Technische Universität Berlin

Geo Data Science

Introduction to Machine Learning

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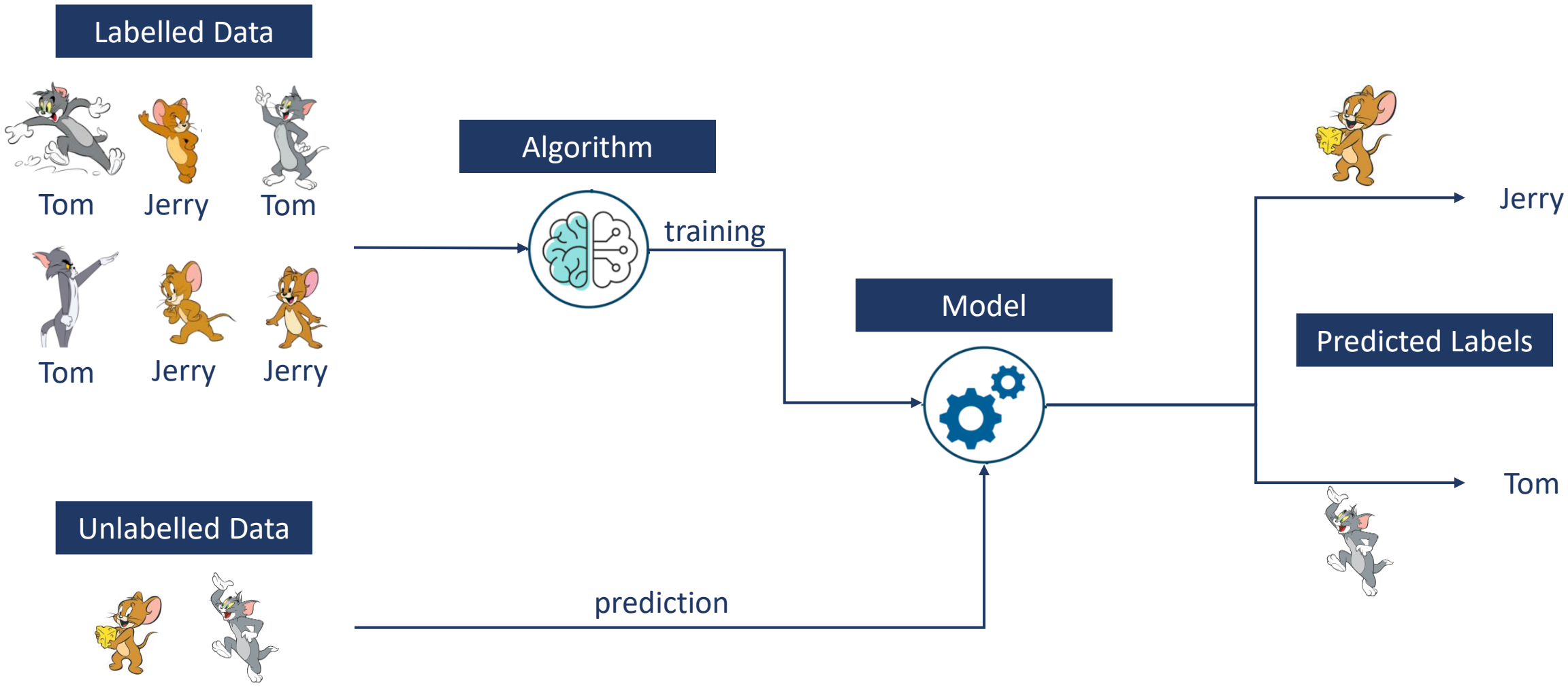
Types of Machine Learning Algorithms

- Supervised learning
  - Given (training) data, which contains the correct answer for each dataset, the learning algorithm tries to find a hypothesis (model) that allows to predict the outcome for unseen datasets

