SUPERVISED LEARNING VS UNSUPERVISED LEARNING

Nilma de Wit

Our view

" Our view is that data needs analytics to achieve insight. Insights need decisioning to realize value, but to get to decisioning, the insights must be operationalized. "

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AI AND ANALYTICS

Our key capabilities include:

Machine & Deep Learning

Supervised
Unsupervised
Semi-supervised
Transfer Learning
Deep Learning

Computer Vision

Image Processing
Image Recognition
Object Detection

Natural Language Processing

Text Analytics
Natural Language
Interaction and
Generation

Forecasting & Optimization

ML in
Forecasting
Optimization
Econometrics

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AGENDA

- [What is Supervised Machine Learning?](#)

- [What is Unsupervised Learning?](#)

- [Why Supervised Learning?](#)

- [Why Unsupervised Learning?](#)

- [How Supervised Learning works?](#)

- [How Unsupervised Learning works?](#)

- [Types of Supervised Machine Learning Techniques](#)

- [Types of Unsupervised Machine Learning Techniques](#)

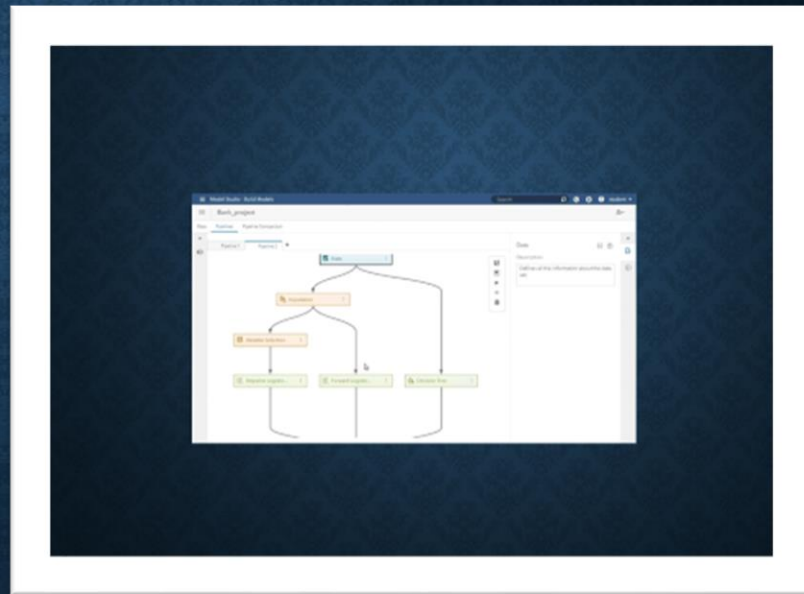- [Supervised vs. Unsupervised Learning](#)

WHAT IS SUPERVISED MACHINE LEARNING?

Labeled/ Targeted

- Binary
- Interval
- Nominal

WHAT IS UNSUPERVISED LEARNING?

"Unlabelled data"

- Perform more complex processing tasks

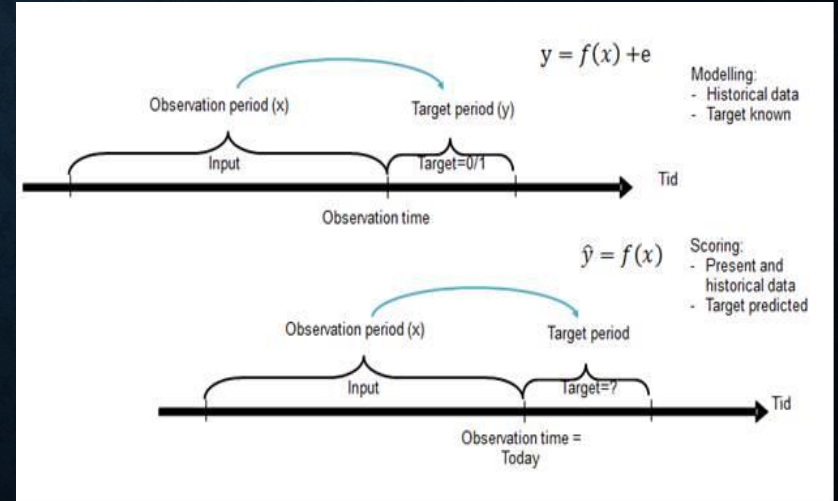# WHY SUPERVISED LEARNING?

