

C210 – Inteligência Computacional

Introdução ao Aprendizado de Máquina

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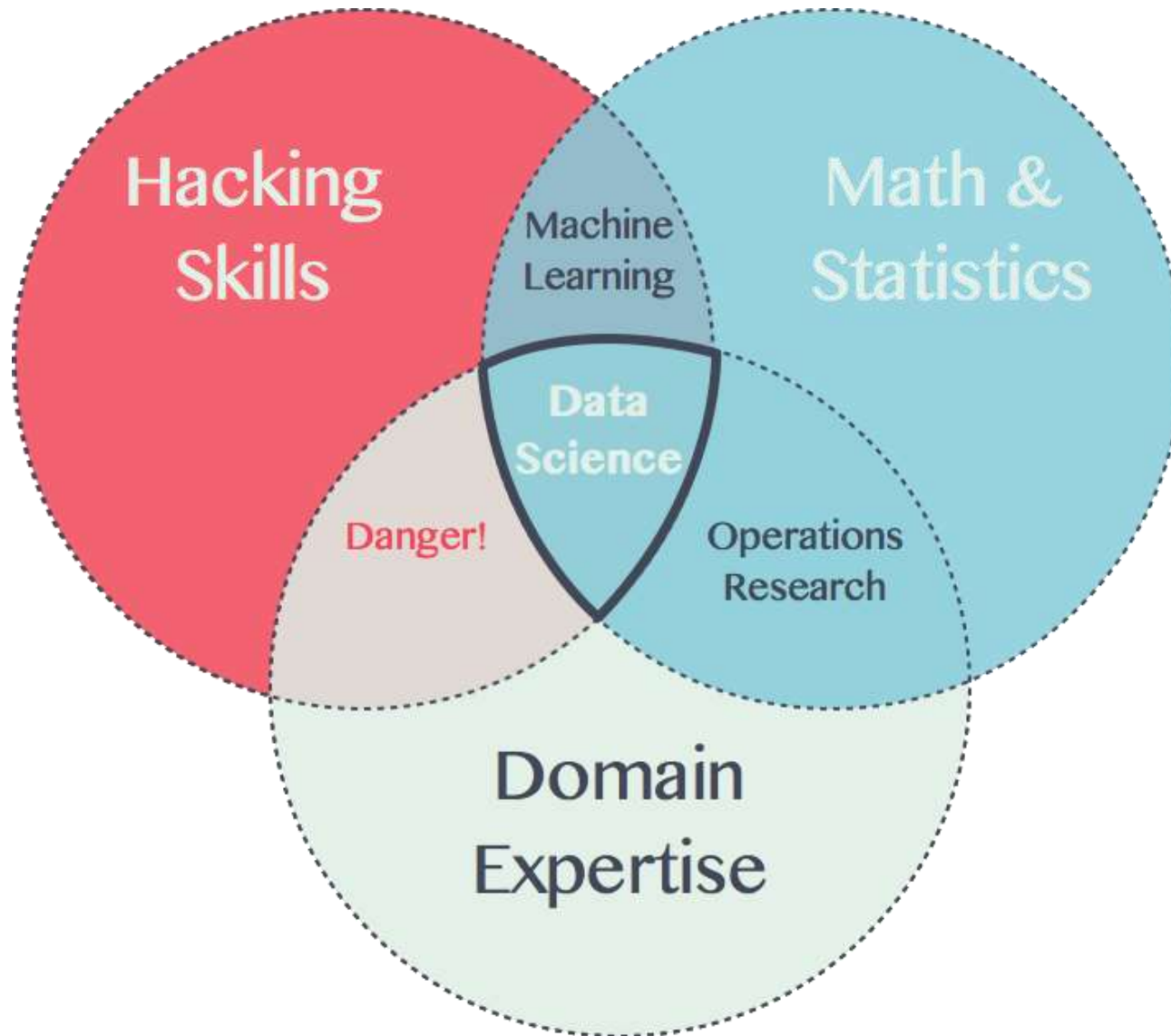
Av. João de Camargo, 510

Santa Rita do Sapucaí - MG

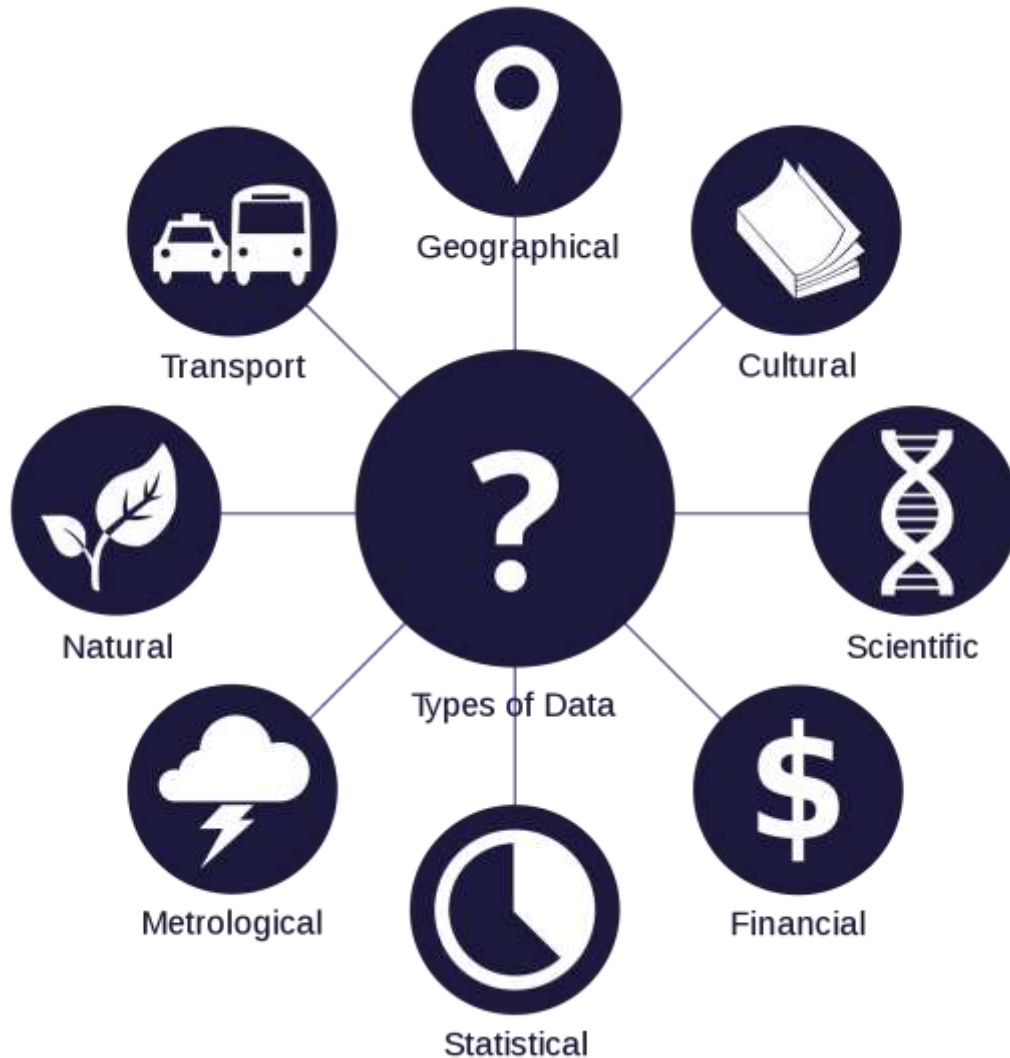
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1º Semestre / 2020