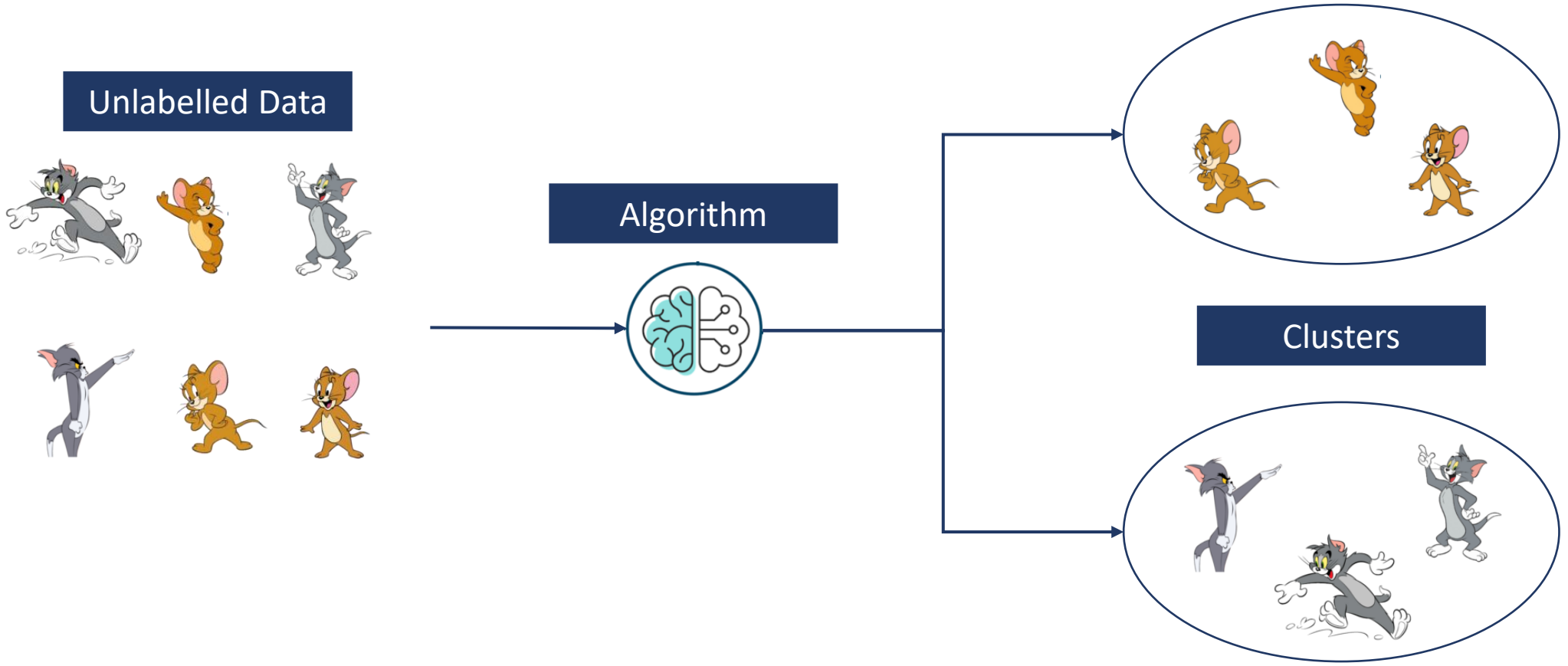
- Unsupervised learning
  - The learning algorithm finds structure in the given data based on similarity and groups the data elements into clusters

- Reinforcement learning
  - The learning algorithm learns from rewards of previous decisions