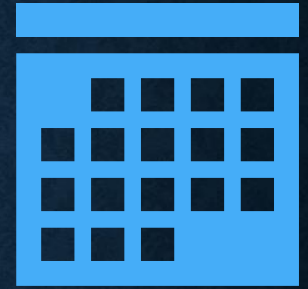DATA.

OPTIMIZE

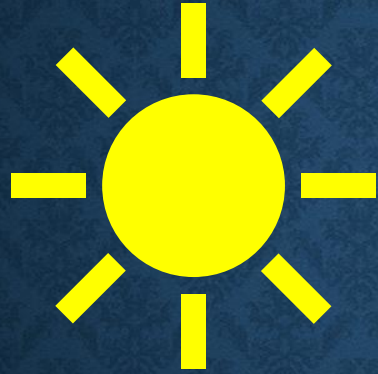SOLVE COMPUTATION PROBLEMS

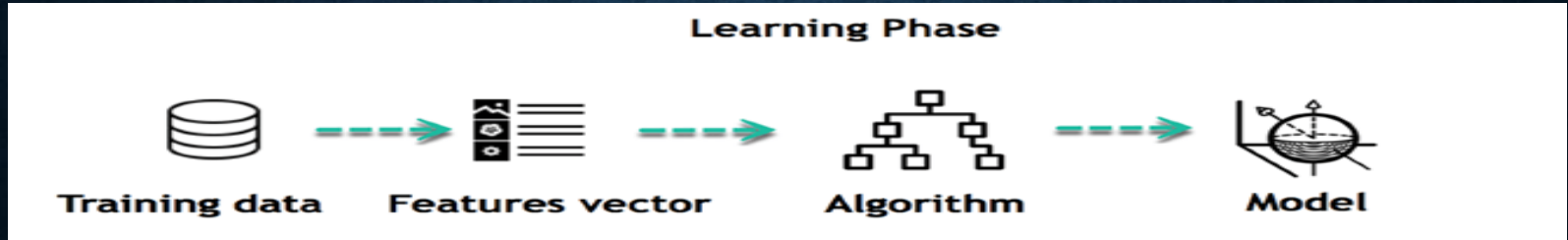# WHY UNSUPERVISED LEARNING?

Unknown patterns in data.

Ease

HOW SUPERVISED LEARNING WORKS?

- Develop a supervised learning model of this example to determine the commute time.
  - Create is a training data set.
    - Total commute time
    - Weather
    - Time,
    - Etc.
  - Relationship between the variables.
- Use the insight, to make decisions

Learning Phase

Training data → Features vector → Algorithm → Model

HOW UNSUPERVISED LEARNING WORKS?

- A baby and her family dog.

- Identify dog

- Introduce new dog

- Similar features

- Identify dog
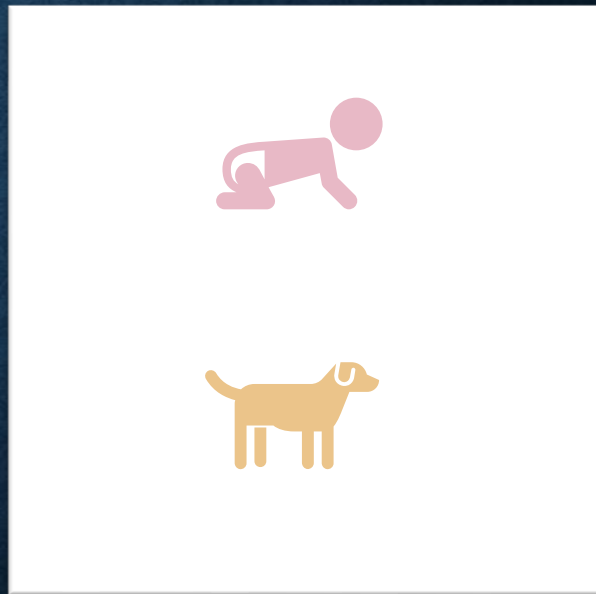
TYPES OF SUPERVISED MACHINE LEARNING TECHNIQUES

Regression

- Predicts a single output value

- Training data

- Example: Pricing housing market

Classification

- Group the output inside a class.

- Binary classification.

