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Types of ML

Types of Machine Learning Techniques

- The machine learning algorithms which we will be covering are
  - Supervised learning algorithms
  - Unsupervised learning algorithms

Models for Supervised Learning

- When the response variable is numerical, predictive modeling is called **Regression**.
- When the response variable is nominal / categorical, predictive modeling is called **Classification**. The values of the response variable can be considered as “class labels” in this case.

Partitioning in Supervised Learning

- In Supervised Learning, we partition the data
- We typically deal with two or three partitions:
  - a training set,
  - a validation set,
  - and sometimes an additional test set.

Training Partition

- Typically the largest partition
- Contains the data used to build the various models we are examining
- Generally used to develop multiple models.

Validation Partition

- Used to assess the performance of each model so that you can compare models and pick the best one.
- This partition is used for internally verifying the performance of the models
- Important for measuring the goodness of fit

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Test Partition

- Used if we need to assess the performance of the chosen model with new data
- Used to overcome the overfitting problem

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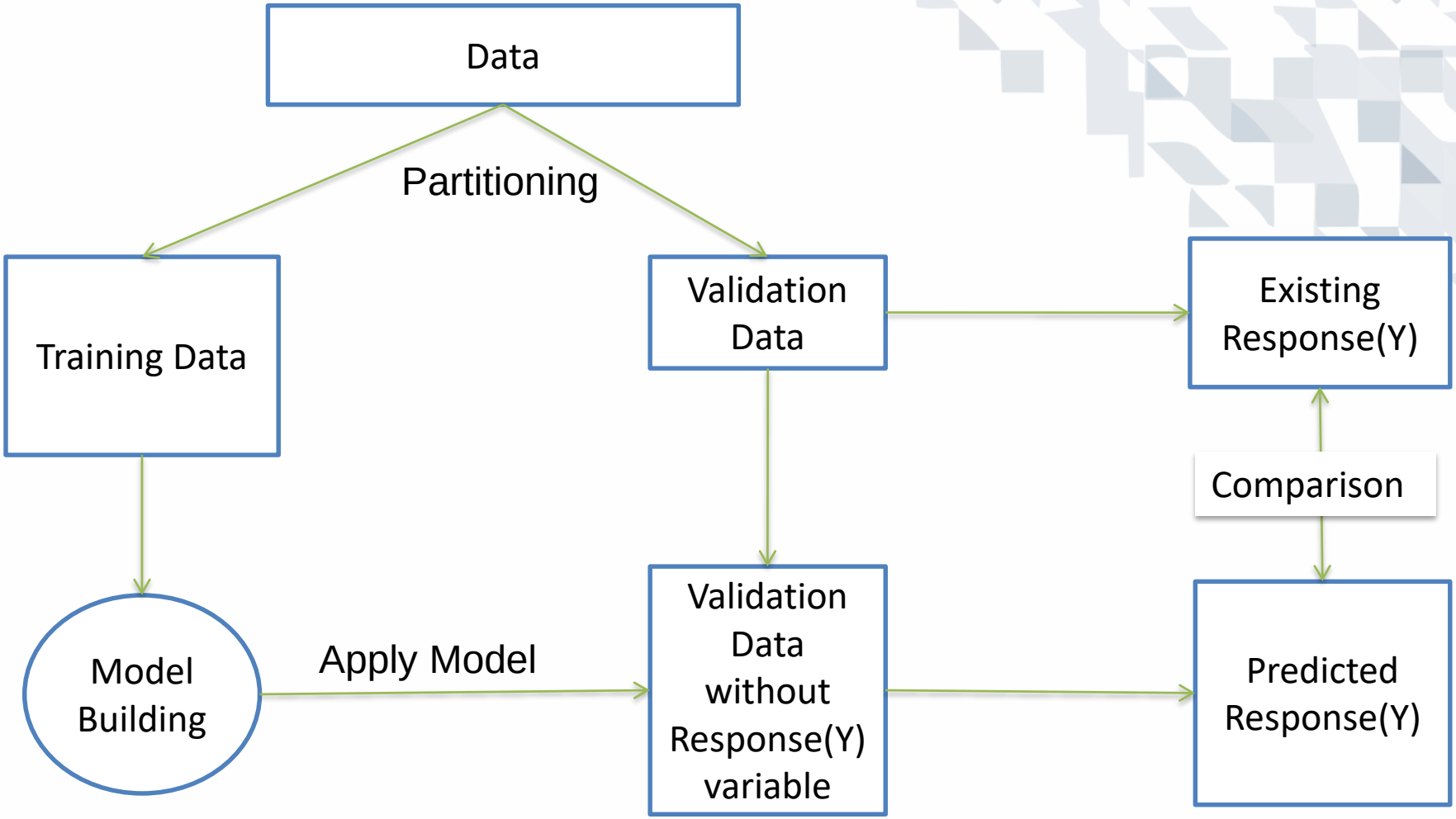
Supervised Learning Process with 2 partitions



