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Translating ideas to reality through innovative education

Data Preprocessing (Wrangling)

Mohammed El-Agha
Software Developer & Data Science Specialist

Data Preprocessing

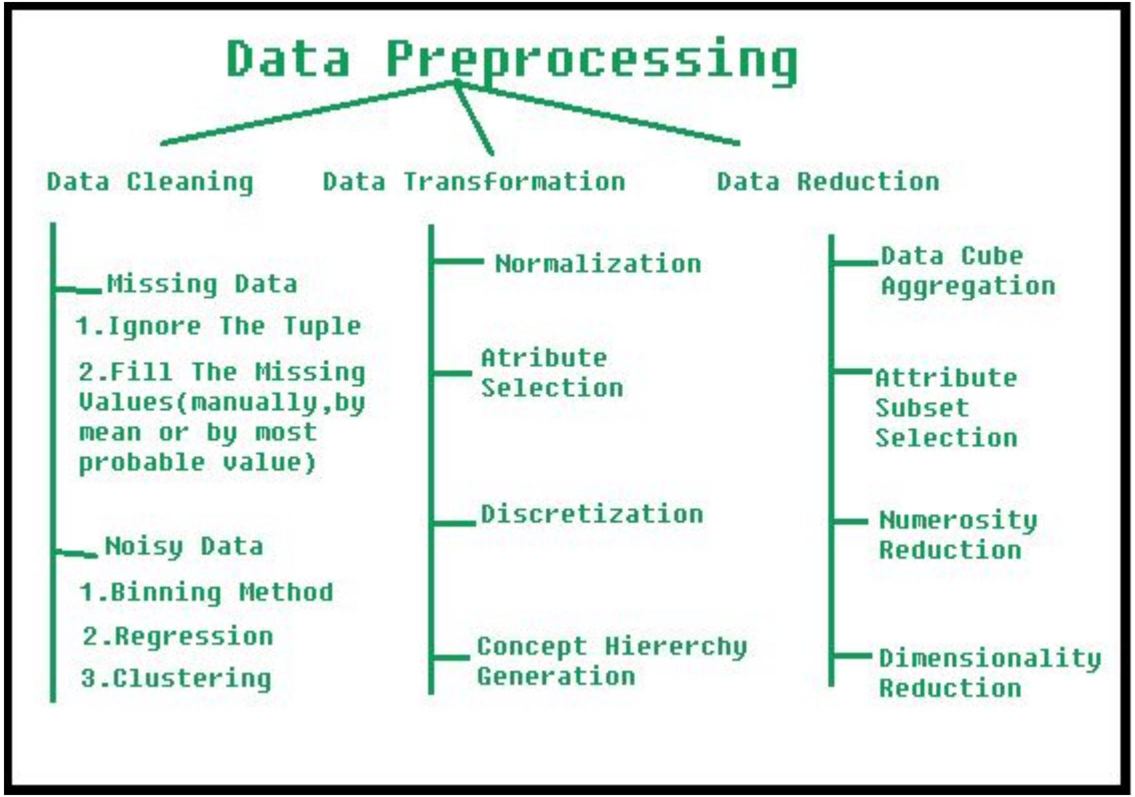
- **Data Preprocessing** is preparation of data to be ready for the processing itself.
    - Change format
    - Change datatype
    - Resolve a problem
    - Change in data itself
    - Add something
    - remove/reduce something

Some Issues

- Missing
- Error in data
- Unreasonable data
- Huge amount of data
- Very high dimensionality
- Very wide range of numeric data
- Unneeded data
- Unneeded features

Data Preprocessing in DS Model

- Collection -> Understanding -> Preprocessing -> Modeling
- Garbage in = Garbage out
- It take 40-80% of project time
- Complete preprocessing may be pusher of model accuracy



Data Preprocessing

Data Cleaning

- Missing Data
  1. Ignore The Tuple
  2. Fill The Missing Values(manually,by mean or by most probable value)
- Noisy Data
  1. Binning Method
  2. Regression
  3. Clustering

Data Transformation

- Normalization
- Atribute Selection
- Discretization
- Concept Hiererchy Generation

Data Reduction

- Data Cube Aggregation
- Attribute Subset Selection
- Numerosity Reduction
- Dimensionality Reduction

Data Preprocessing Types

- Data Cleaning
- Data Transformation
- Data Reduction

Data Preprocessing Types

- **Data Cleaning**

- Related to fixing problem/error in the data
- Like: missing, errors, faults, noisy, unreasonable

