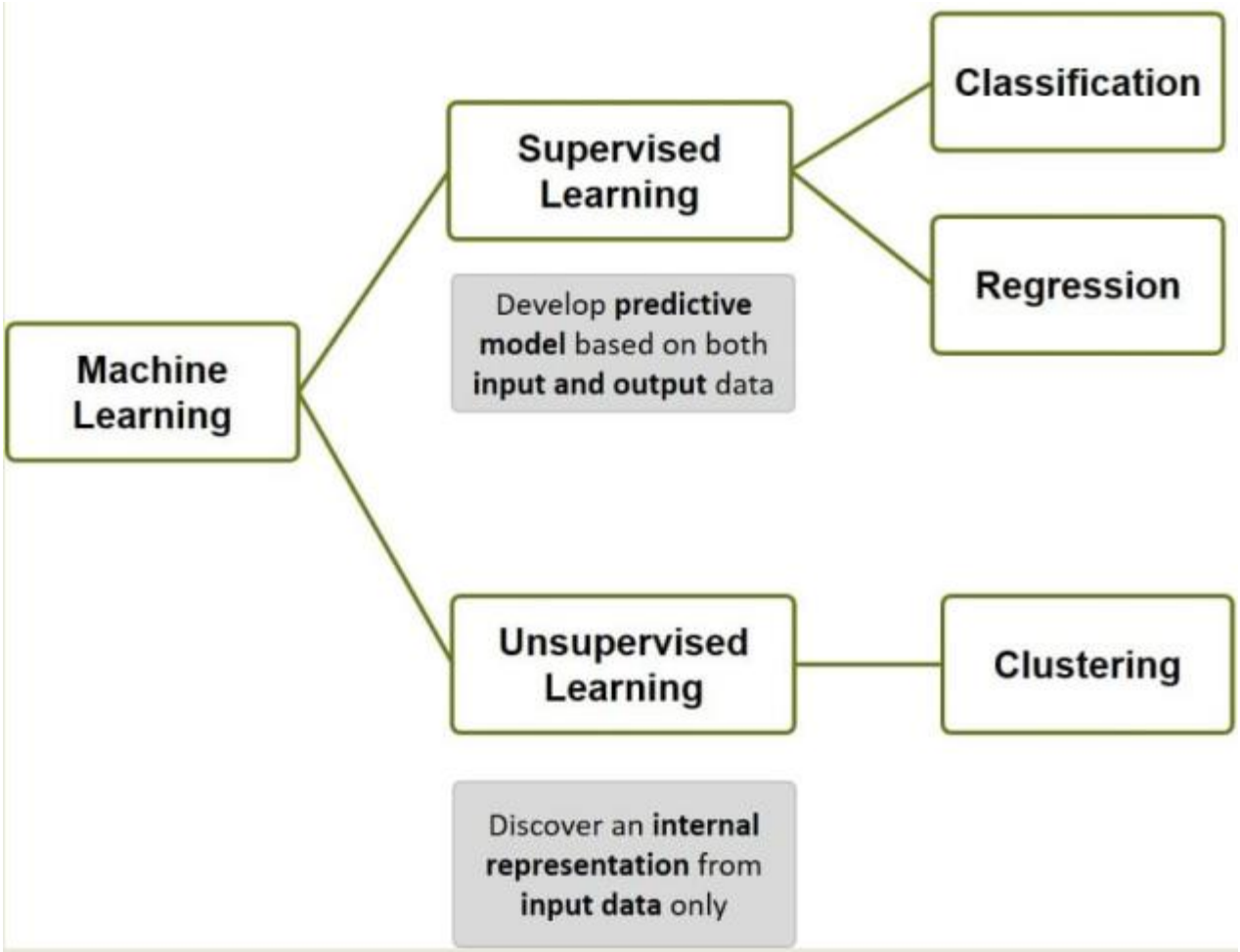
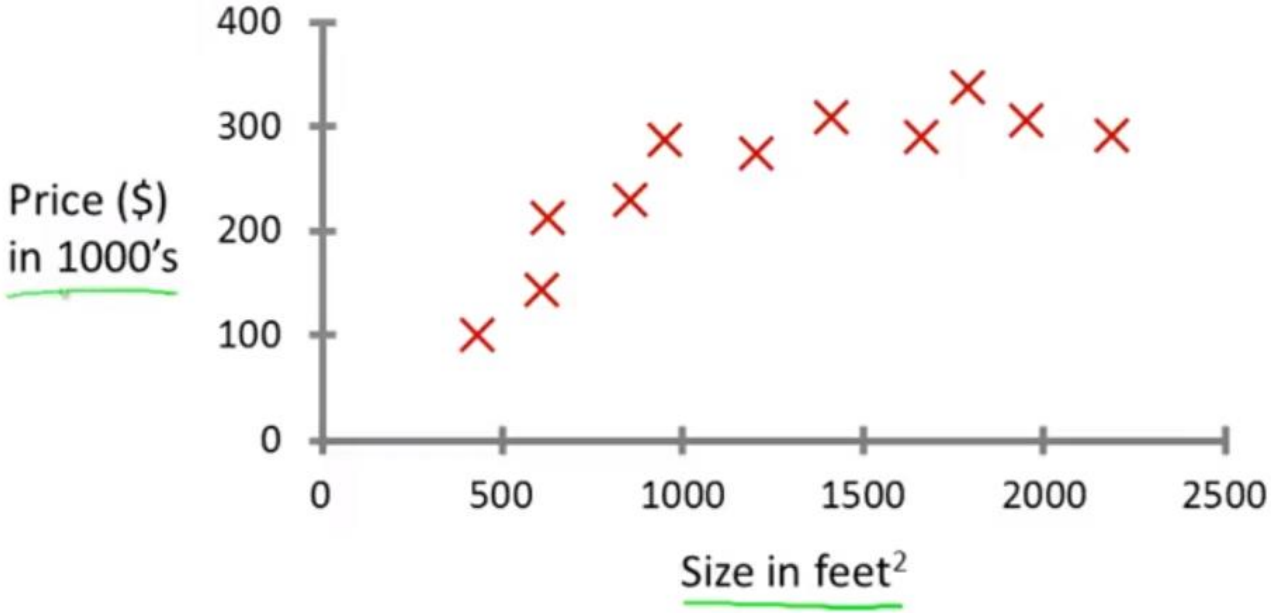
MACHINE LEARNING

