Universiti
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Engineering • Technology • Creativity

CHAPTER 2
Overview of Data Visualization

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Learning Outcomes

This chapter aims for learner to be able to:-

1. Characterize the sciences of data visualization.

2. Identify skillset required for data visualization.

3. Expose with standard HTML5 online visualization.

Table of Content

- Principles of data visualization

- Graphing and visualization algorithms

- Scalability concerns

- Introduction to standard visualization web APIs

Sciences of Data Visualization
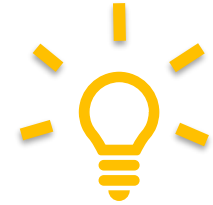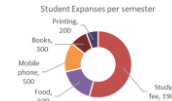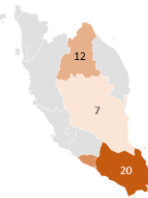
Data Science

Decision Science

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Data Science

… a "concept to unify statistics, data analysis and their related methods" in order to "understand and analyze actual phenomena" with data.

Hayashi C. (1998)

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Data Science

Data Science Process
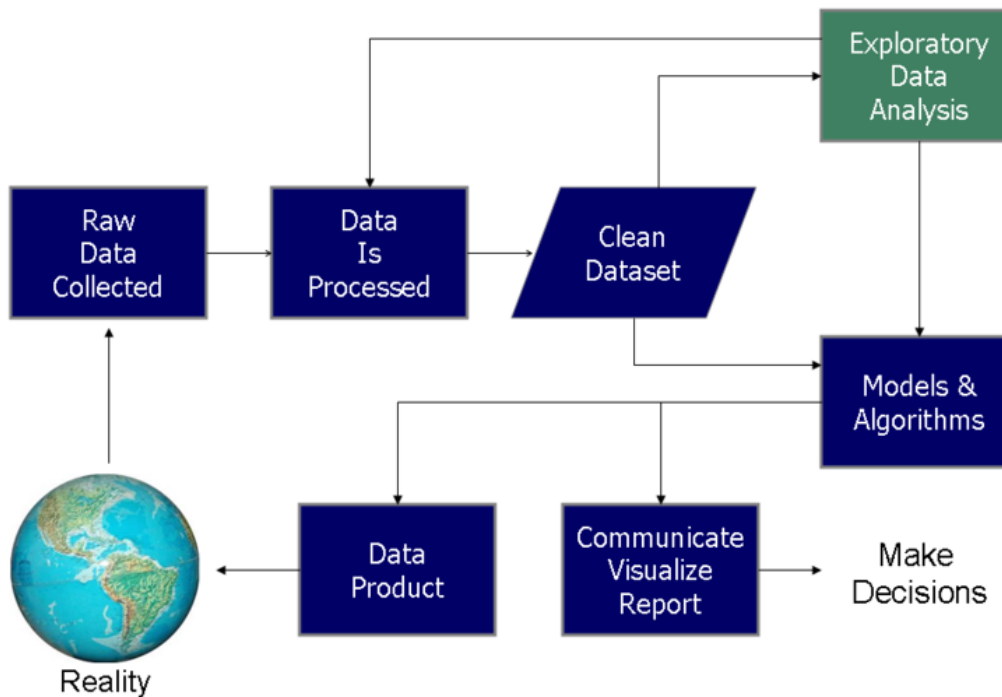
Source : Cathy O'Neil and Rachel Schutt, 2013

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Data Scientist

*"…. data scientists do is make **<u>discoveries</u>** while swimming in data."*

Source : <u>T. H. Davenport & D.J. Patil, 2012</u>
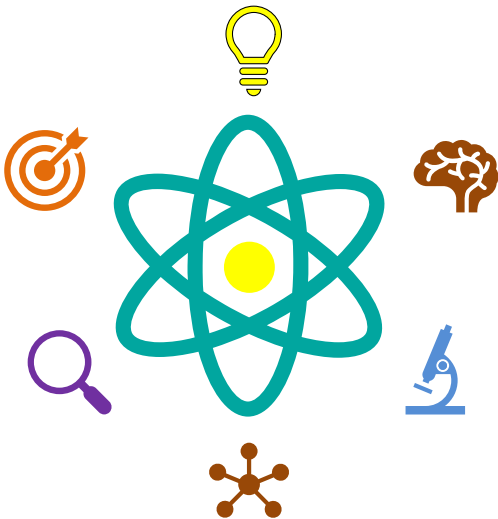
Data Science Skillsets

According to [Quora (2017)](#), top five skills for data scientist:-

Programming

Quantitative analysis

Product intuition

Communication

Teamwork

Decision Science

- Making decisions is a needs for everybody at all level – personal, organizational, regional, national and global.