Panorama

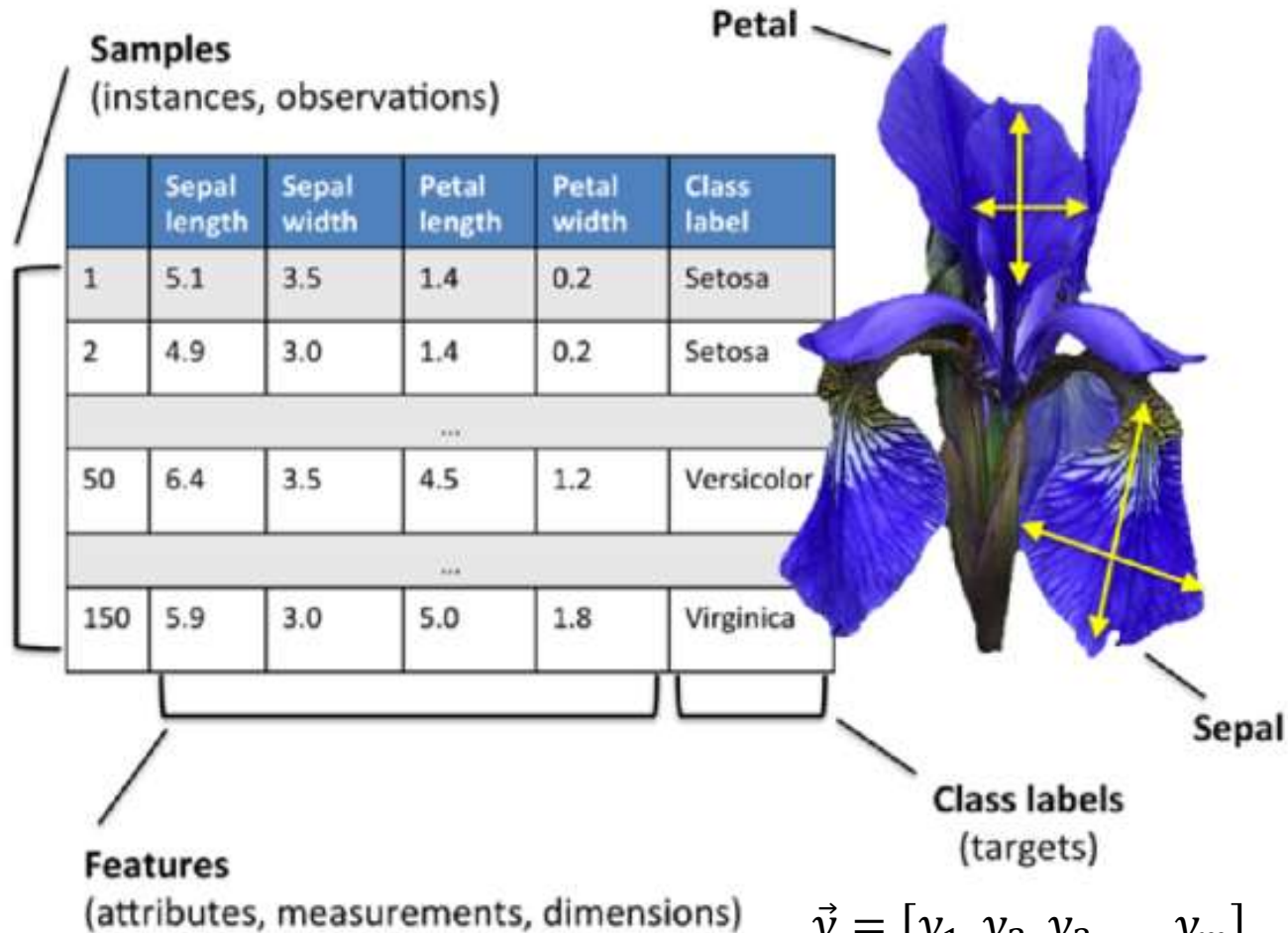


Tenho os dados, e agora?