Supervised vs Unsupervised Learning

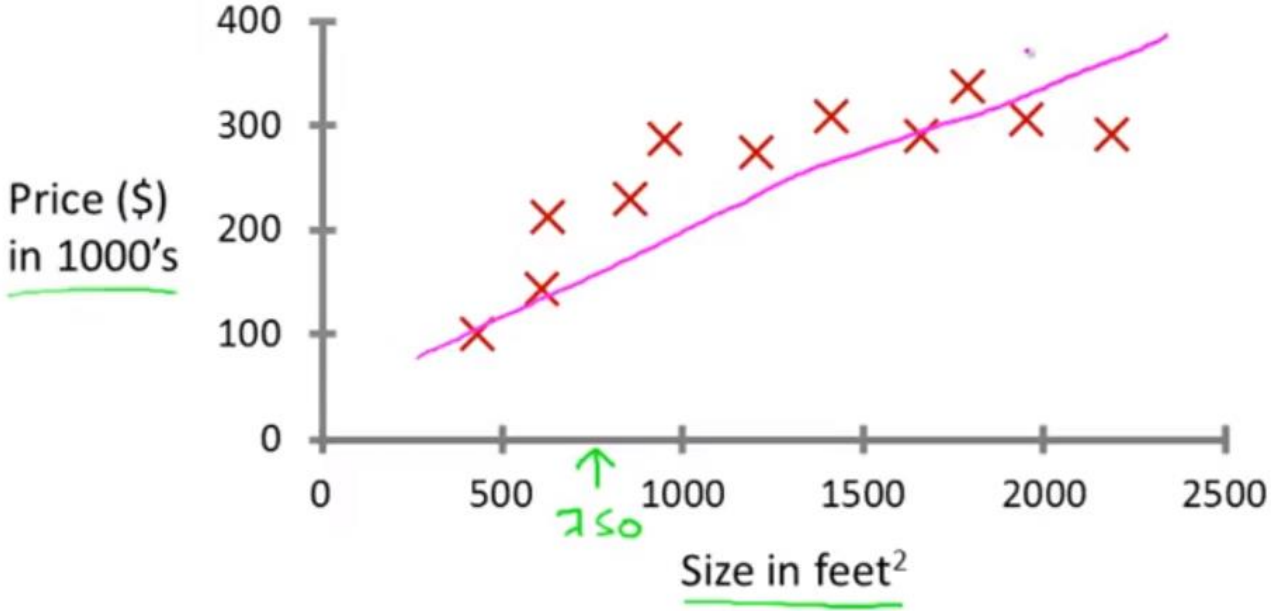
SUPERVISED LEARNING


Machine Learning
Supervised Learning
Develop predictive model based on both input and output data
Classification
Regression
Unsupervised Learning
Discover an internal representation from input data only
Clustering

Housing price prediction.



Housing price prediction.



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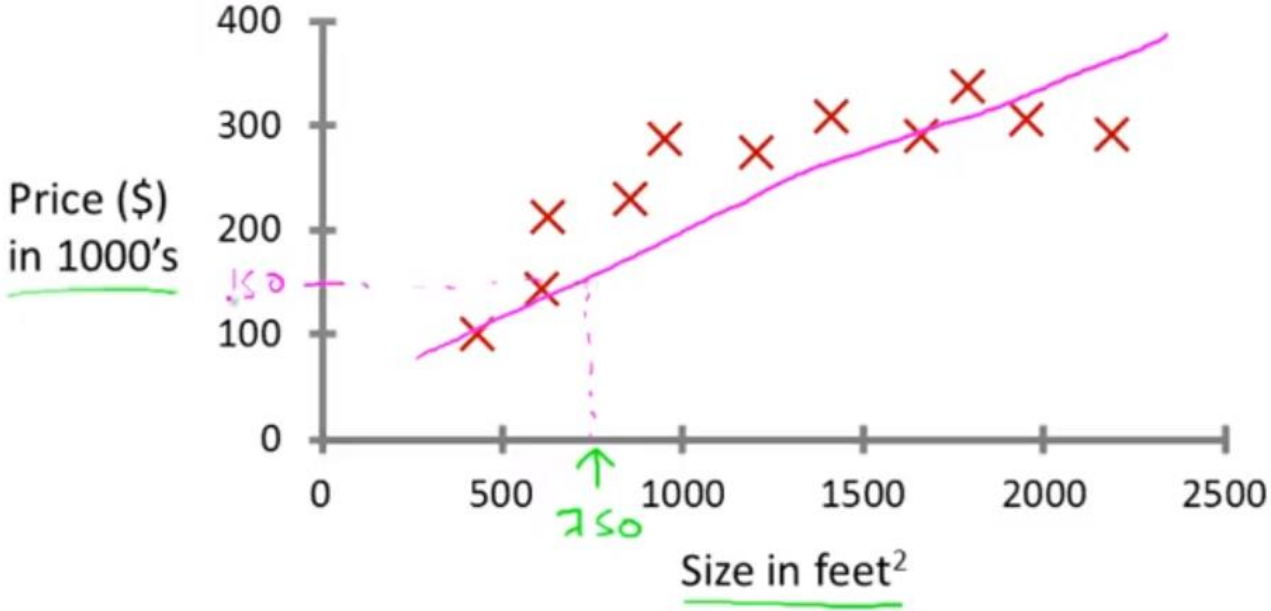