- Multiclass classification

- Example: Defaulter of the loan

- Strenghts:

  - Probabilistic interpretation

  - Regularized

- Weaknesses:

  - Underperformance

  - Not flexible

Types of Unsupervised Machine Learning Techniques

Clustering
Association
Segmentation

- Kmeans
- Kmodes
- Kprototypes
- Outlier Detection
- And more

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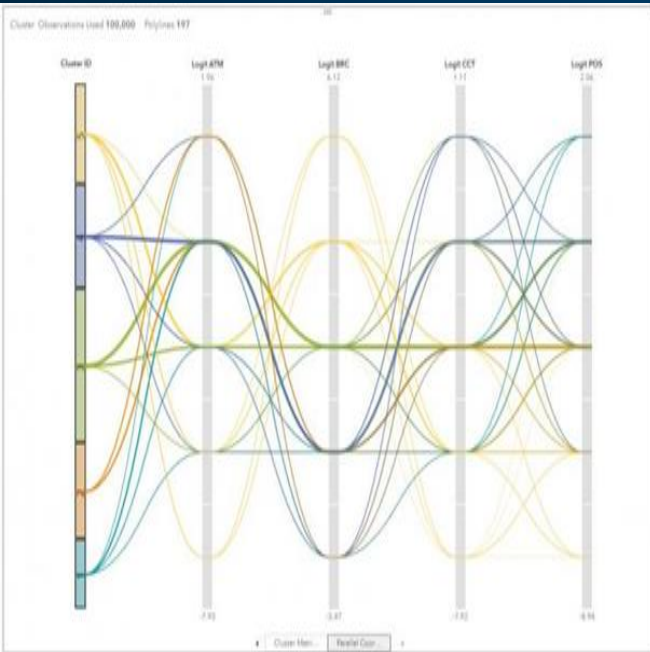
SUMMARY

- Supervised ➜ well "labeled."

- Unsupervised ➜ machine learning technique, no need to supervise the model.

- Supervised ➜ collect data or produce a data output

- Unsupervised ➜ finds all kind of unknown patterns in data.

- Supervised ➜ Regression and Classification

- Unsupervised ➜ Clustering and Association

- Supervised ➜ input and output variables will be given

- Unsupervised ➜ only input data will be given

Thank you
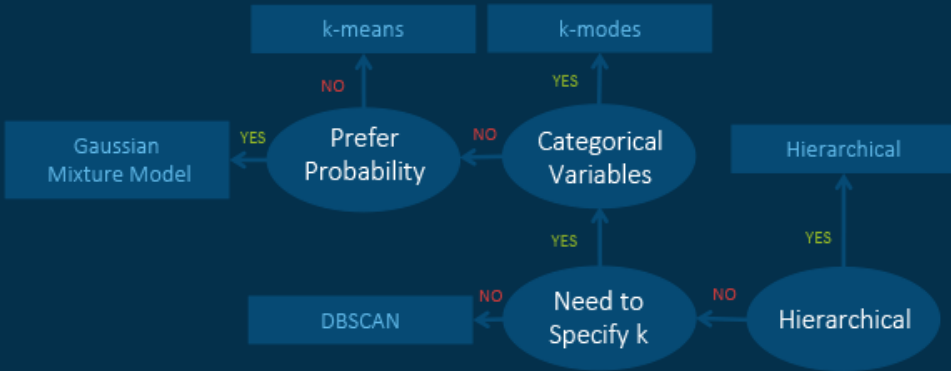
Machine Learning at SAS
Algorithms

- Neural networks *
- Nearest-neighbor mapping
- k-means clustering
- Self-organizing maps

- Factorization Machines *
- Principal components analysis
- Singular value decomposition
- And More ……
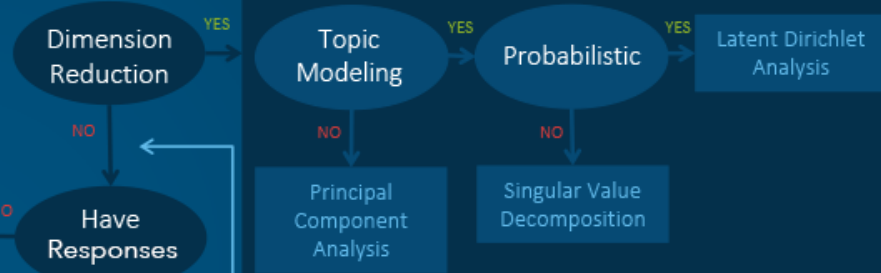
* Hyper-parameter auto-tuning available with SAS Viya

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Machine Learning Algorithms Cheat Sheet