Nomenclatura

https://en.wikipedia.org/wiki/Iris_flower_data_set

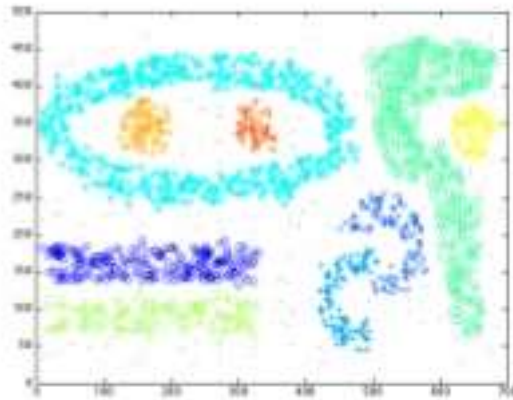


$$\vec{y} = [y_1, y_2, y_3, \dots, y_m]$$

$$\vec{x} = \begin{bmatrix} x_1^1 & \dots & x_k^1 \\ \vdots & \ddots & \vdots \\ x_1^m & \dots & x_k^m \end{bmatrix}$$

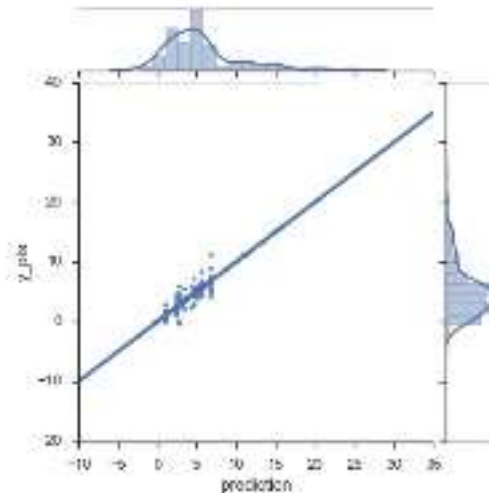
Tipos de aprendizado

Unsupervised Learning

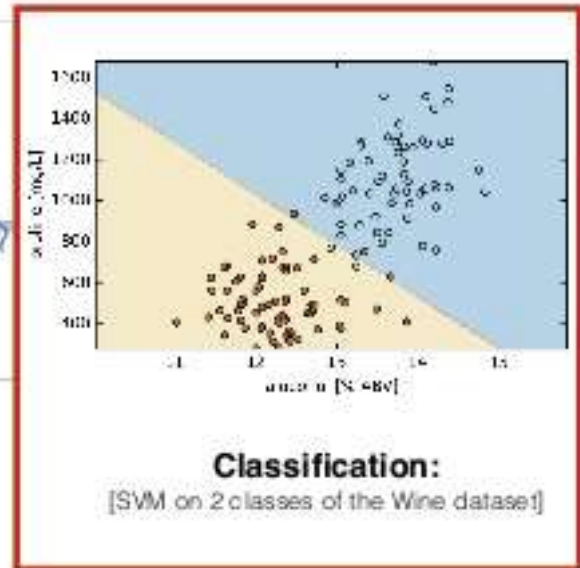


Clustering:
[DBSCAN on a toy dataset]

Supervised Learning



Regression:
[Soccer Fantasy Score prediction]



Classification:
[SVM on 2 classes of the Wine dataset]

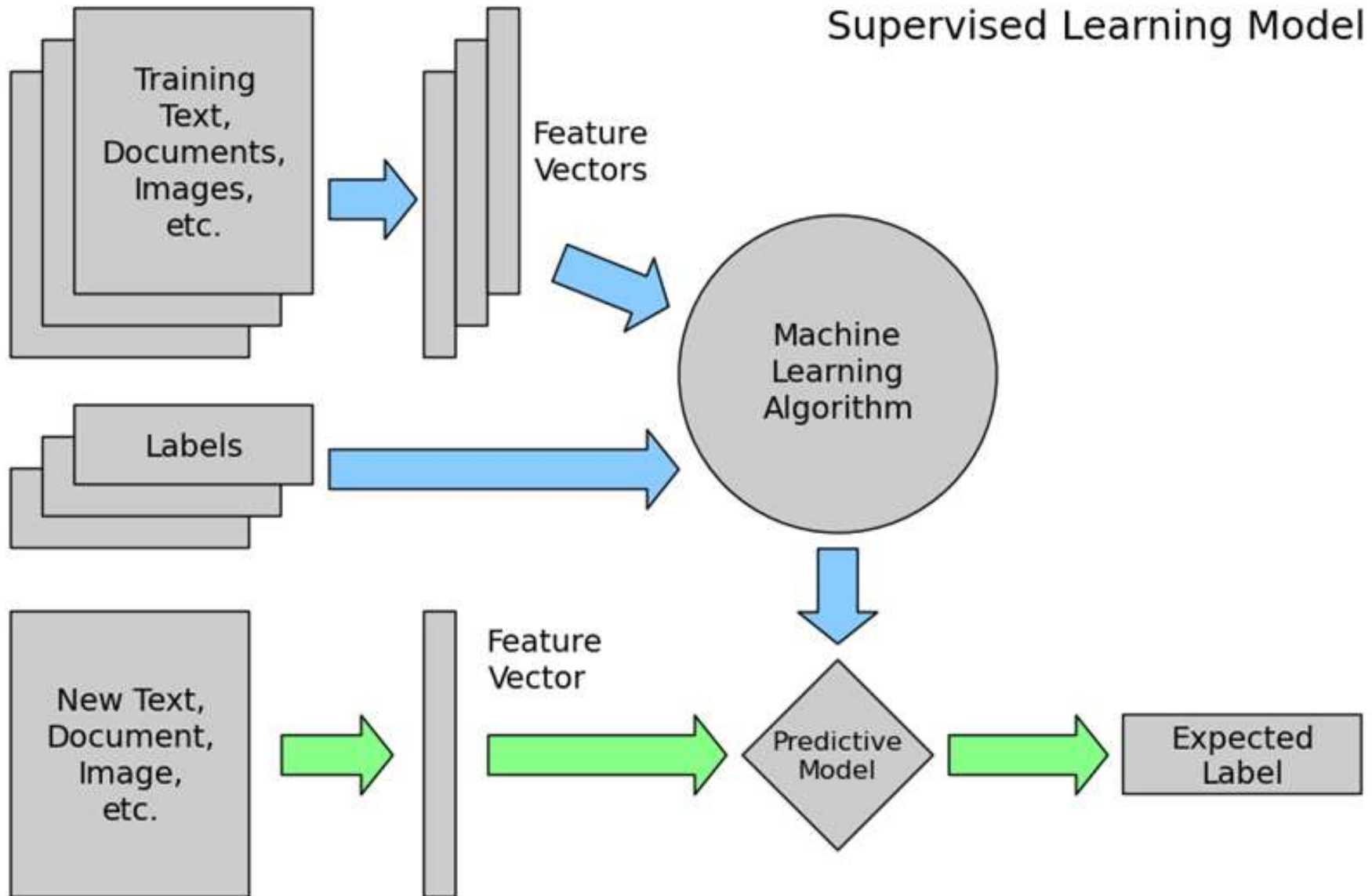
[https://www.slideshare.net/SebastianRaschka/nextgen-talk-022015/9-](https://www.slideshare.net/SebastianRaschka/nextgen-talk-022015/9-UnsupervisedlearningSupervisedlearningClusteringDBSCAN_on_a_toy_datasetClassificationSVM)