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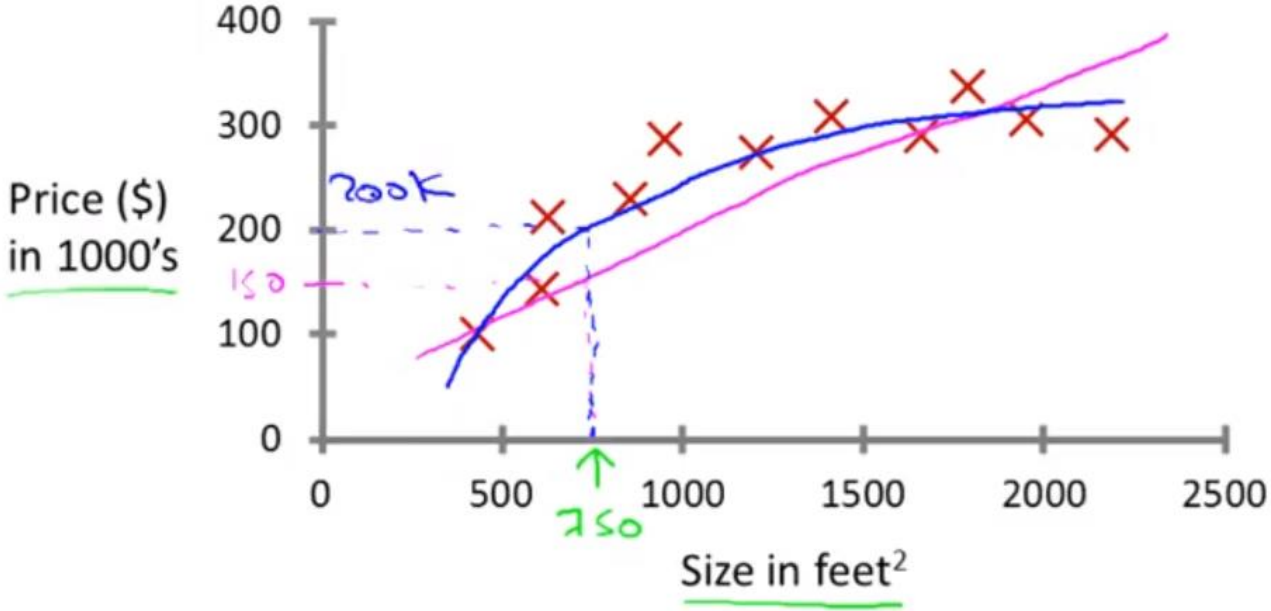

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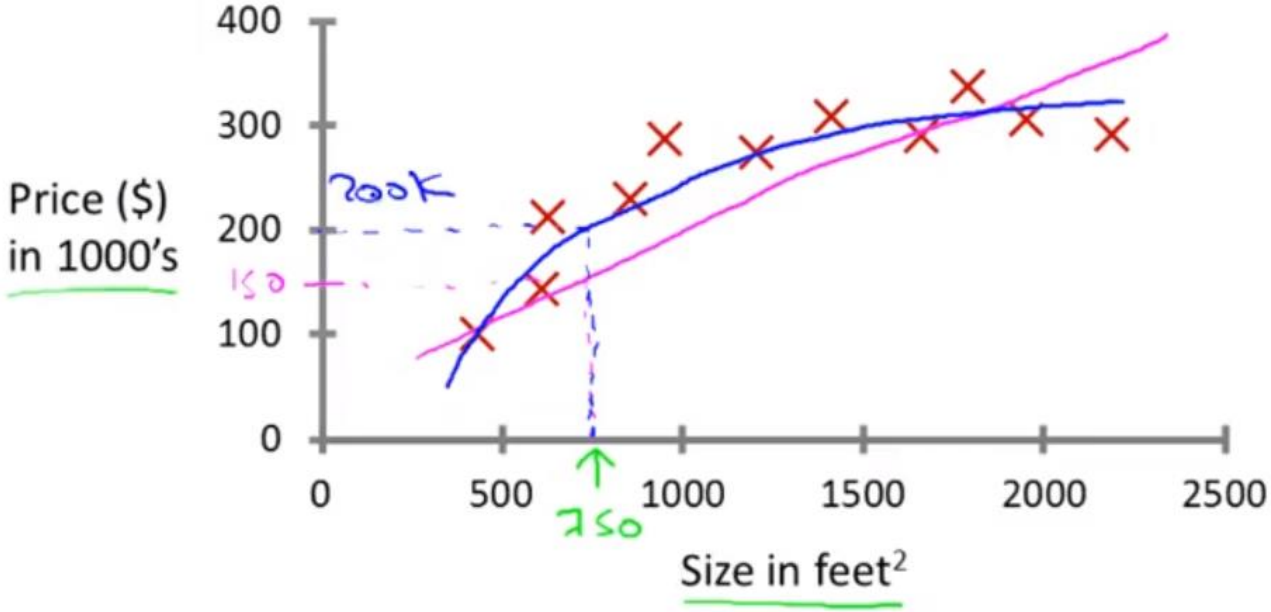
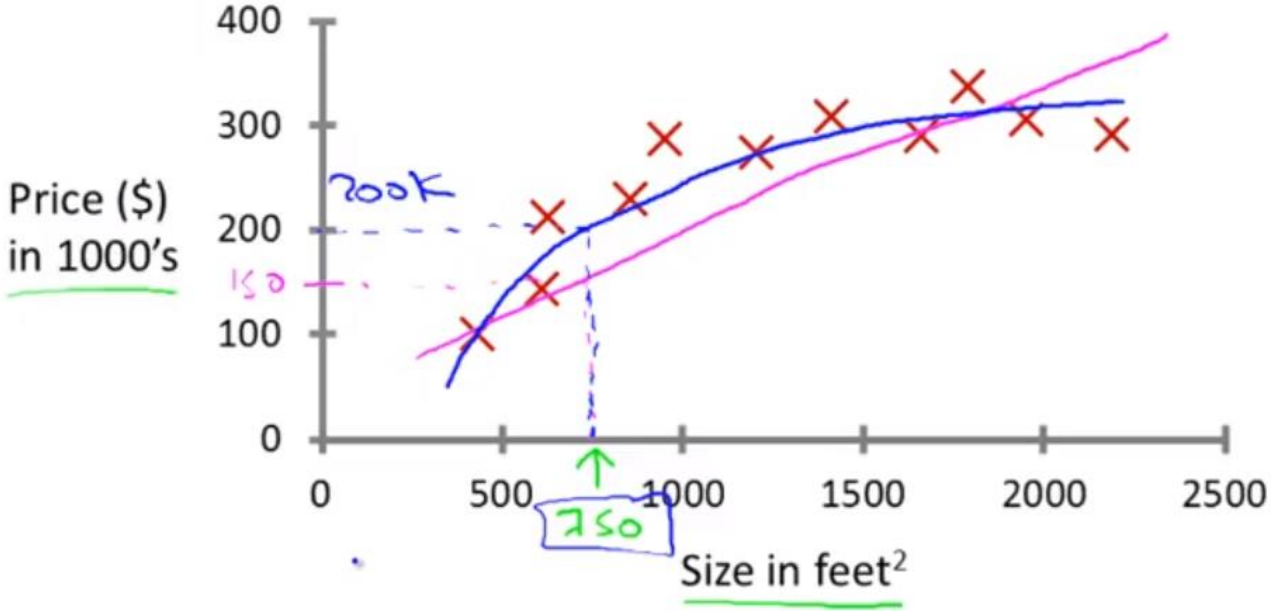


