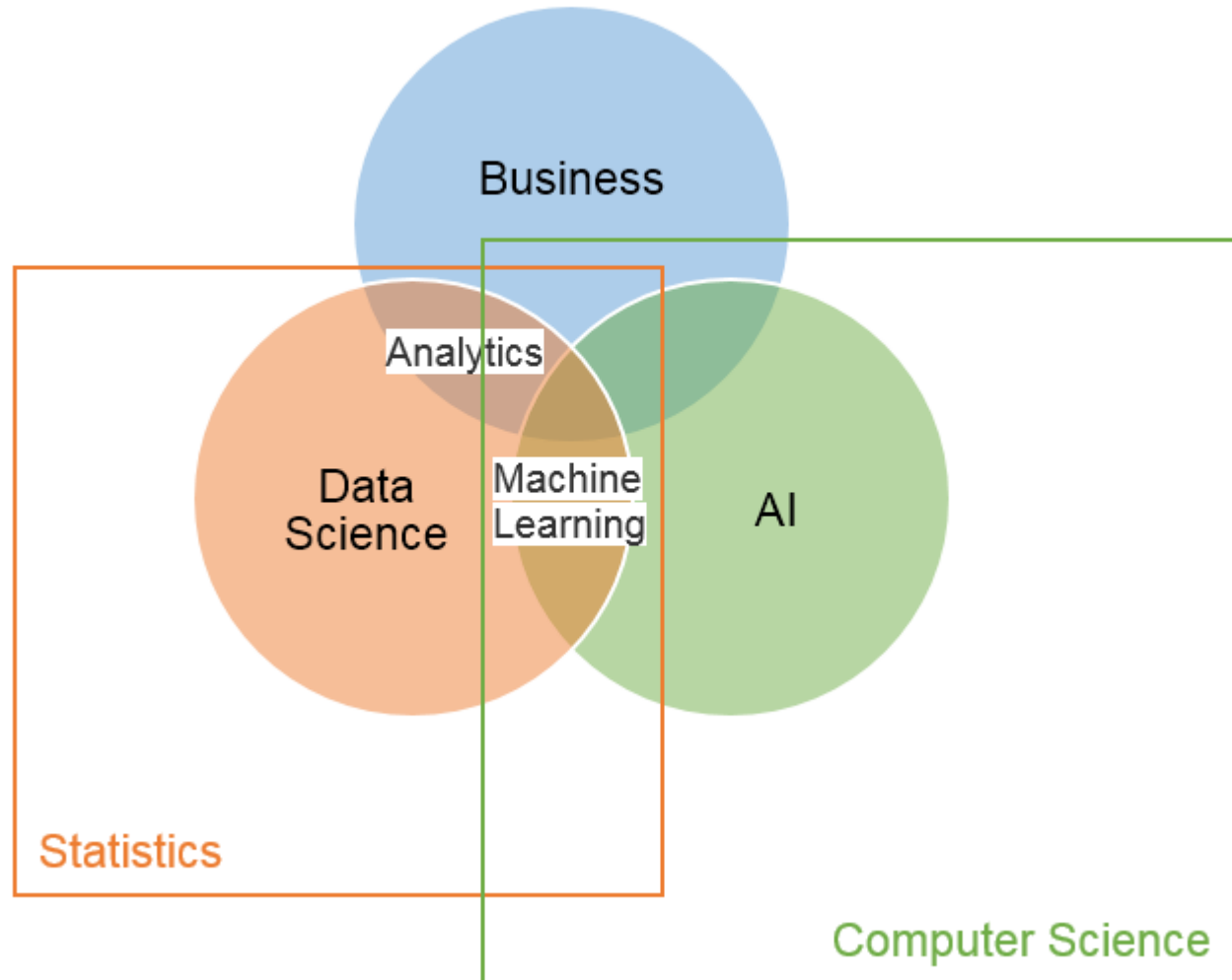


Figure: Organization