UnsupervisedlearningSupervisedlearningClusteringDBSCAN_on_a_toy_datasetClassificationSVM

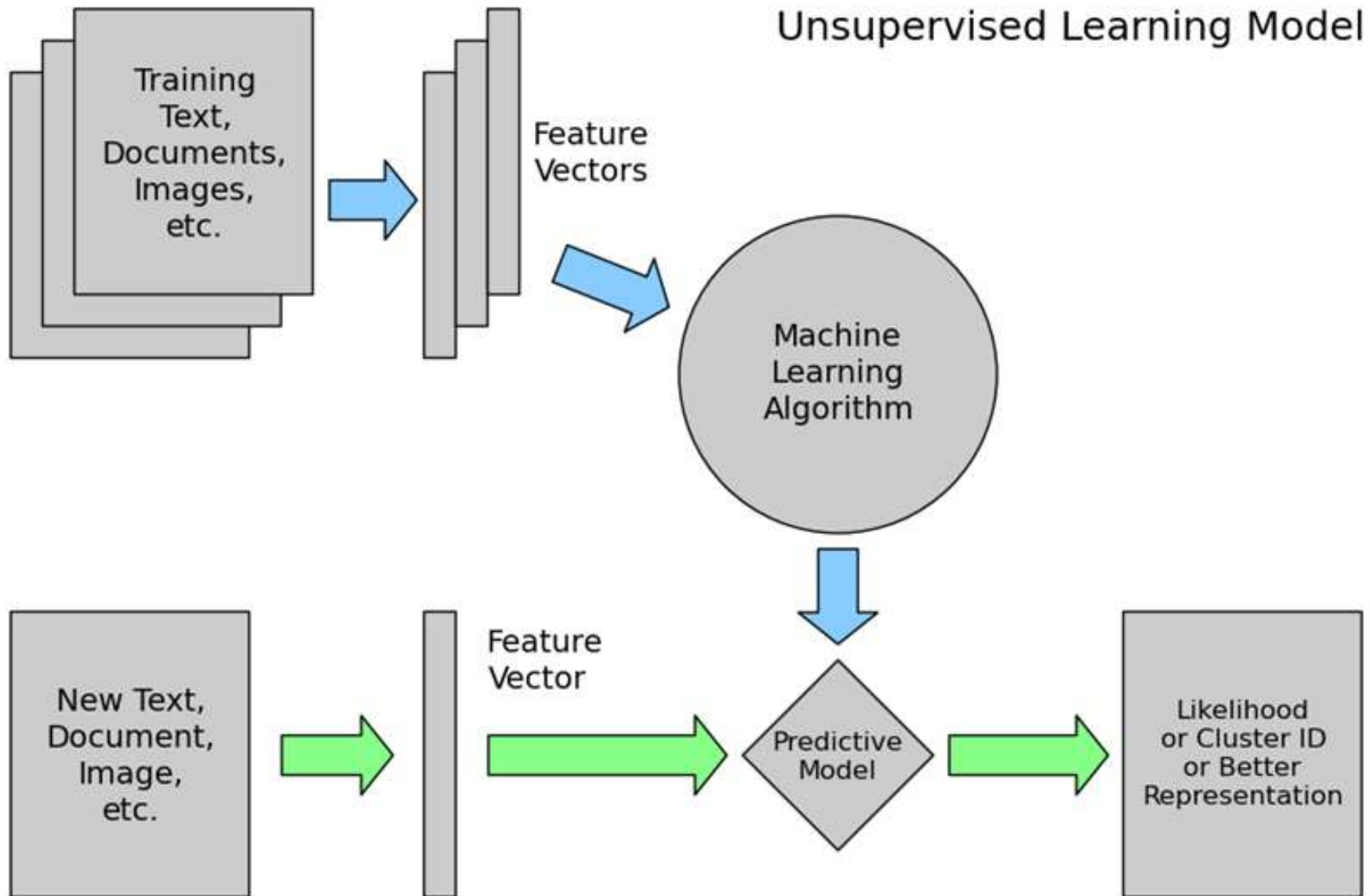
Tipos de aprendizado

- **Aprendizado supervisionado**, quando é utilizado um agente externo que indica à rede a resposta desejada para o padrão de entrada;
- **Aprendizado não supervisionado** (agrupamento), quando não existe um agente externo indicando a resposta desejada para os padrões de entrada.