Supervised Learning

"right answers" given

Housing price prediction.

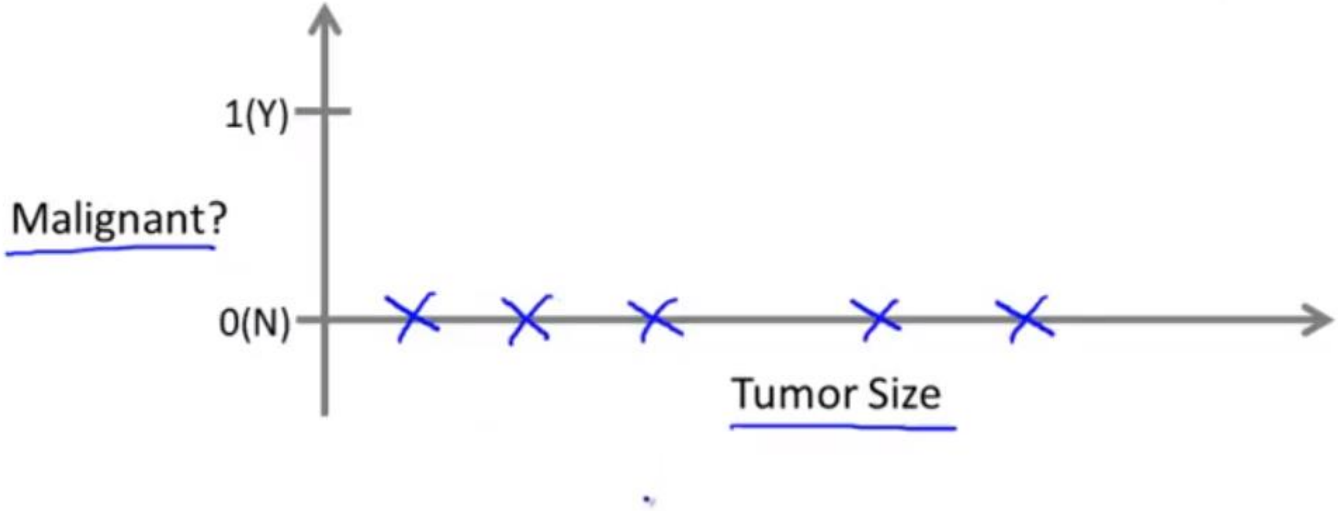


Supervised Learning

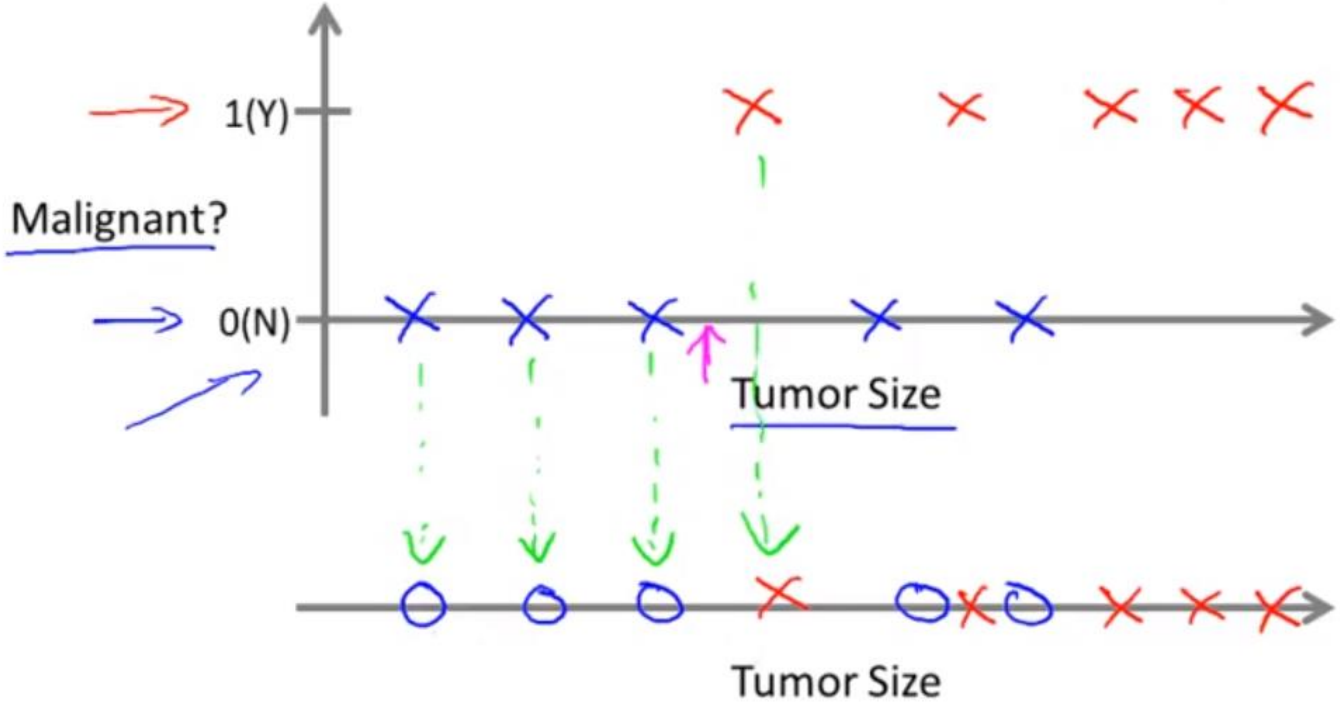
"right answers" given