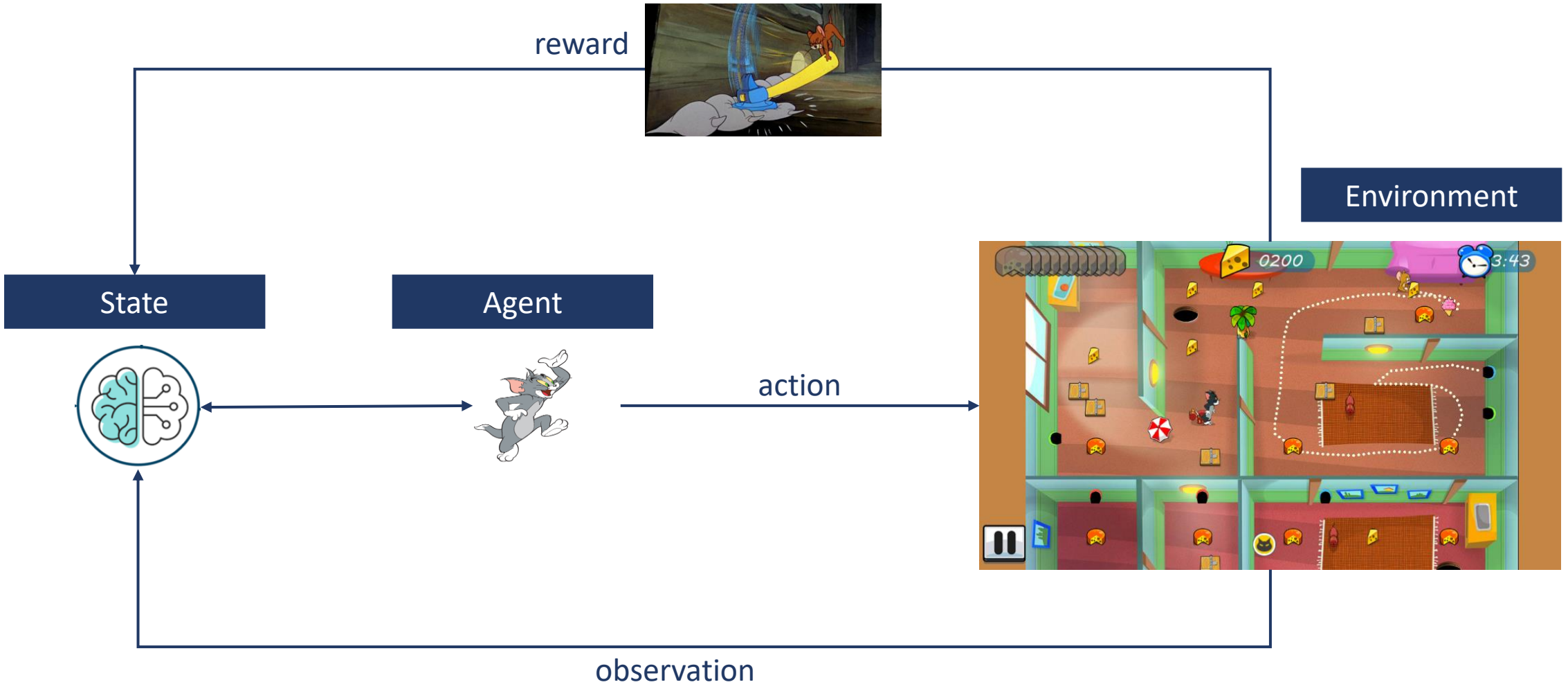
Supervised Learning



Unsupervised Learning



Reinforcement Learning



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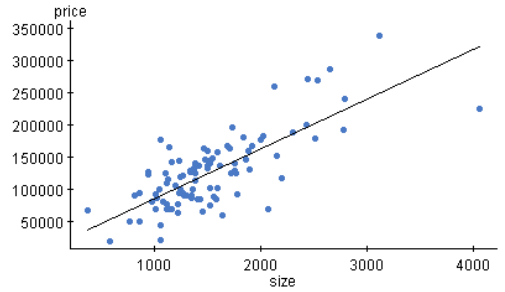
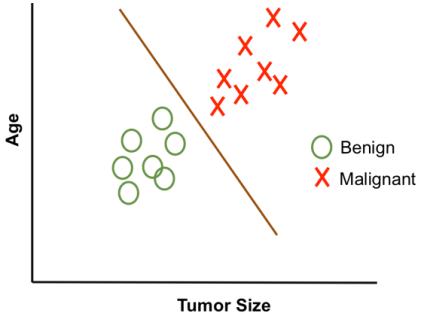
Types of Machine Learning Problems

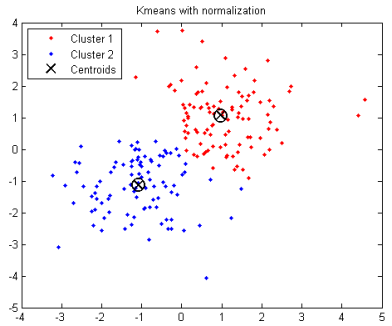
- **Regression** – supervised learning problem where the answer to be learned is a continuous value