Tipos de aprendizaje: supervisado



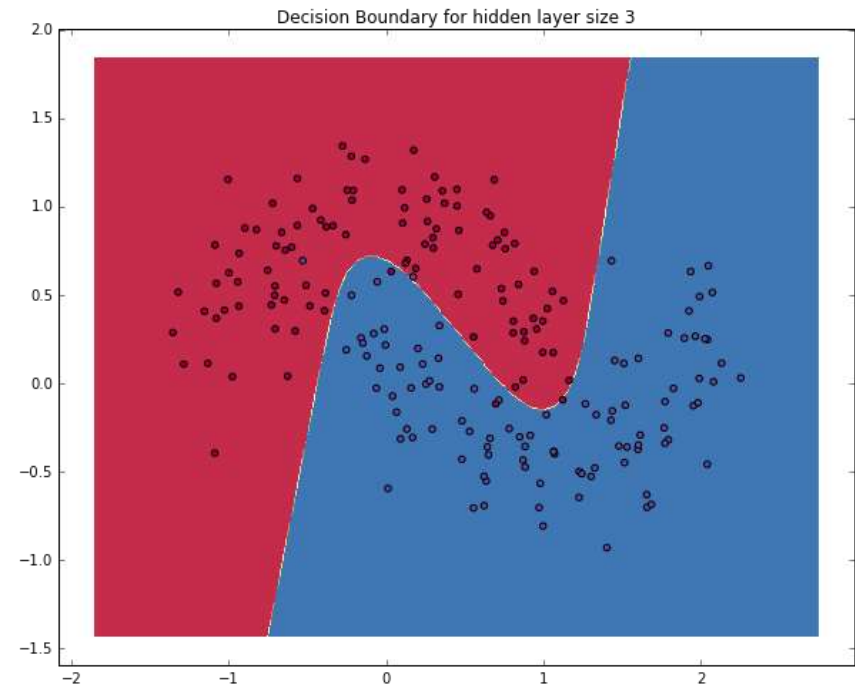
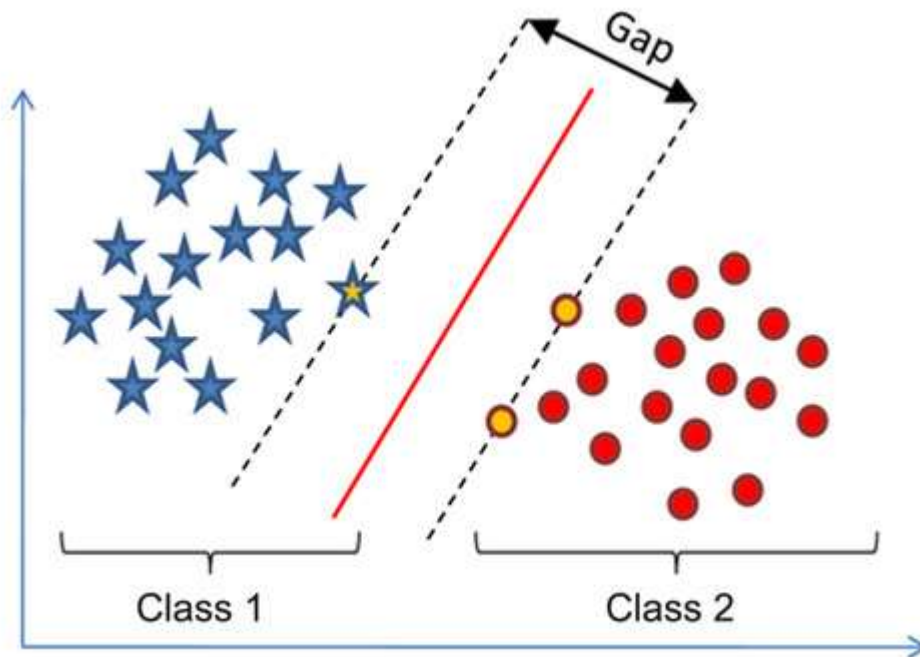
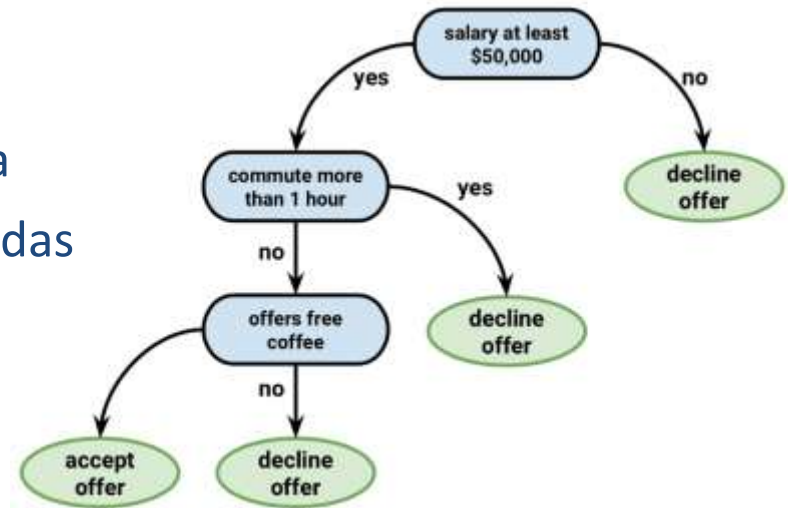
Tipos de aprendizado: não-supervisionado