Data Preprocessing Types

- **Data Transformation**

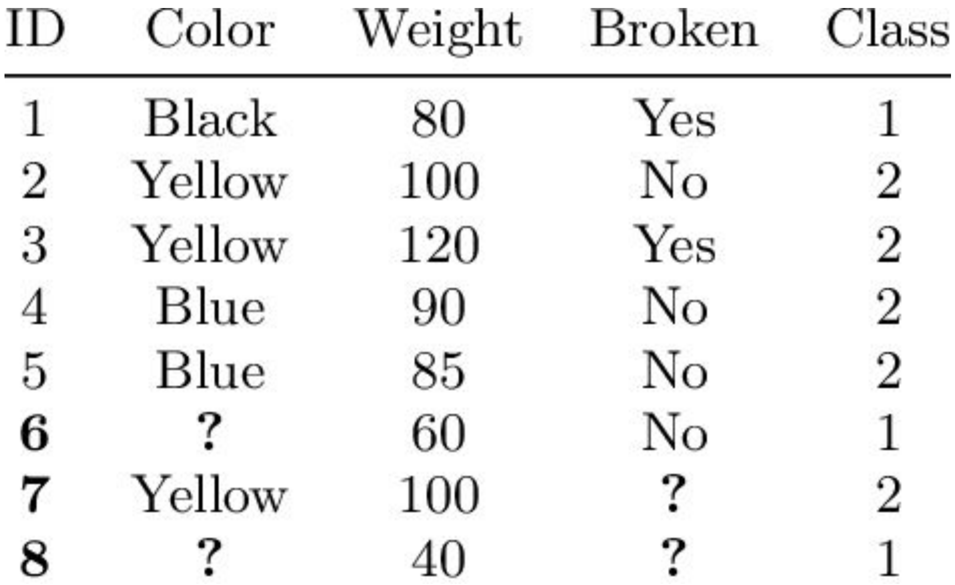
- Related to
  - Data be appropriate for DS task
  - Best formating
  - May used for enhancing performance (accuracy)
- Like: datatype conversion, change numeric range

Data Preprocessing Types

- **Data Reduction**

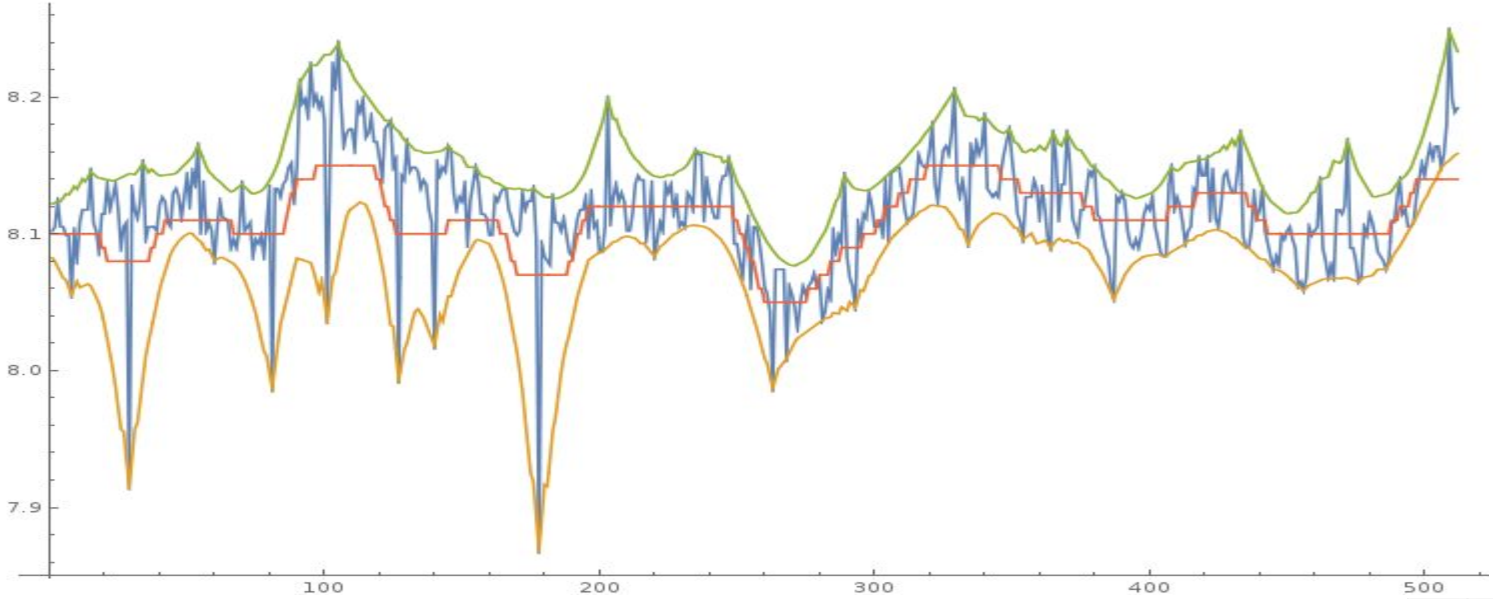
- Related to
  - Reduction of data size, on row or column level
  - May be use to improve efficiency (time or space performance)
- Like: sampling, feature reduction