Regression: Predict continuous valued output (price)

Breast cancer (malignant, benign)

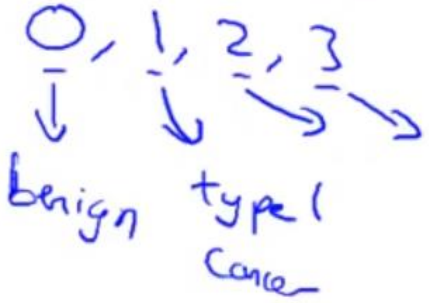


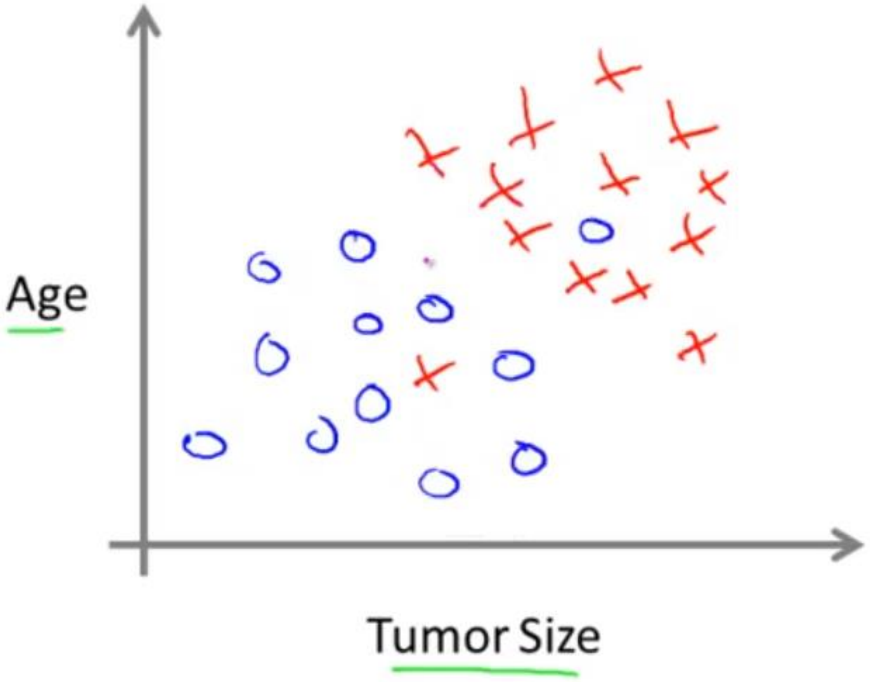
Breast cancer (malignant, benign)