Principais algoritmos

➤ Classificação

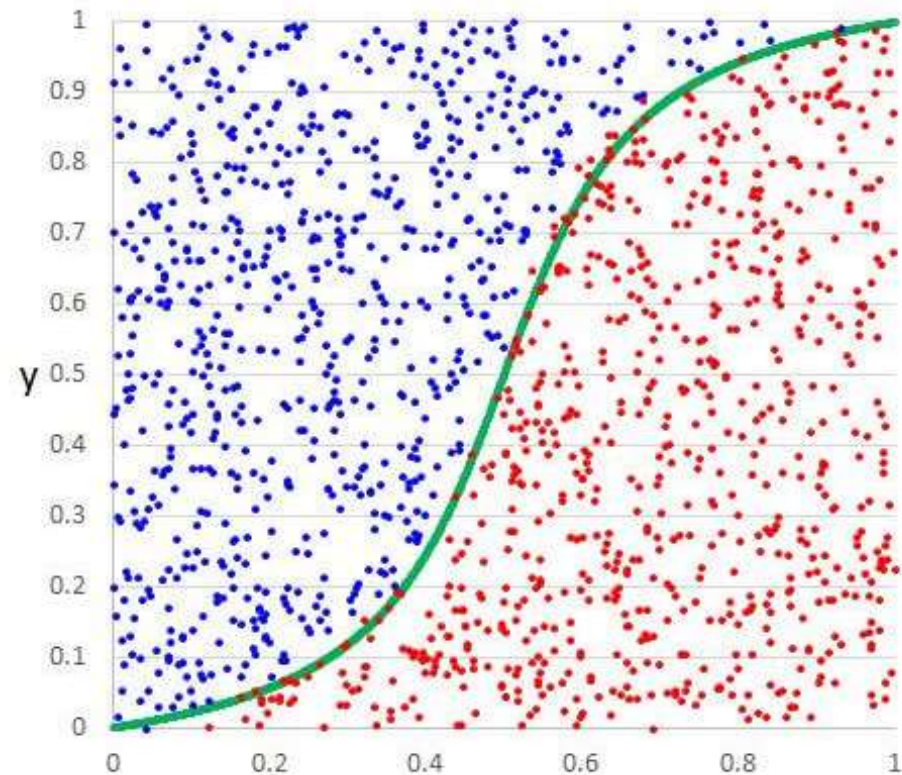
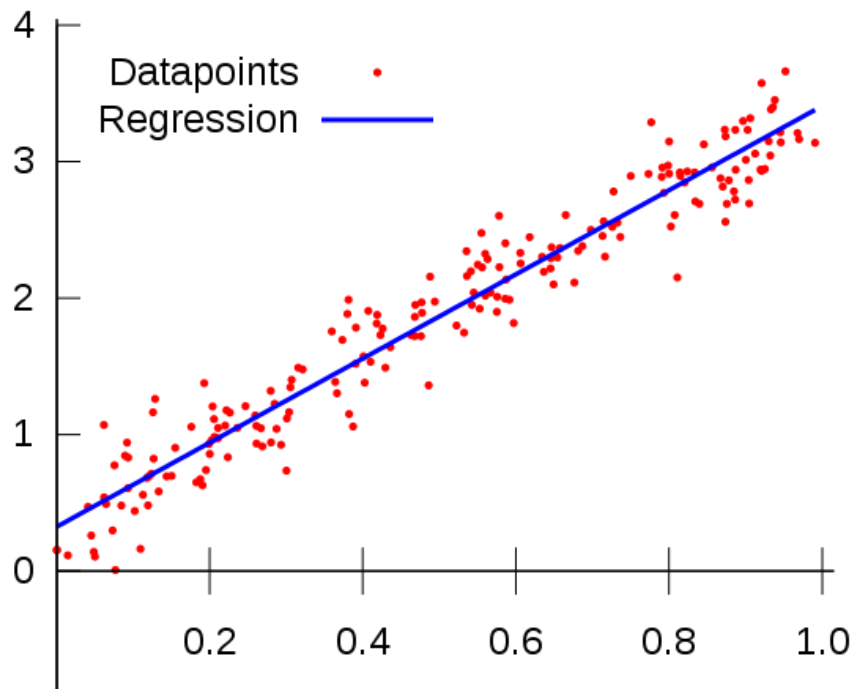
- **Objetivo:** associar um padrão de entrada para uma das classes previamente definidas
- **Exemplos:** Redes Neurais Atificiais, Máquinas de Vetores de Suporte e Árvores de Decisão



Principais algoritmos

➤ Regressão

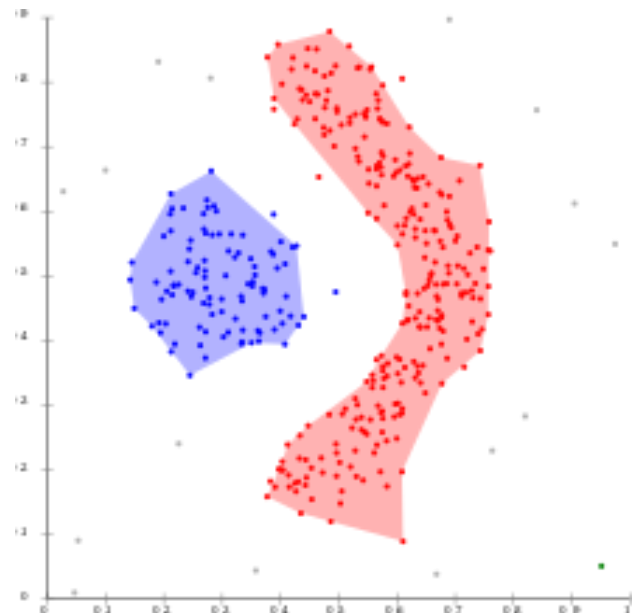
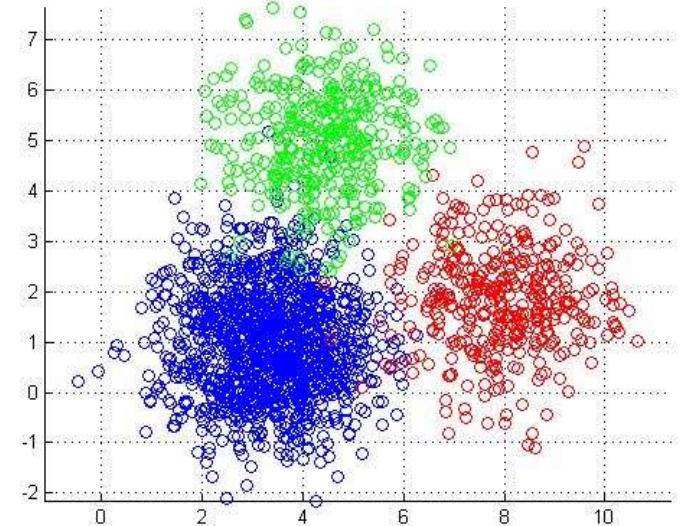
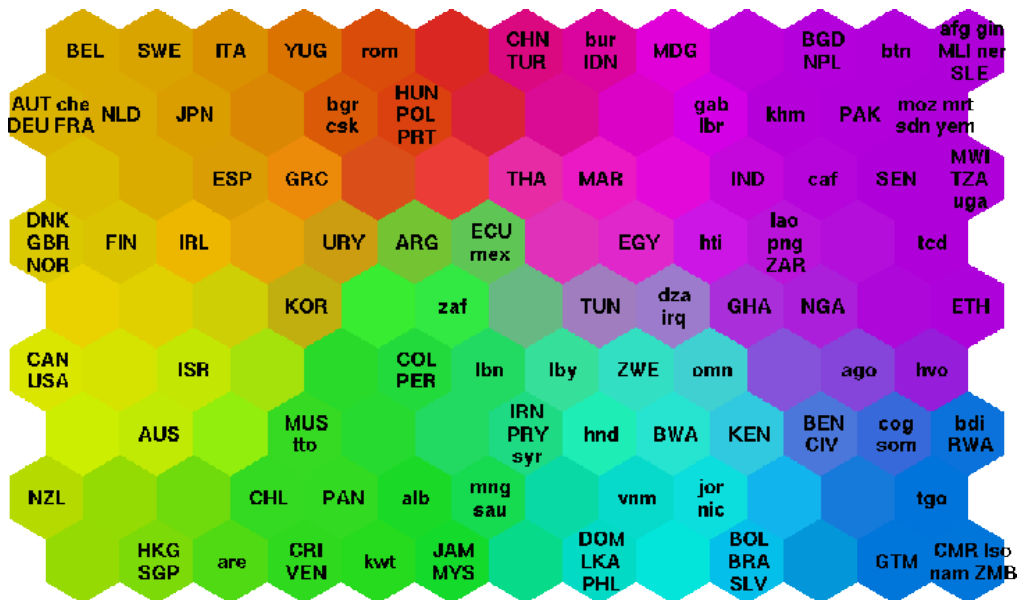
- **Objetivo:** mapear o relacionamento funcional entre as variáveis (reais) de um sistema a partir de um conjunto de valores conhecidos
- **Exemplos:** Regressão Linear e Regressão Logística