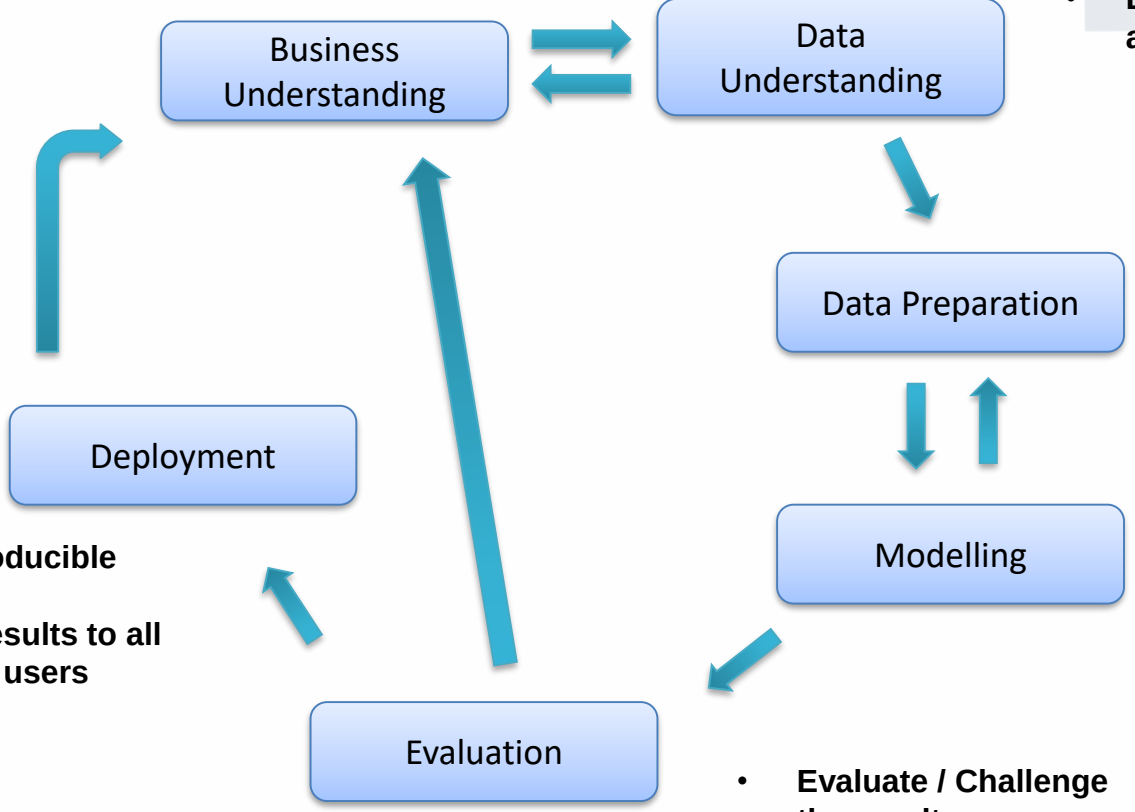
Unsupervised Learning

- Unsupervised learning algorithms are those used where there is no outcome variable to predict or classify.
- Association rules, data reduction methods, and clustering techniques are all unsupervised learning methods.

Examples of Unsupervised Learning

- Clustering Techniques
  - Hierarchical
  - K-means
  - K-medoids
- Principal Component Analysis
- Association Rules

Analytics Lifecycle (CRISP-DM)



- **Define a question**

- **Define Ideal Dataset**
- **Determine what data you can access**

- **Obtain the data**
- **Clean the data**

- **Data Exploration**
- **Predictive Modelling**
- **Interpretation of results**

- **Evaluate / Challenge the results**
- **Synthesize / write-up results**

- **Create reproducible code**
- **Distribute results to all the types of users**

Popular (Desktop-In Memory Processing) Software for Machine Learning Algorithms

- Programming
  - R
  - Python
  - Scala (Spark MLlib)
- GUI based
  - RapidMiner (Only Academic Free)
  - Weka (Free)
  - KNIME (Free)
  - SAS Enterprise Miner
  - IBM SPSS Modeller

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Cloud-based Solutions for Machine Learning

- IBM Watson
- Microsoft Azure ML Studio
- Google Analytics Platform
- BigML
- Amazon Web Services