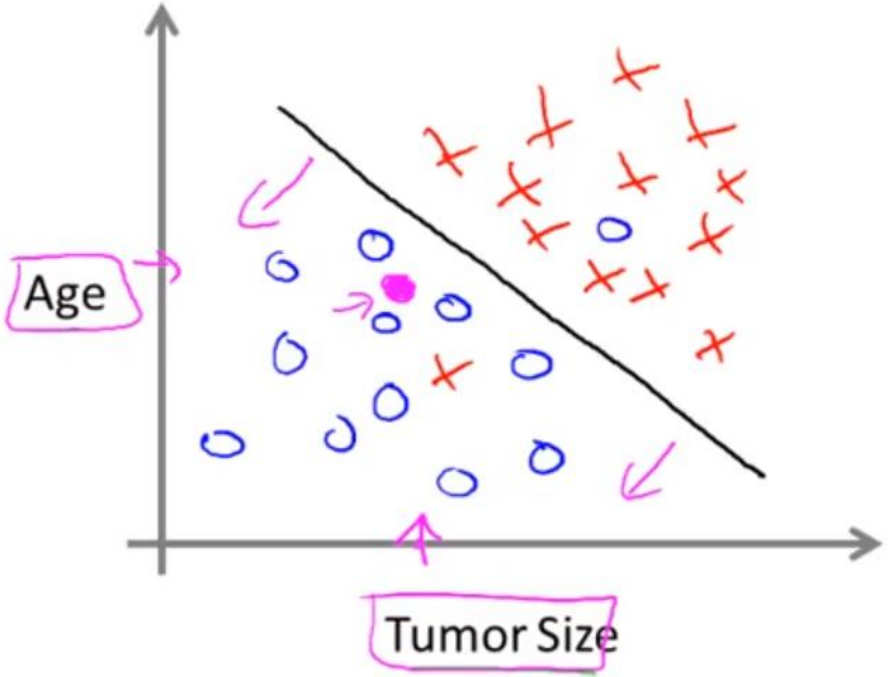


Classification

Discrete valued output (0 or 1)







- Clump Thickness
- Uniformity of Cell Size
- Uniformity of Cell Shape

...

You're running a company, and you want to develop learning algorithms to address each of two problems.

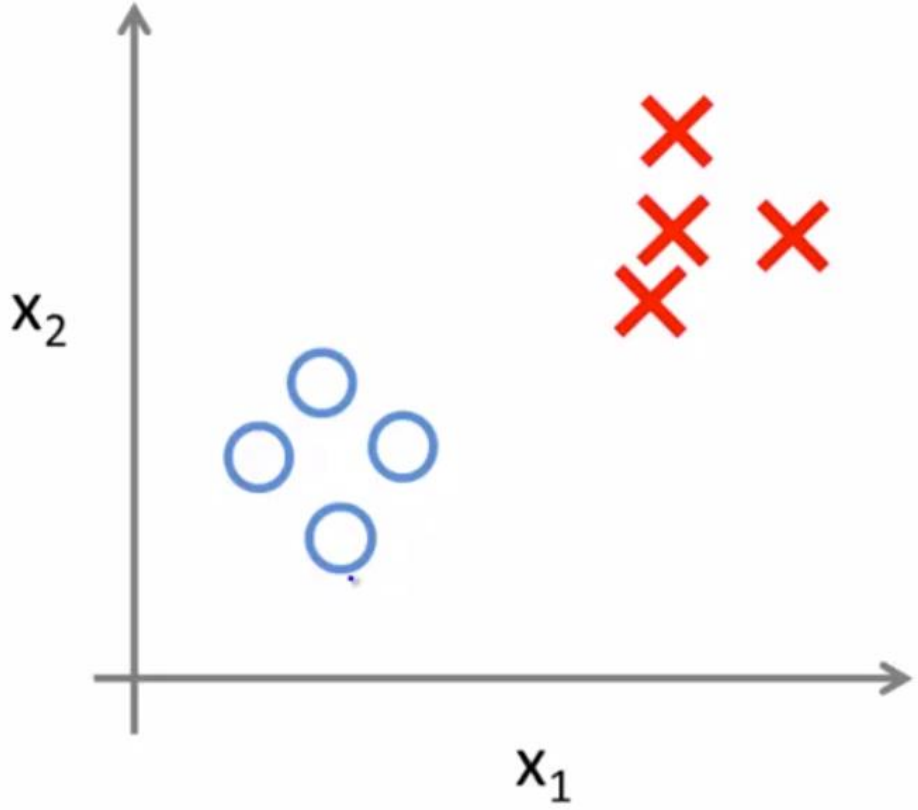
Problem 1: You have a large inventory of identical items. You want to predict how many of these items will sell over the next 3 months.
Problem 2: You'd like software to examine individual customer accounts, and for each account decide if it has been hacked/compromised.

Should you treat these as classification or as regression problems?

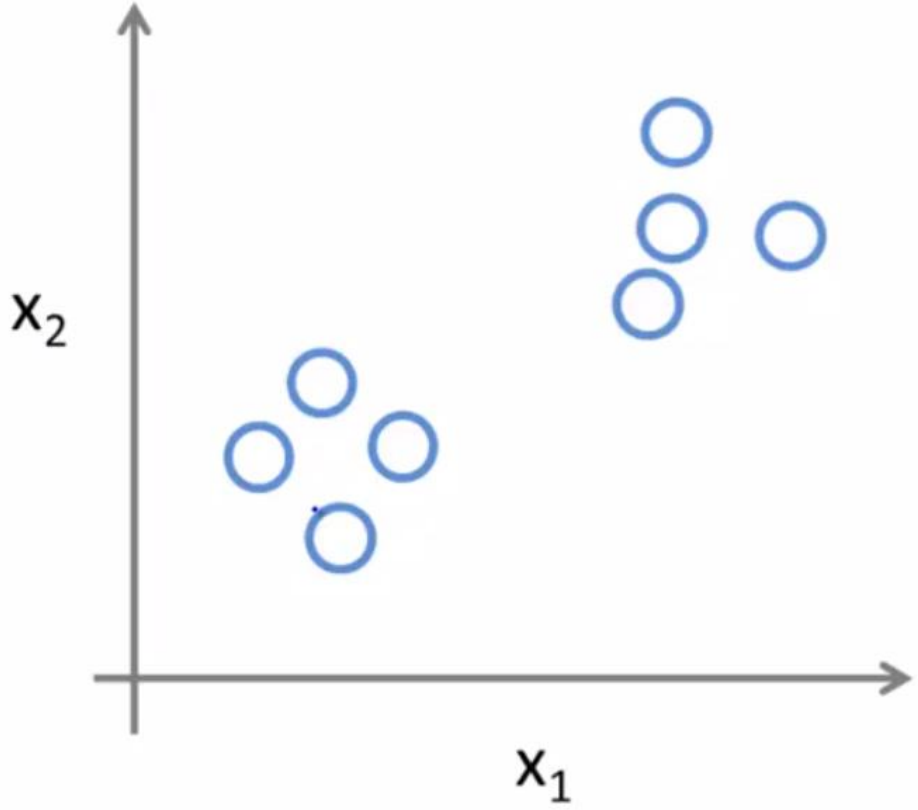
- ◯ Treat both as classification problems.
- ◯ Treat problem 1 as a classification problem, problem 2 as a regression problem.
- ◯ Treat problem 1 as a regression problem, problem 2 as a classification problem.
- ◯ Treat both as regression problems.