Principais algoritmos

➤ Agrupamento

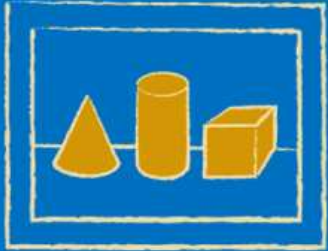
- **Objetivo:** identificar e detectar semelhanças e particularidades entre os diversos padrões de entrada para efetuar o agrupamento
- **Exemplos:** K-Means, Mapas Auto-Organizáveis e DBSCAN / OPTICS



Procedimento

<http://oliviaklose.com/machine-learning-11-algorithms-explained/>

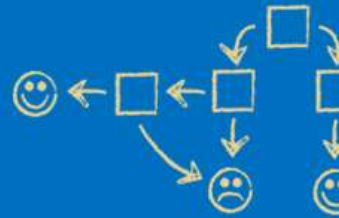
Get Raw Data



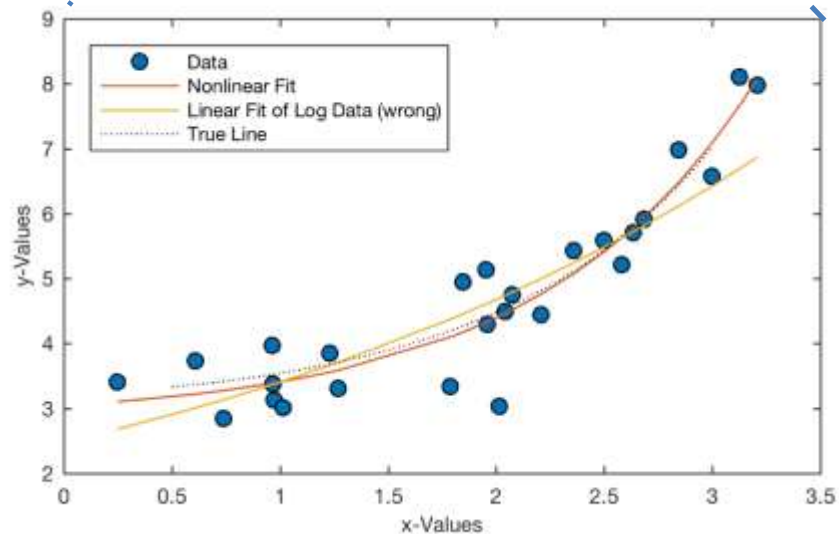
Clean Data

$$\begin{bmatrix} X + Y = Z \\ A + B = C \\ X + A = Z \\ B + Y = ? \end{bmatrix}$$