Example - Missing Data

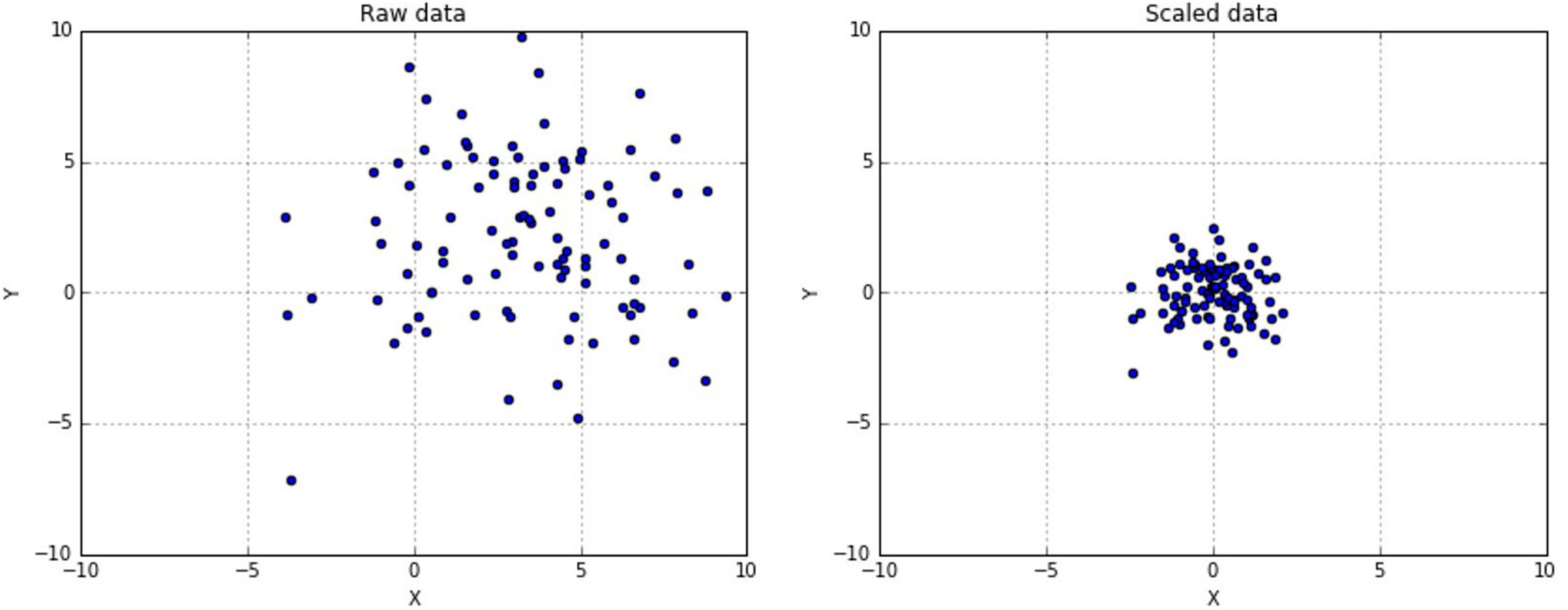


ID	Color	Weight	Broken	Class
1	Black	80	Yes	1
2	Yellow	100	No	2
3	Yellow	120	Yes	2
4	Blue	90	No	2
5	Blue	85	No	2
6	**?**	60	No	1
7	Yellow	100	**?**	2
8	**?**	40	**?**	1

Example - Noise Data



Example - Normalization



Data Preprocessing

- **Good Resources**

- (Book) Feature Engineering and Selection: A Practical Approach for Predictive Models (Chapman & Hall/CRC Data Science Series)
- (Webpage) https://www.geeksforgeeks.org/data-preprocessing-in-data-mining

Any Questions

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Thank You!

Mohammed El-Agha
Data Science Instructor