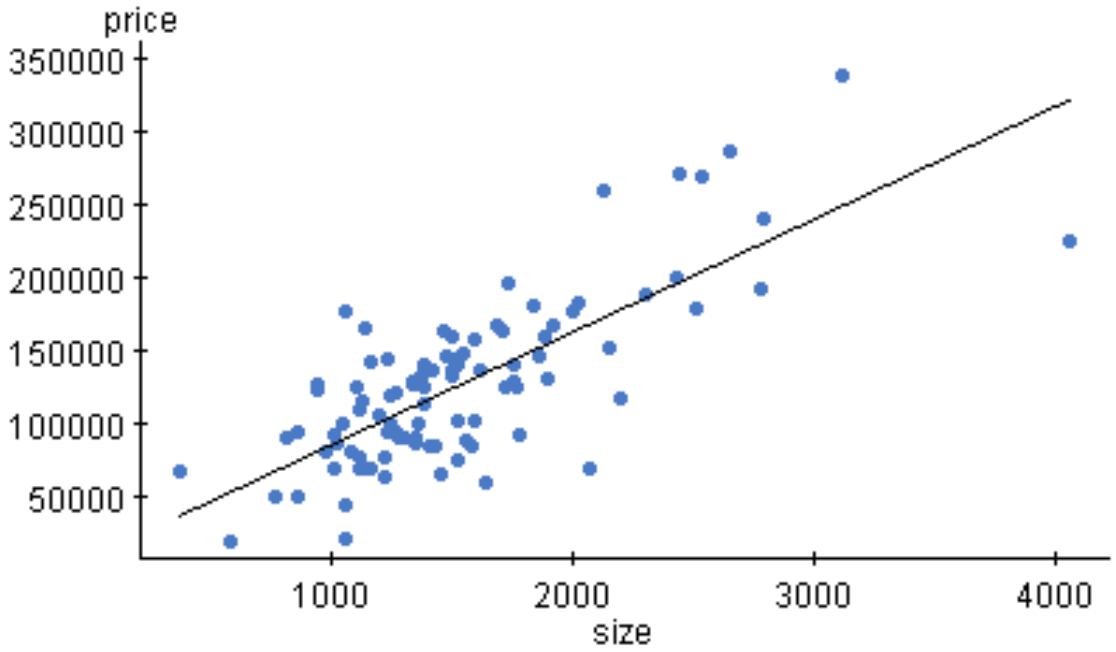
- **Classification** – supervised learning problem where the answer is discreet (one of finitely many) values



- **Segmentation** – unsupervised learning problem where the structure to be learned is a set of clusters of similar examples