Collective Intelligence Capability Development Curve

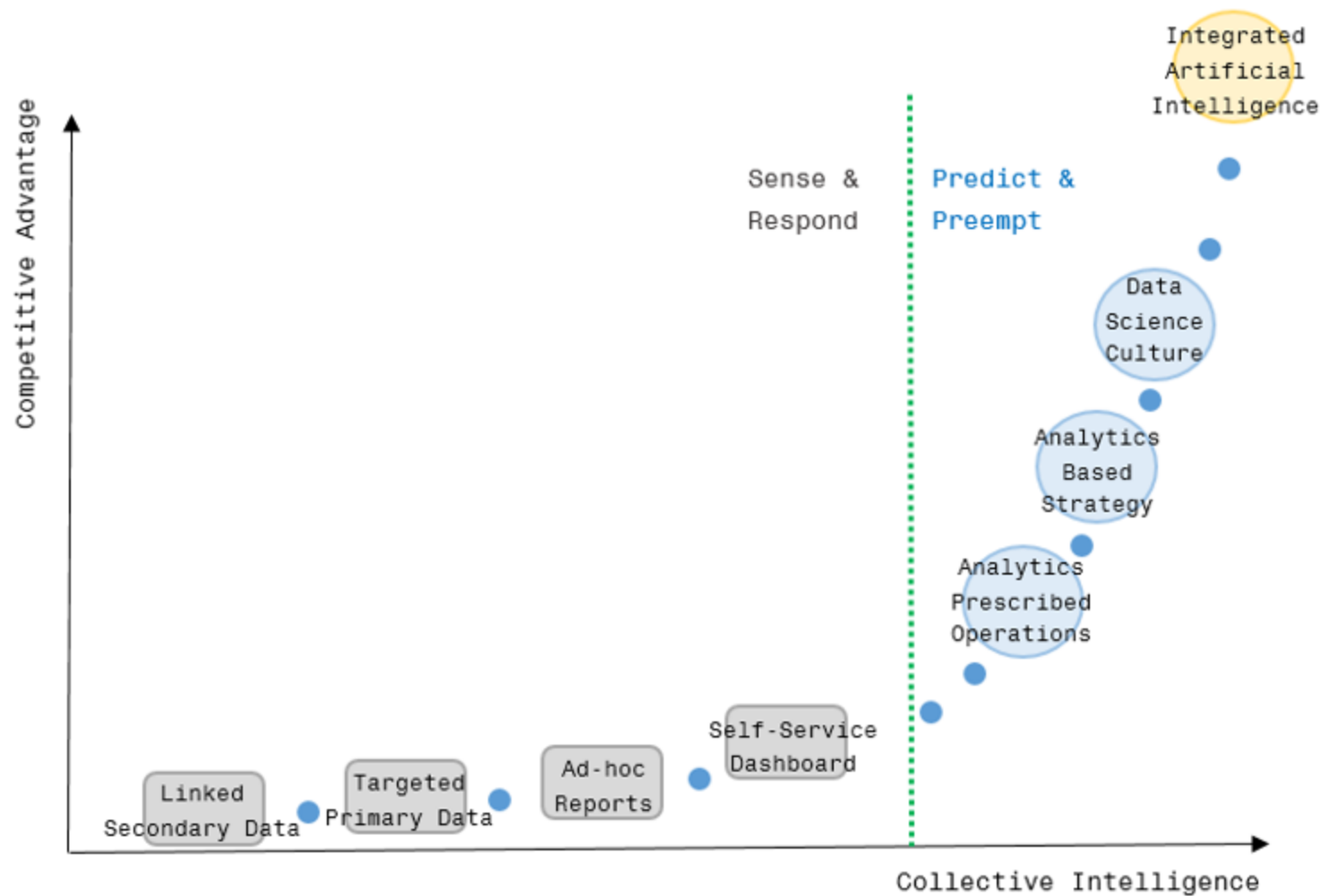
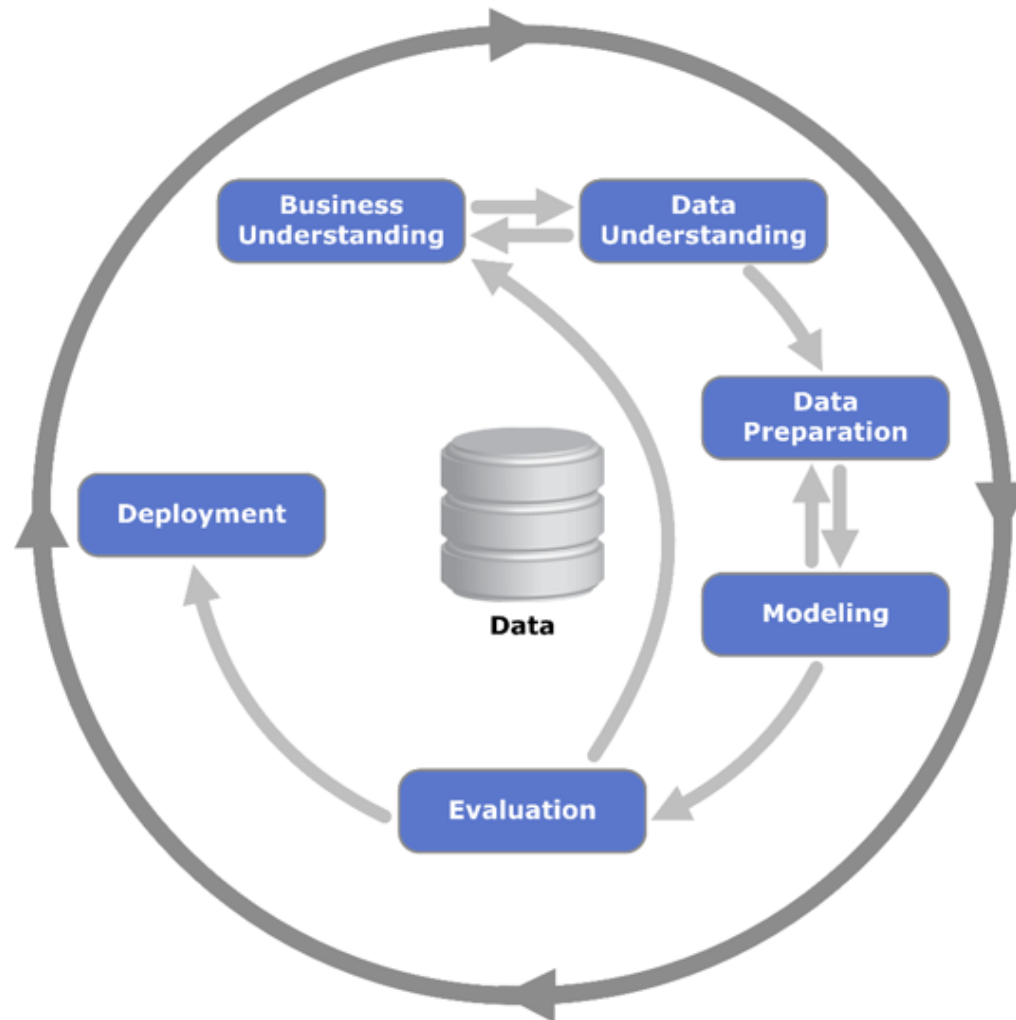