- Increasing research interest in decision science based on SCOPUS database.

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Visualization Web API's

- With HTML5, it is now possible to perform **drawing of graphics** in the web without require any additional software plug-ins.

- List of web APIs for data visualization:-
  - Google charts
  - D3.js

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Google Chart API

- URL : https://developers.google.com/chart/
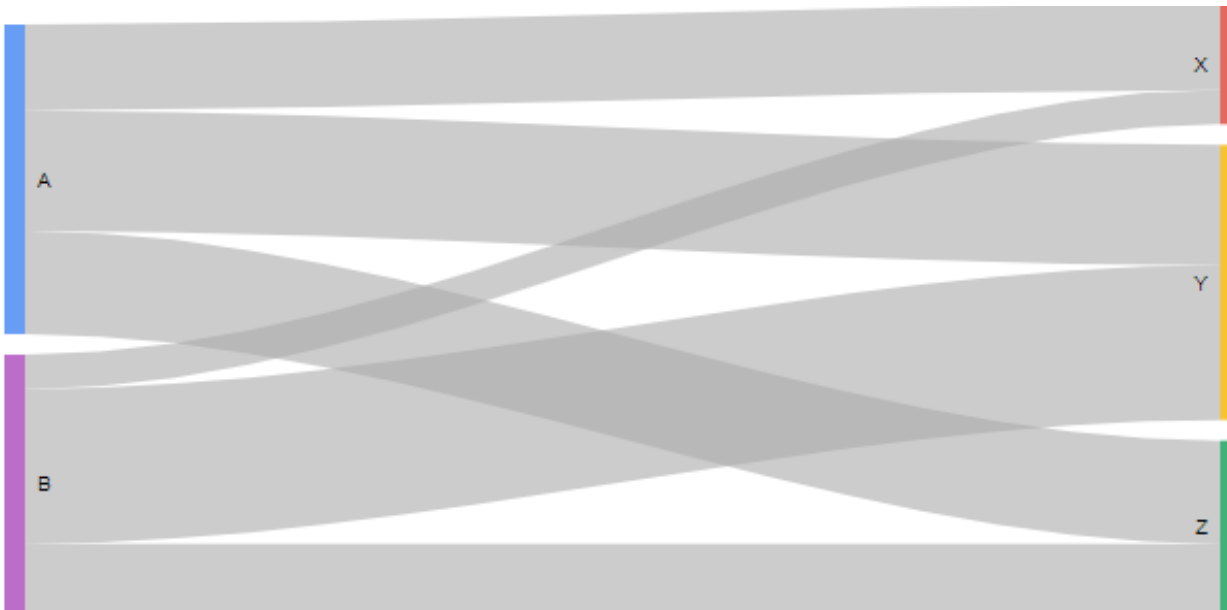
Sankey diagram, available in Google Chart API
Source : https://developers.google.com/chart/interactive/docs/gallery/sankey

Summary

- Data visualization involve the interdisciplinary of data (computer & technology) and cognitive (thinking) sciences.

- Collaborative wisdom through web bring greater impact on data visualization.

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References

- Hayashi C. (1998) What is Data Science ? Fundamental Concepts and a Heuristic Example. In: Hayashi C., Yajima K., Bock HH., Ohsumi N., Tanaka Y., Baba Y. (eds) Data Science, Classification, and Related Methods. Studies in Classification, Data Analysis, and Knowledge Organization. Springer, Tokyo
https://doi.org/10.1007/978-4-431-65950-1_3

- *R. Schutt & C. O. Neil, Doing Data Science: Straight Talk from the Frontline,* O'Reilly Media, Inc. ©2013

- Quora (2017), *What Are The Top Five Skills Data Scientists Need?*

Learn more

- http://www.fusioncharts.com/whitepapers/downloads/Principles-of-Data-Visualization.pdf

- http://download.101com.com/pub/tdwi/Files/052114%20IBM.pdf

- https://www.idrc.ca/sites/default/files/sp/Documents%20EN/data-visualization-in-review-summary-report.pdf