UNSUPERVISED LEARNING

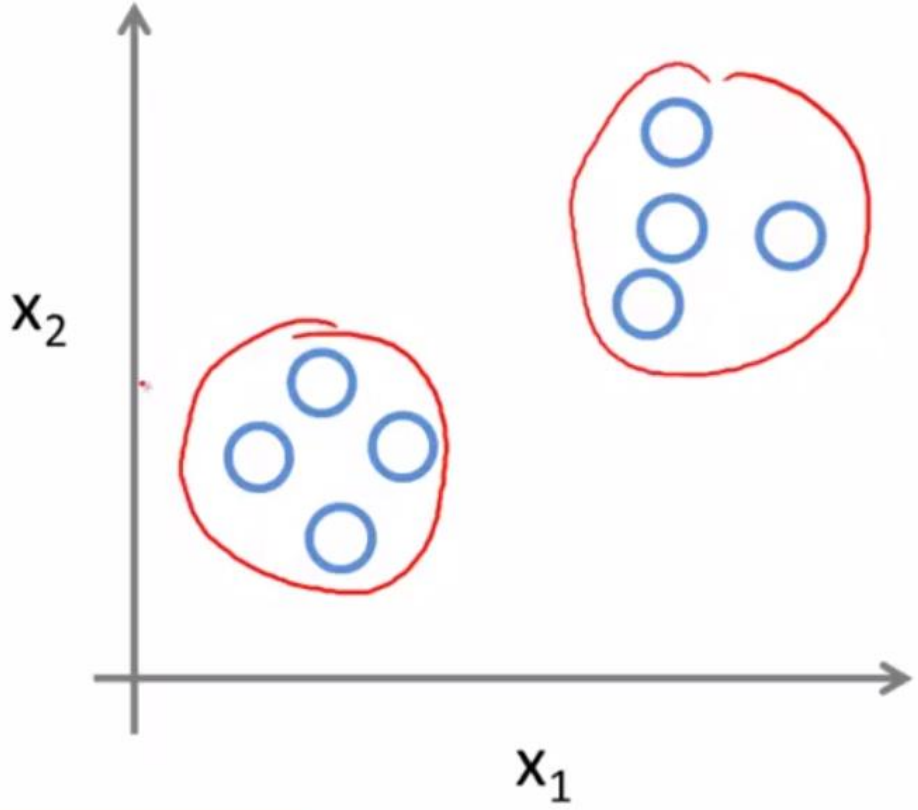
Supervised Learning



Unsupervised Learning



Unsupervised Learning



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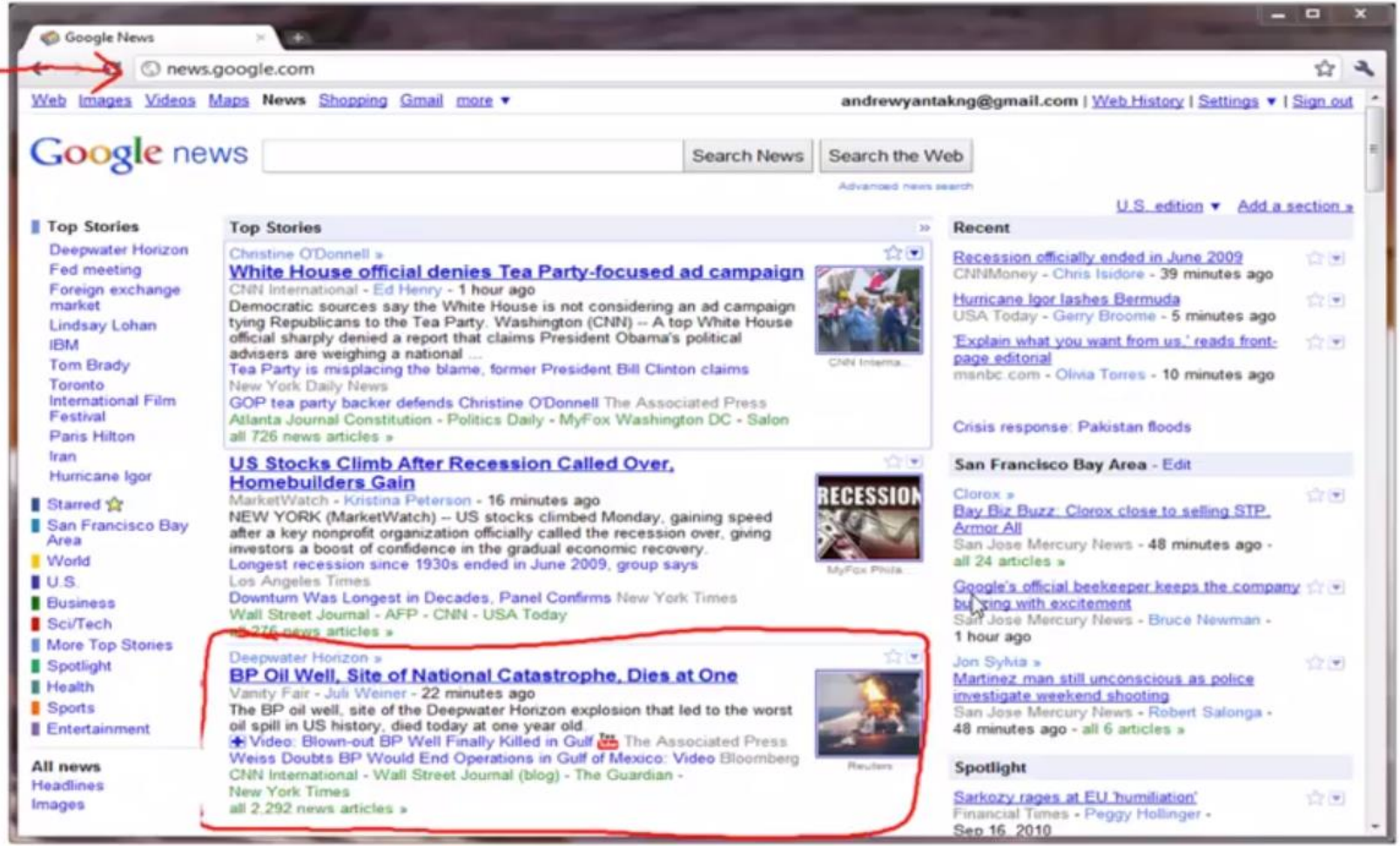
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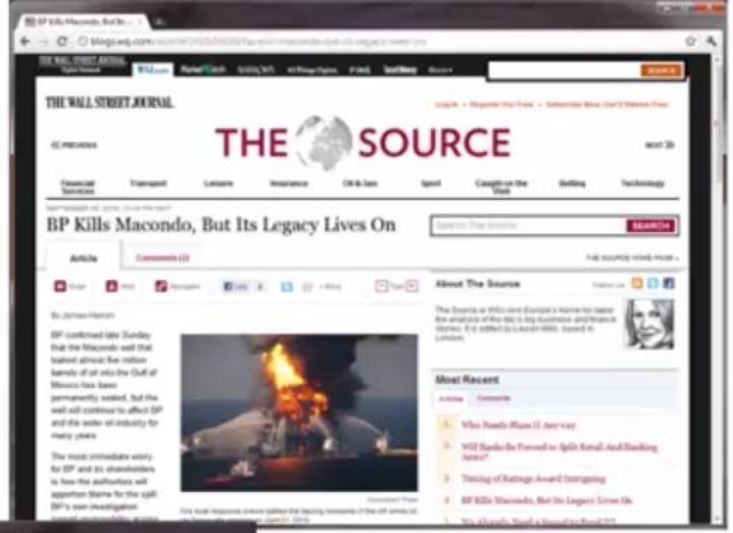
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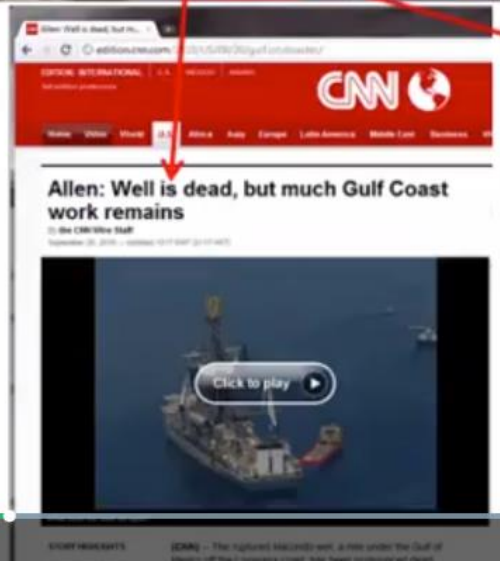
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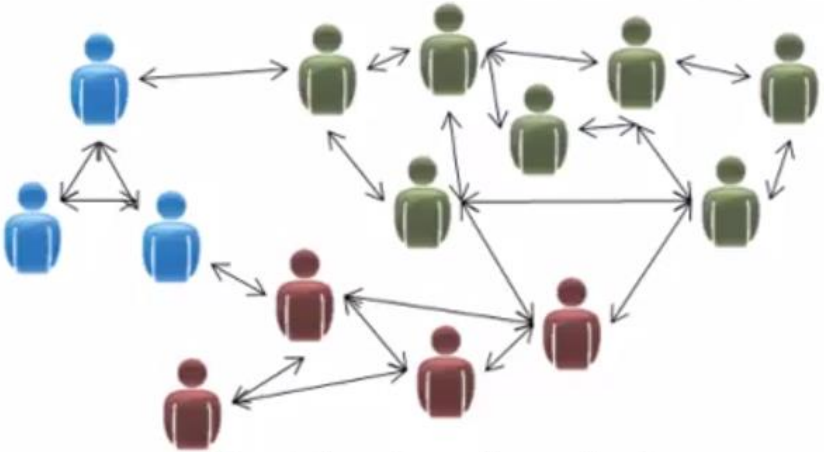
Organize computing clusters



Social network analysis

Market segmentation

Astronomical data analysis

Of the following examples, which would you address using an unsupervised learning algorithm? (Check all that apply.)

- [ ] Given email labeled as spam/not spam, learn a spam filter.
- [ ] Given a set of news articles found on the web, group them into set of articles about the same story.
- [ ] Given a database of customer data, automatically discover market segments and group customers into different market segments.
- [ ] Given a dataset of patients diagnosed as either having diabetes or not, learn to classify new patients as having diabetes or not.