Figure: CRISP-DM Process Diagram.

Source: https://en.wikipedia.org/wiki/Cross-industry_standard_process_for_data_mining



A useful template for doing Analytics in real world.

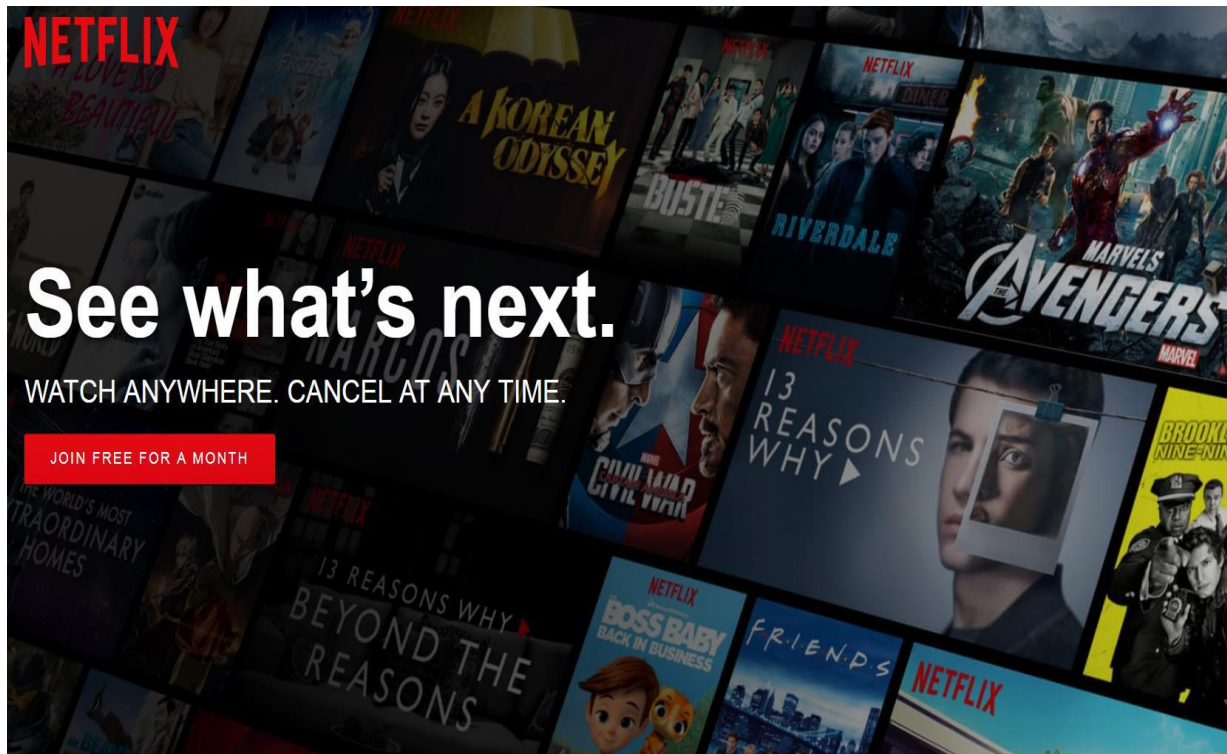
Characteristics of Problems suitable to be solved by Analytics

- Not all problems are suitable
- Characteristics of problems that could be solved successfully by Analytics:
 1. Predictive Need
 2. Imperfect Knowledge
 3. Availability of Training Data

Real Success Stories

Netflix

1. Predictive Need?
2. Imperfect Knowledge?
3. Availability of Training Data?



1998 Revenue: US\$1 million
2017 Revenue: US\$ 12 Billions


Hospital A&E

1. **Predictive Need?**
2. Imperfect Knowledge?
3. Availability of Training Data?

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Life/Death

1. Predictive Need?
2. Imperfect Knowledge?
3. Availability of Training Data?

Cancer Diagnosis and Injury Prognosis



225 Brain Scan Cases for Cancer

Elite Doctors: 66% Accuracy in 30 mins

AI: 87% Accuracy in 15 mins

Source: China Daily, 2 Jul 2018, AI defeats top doctors in competition.

1. **Predictive Need?**
2. Imperfect Knowledge?
3. Availability of Training Data?

