Data Analysis Workshop - 1

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Outline

- Session 1: Fundamentals of Data Handling
- Session 2: Data Processing & Exploration
- Session 3: Data Visualization
- Session 4: Time-series Analysis

Session 1: Fundamentals of Data Handling

- What is Data Analytics
- Why use Python
- Python Data Types
- Python Data Structures

Data Analytics

Descriptive — What happened?

- Comprehensive accurate live data analysis & visualization

Business Intelligence | Dashboards

Diagnostic — Why did it happen?

- Ability to identify the root cause & remove confounding information

Simulation | Data mining

Predictive — What will happen?

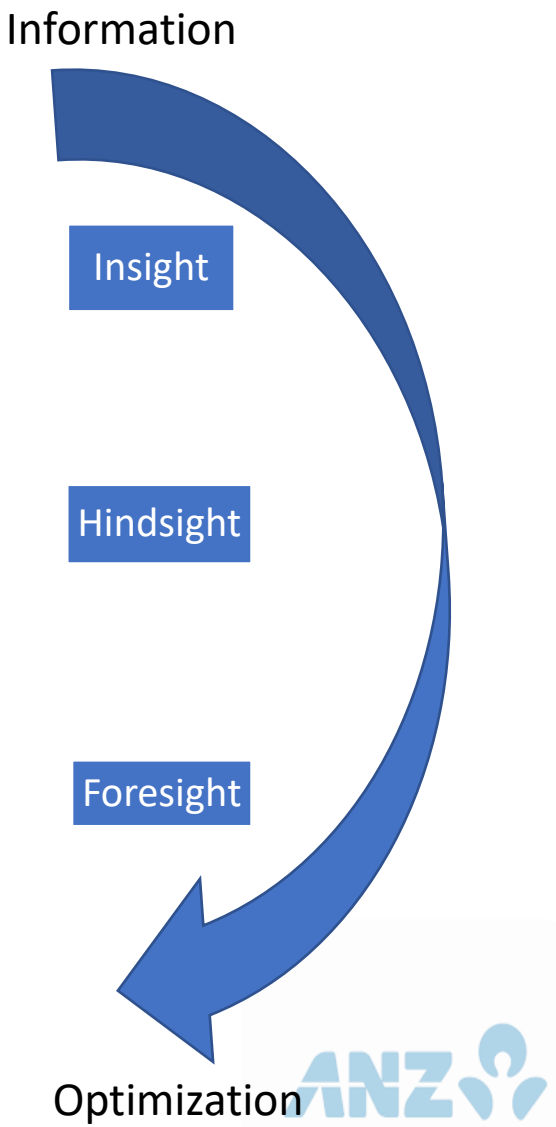
- Identify patterns using historical data
- Automation using ML ops and algorithms

Simulation | Data mining

Prescriptive — How can we make it happen?

- Advanced techniques & algorithms for recommendations

Decision Tress | Mathematical Modelling



Data Analysis Pipeline

Data Acquisition

- 1 D Data: Time-series data (transaction history)
- 2 D Data: Transaction and location
- n D Data: Amount, location, time etc.

Data Wrangeling

- Read & structure the data
- Process using software tools

Data Processing

- Strategize (target variable / feature selection / feature engineering)
- Assess (distribution) and select modelling algorith,

Tools for Analysis

Python	• Interpreted, high-level & general-purpose programming language
R	• Programming language and free software environment for statistical computing & graphics
Matlab	• Proprietary multi-paradigm programming language and numerical computing environment by MathWorks
Java	• Class-based, object-oriented programming language

Why Python?

- High Level
- Open Source
- Large standard library
- Interpreted
- Object oriented
- Faster & scalable
- Powerful for scientific computing

Python Programming

- Cross platform compatible libraries on Unix, Windows, Macintosh
- Jupyter Notebook: Open-source web application. Allows to create and share document that contains code, equations, visualizations and comments. Type .ipynb files.
- Anaconda: Free and open source distribution of Python. Simplifies package management and deployment. Includes wide array of data science libraries
- Other IDE's: PyCharm, Spyder etc.
- JupyterLab: Web based user interface of Jupyter
    - Access Workshop Repo on Cloud
https://mybinder.org/v2/gh/skusmakar2/PythonWorkshop/0480074cdf5f7ef31ecbc9ef1884efa7fde3f574

Fundamentals

Data Types

Data Structures & Collections

Control Statements

Loops

Functions

Major Libraries for Data Processing & Exploration

NumPy	• Multidimensional array objects and a collection of routines for processing the array objects
SciPy	• Scientific computing library for mathematics, science and engineering
Matplotlib	• Cross-platform library for making plots from data in arrays
Pandas	• Open-source Python library providing high performance, easy to use data structures, data analysis and visualization tools
Scikit-learn	• ML library in Python. Provides a selection of efficient algorithms for statistical modelling for different ML frameworks

References

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- https://wiki.python.org/moin/BeginnersGuide/Overview
- https://www.w3schools.com/python/python_intro.asp
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