Build Model

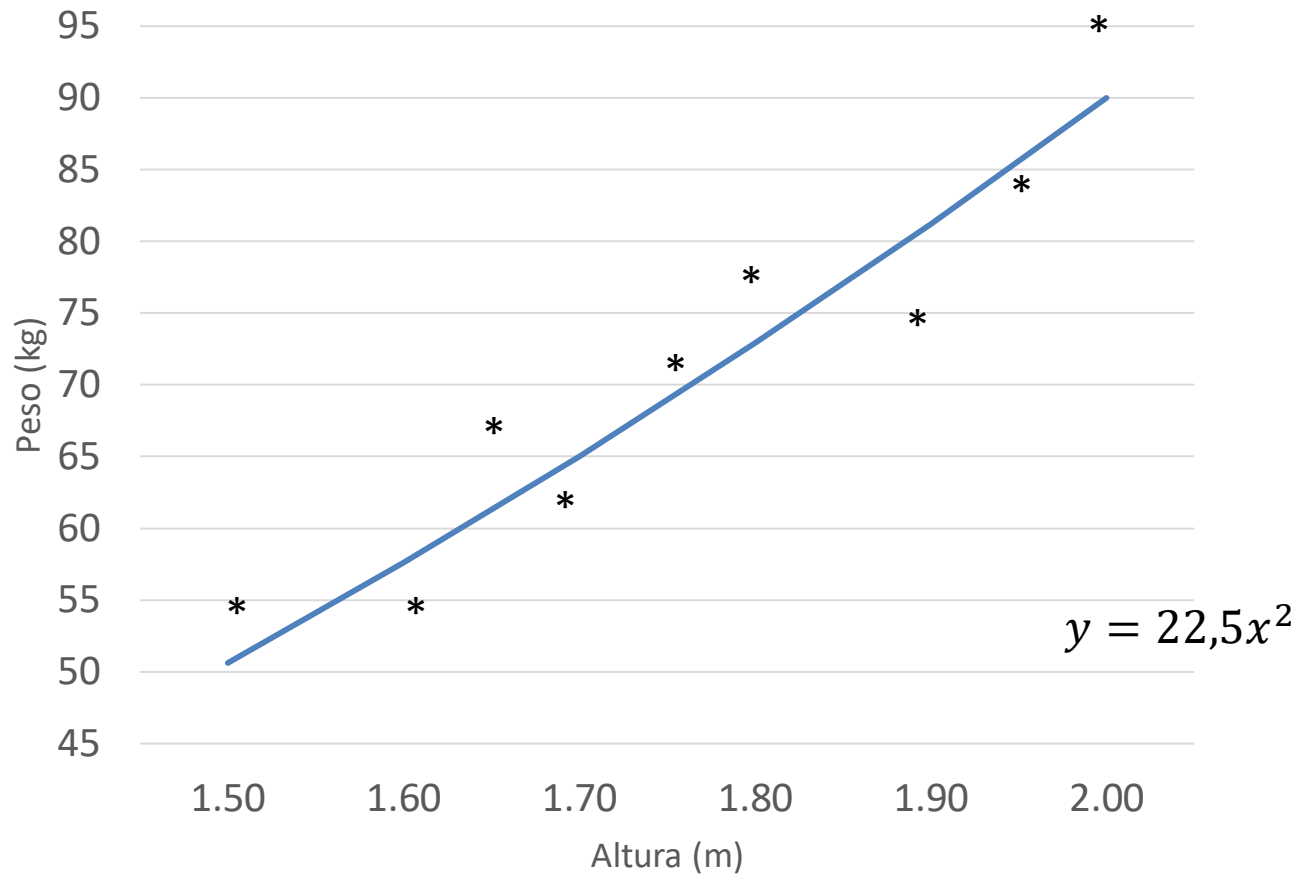


Predict

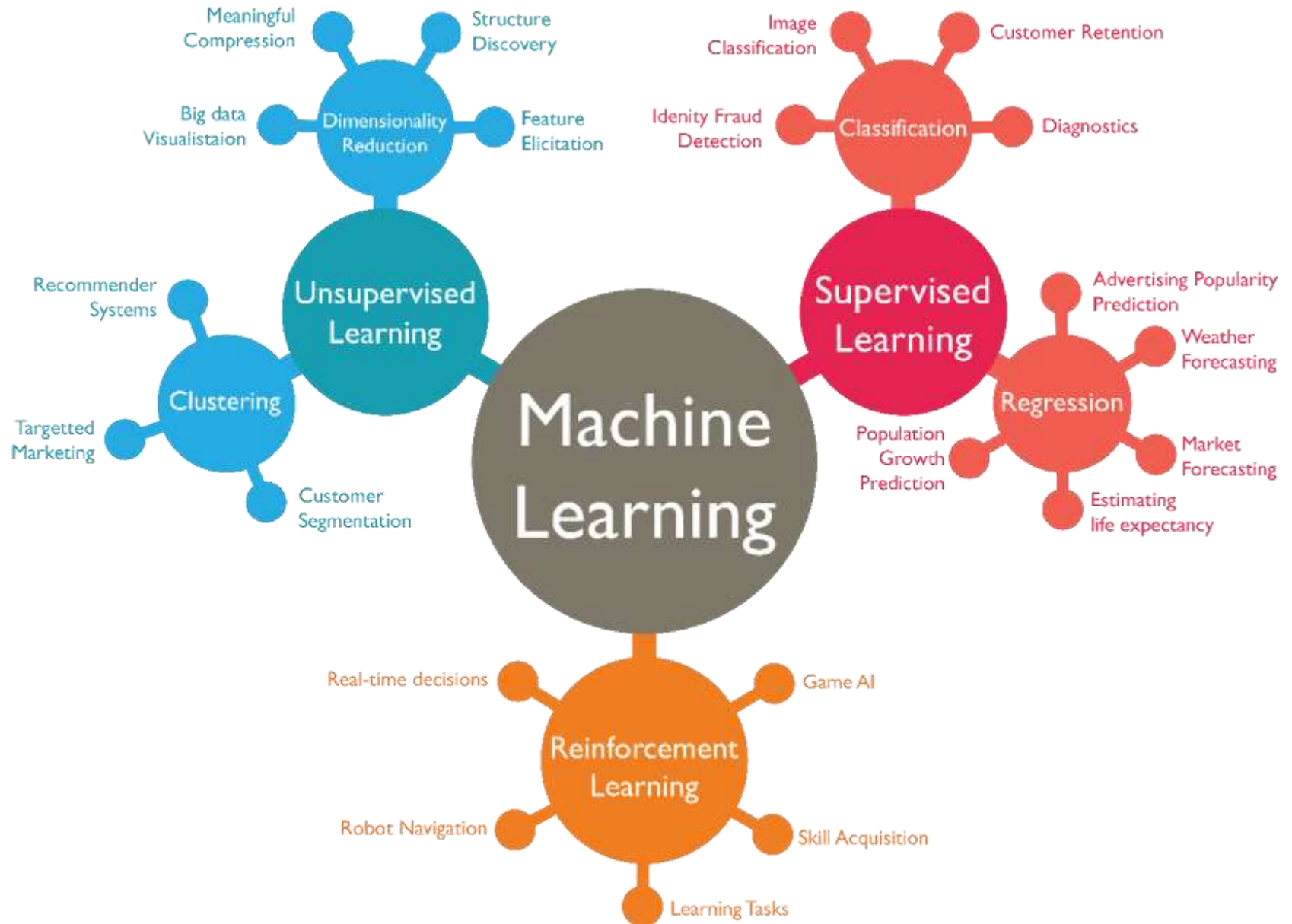


Objetivo do aprendizado

- Obter o modelo matemático que representa o problema



Exemplo





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FIM

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