Winning Presidential Elections



100 Analytics staff to collect data and predict Voter actions

DBS Bank

1. Predictive Need?
2. Imperfect Knowledge?
3. Availability of Training Data?

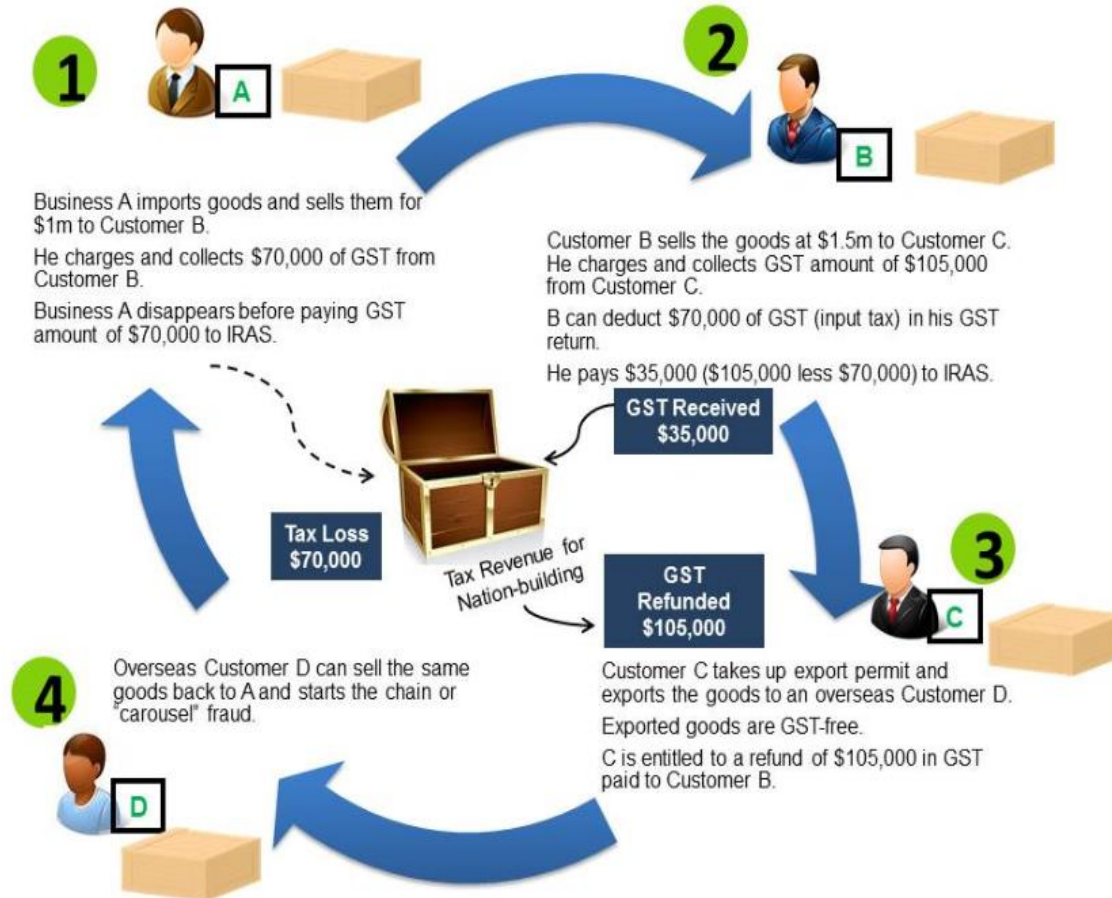
Leverages analytics to reduce ATM out-of-cash occurrences by over 90%



Lower Risk and Reduce Costs at the same time

1. Predictive Need?
2. Imperfect Knowledge?
3. Availability of Training Data?

Tax Fraud Detection at IRAS



All cases can be scanned.
Suspicious cases automatically flagged by Analytics.

Install R and then RStudio

- Install R first [just Base R for now]
 - <https://cran.r-project.org/>
- Then install free RStudio Desktop
 - <https://www.rstudio.com/products/rstudio/download/#download>
- Bring your laptop to physical class.

Learn Basic Operations in R

- Textbook AAD1 Appendix B.
- Quick R Tutorial online:
 - <https://www.statmethods.net/r-tutorial/index.html>

Summary

- Analytics have great potential to transform how an organization works and strategize.
 - Strategy
 - Operations
- BC2406: Learn Concepts, Techniques and Tools to **correctly design** and execute **Analytics**.
- Used correctly and ambitiously, any individual or company can change their situation, just like Netflix, Barack Obama, UC San Diego Hospital, Oakland Athletics Baseball team in Moneyball,..