



What is Data Science

Introduction

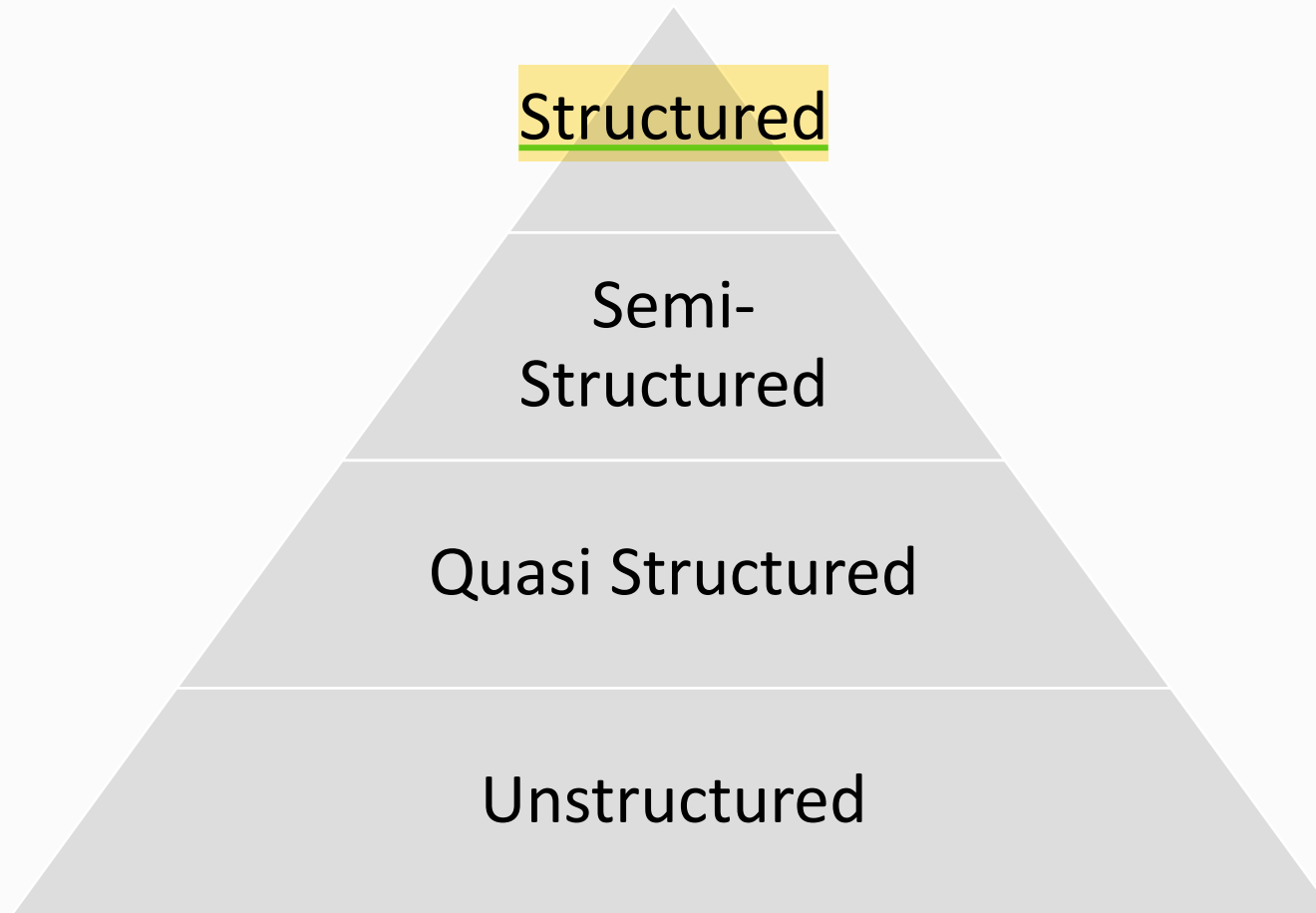
Areej Alasiry

Lecture Outline

- Classification of Data Science
- Algorithms of Data Science
- A Case for Data Science
- Properties of Data

Properties of Data

Structured vs Unstructured Data



Quantitative vs Categorical Data

- Quantitative data consists of numerical values.
- Categorical data consists of observations properties.
- Can you think of examples?

Big Data vs. little Data

- The challenges of big data:
 - Slow analysis time.
 - Hard to visualize.
 - Simple models do not require massive data to fit

What is Data Science

- Extracting meaningful patterns from data to make decision
- Building representative models that capture the relationship between data (i.e. fits data)
 - Predict output
 - Understand the relationship between input and output.
- Associated Fields of Data Science
 - Statistics
 - Visualisation
 - Hypothesis Testing
 - Data Engineering

Case of Data Science

- Data are massively accumulated over the past few decades
- Data science provides a paradigm to handle large data
- Volume of data
- Variety and dimensionality
- Complexity of required information/knowledge to be extracted

Data Science Classification

- Supervised vs. Unsupervised learning models.
- Data Science tasks

Regression	Clustering
Classification	Association Analysis
Feature Selection	Anomaly/outlier Detection
Text Mining	Recommendation engines
Time Series Forecasting	Deep Learning

Data Science Algorithms

- “An algorithm is a logical step-by-step procedure for solving a problem.”
- How to choose an algorithm?
 - Type of dataset
 - Objective
 - Structure of the data
 - Outliers
 - Computational Power
 - Dimensionality of the data (no. of records and attributes)

Session Mind Map

Home work

- In the discussion forum, post some examples of real-world problems/applications that you believe it belongs to data science field.

References

- Data Science: Concepts and Practice. 2nd Edition by Vijay Kotu and Bala Deshpande, ISBN: 978-0-12-814761-0©2019.
- THE Data Science Design MANUAL. Steven S. Skiena, ISBN: 978-3-319-55444-0 ©2017.