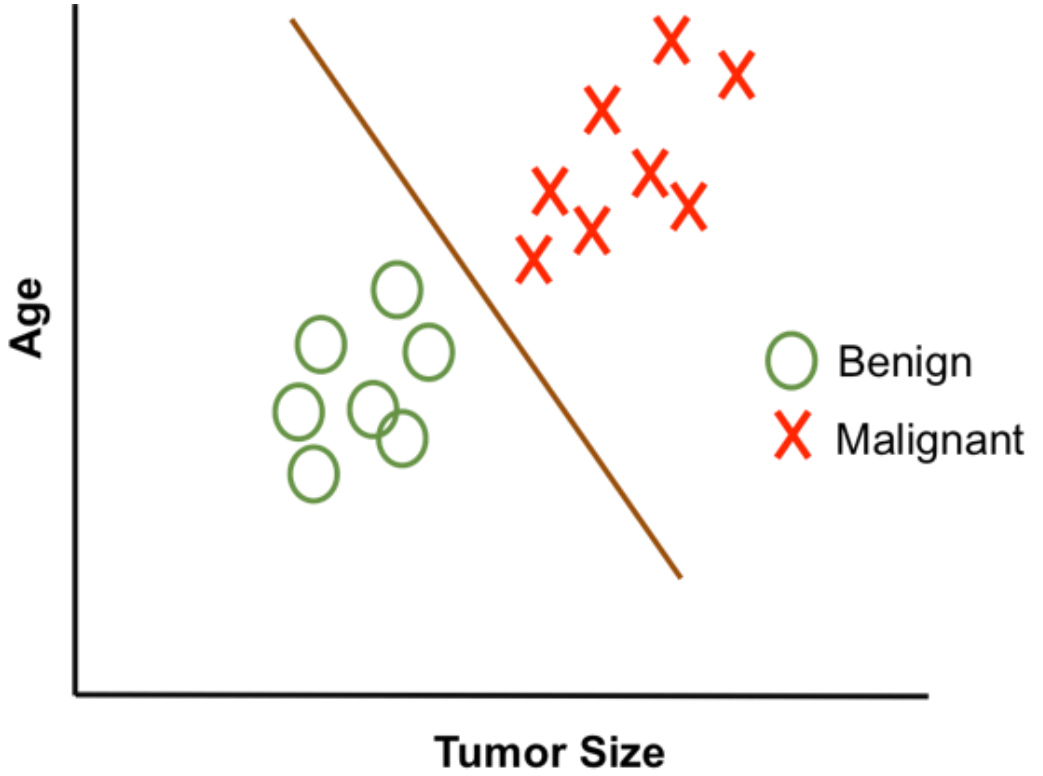


Regression



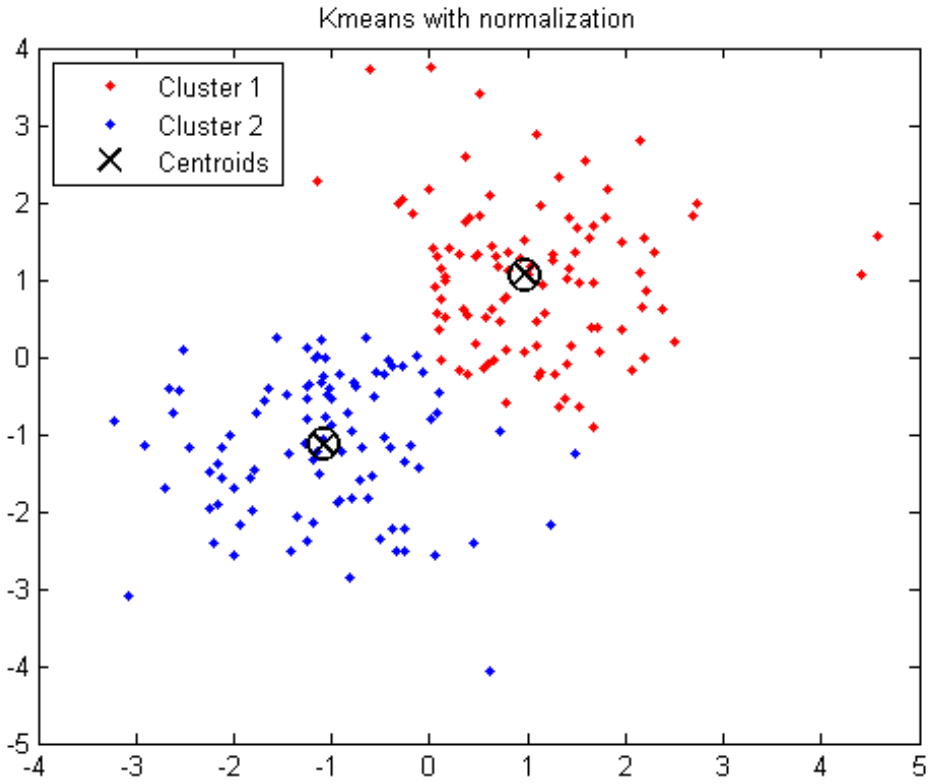
- Learn a model by fitting a (straight) line through all (training) examples
- Predict the outcome for an unseen dataset by substituting the input values into the model

Classification



- Learn a model by finding a (straight) line that separates the (two) classes
- Predict the class by determining in which region your unseen input dataset lies

Segmentation



- Learn the structure of data by grouping similar examples into a set of clusters
- Predict the properties of an unseen dataset by its closeness to a cluster

Types of Machine Learning Problems

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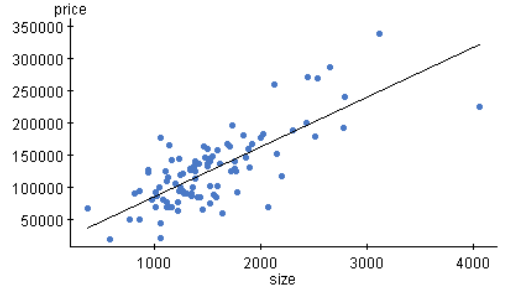

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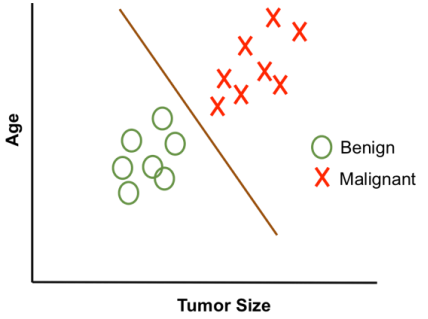
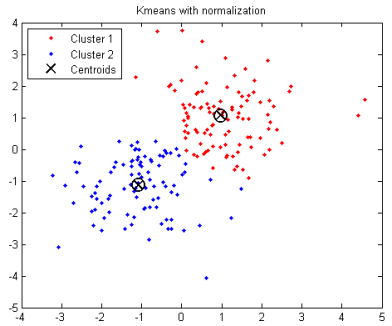


- Segmentation – unsupervised learning problem where the structure to be learned is a set of clusters of similar examples



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Thank you for your attention!