



# Unsupervised Learning



# Unsupervised Learning

- Supervised Learning
  - Using historical **labeled** data, predict a label on new data (regression or classification).
- Unsupervised Learning
  - Using **unlabeled** data, discover patterns, clusters, or significant components.



# Unsupervised Learning

- Unsupervised Learning:
  - Clustering:
    - Using features, group together data rows into distinct clusters.
  - Dimensionality Reduction:
    - Using features, discover how to combine and reduce into fewer components.



# Unsupervised Learning

- Paradigm shift for supervised to unsupervised learning:
  - ***Supervised performance metrics will not apply for unsupervised learning!***
  - How can we compare to a correct label answer, if there was no label to begin with?



# ML Pathway



**Real  
World**

**Collect &  
Store  
Data**

**Clean &  
Organize  
Data**

**Exploratory  
Data  
Analysis**

**Machine  
Learning  
Models**

**Supervised Learning:**

*Predict an Outcome*

**Unsupervised Learning:**

*Discover Patterns in Data*





# ML Pathway



**Real  
World**

**Collect &  
Store  
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Organize  
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**Exploratory  
Data  
Analysis**

**Clustering**

**Unsupervised Learning:**  
*Discover Patterns in Data*

**Dimensionality  
Reduction**

