Introduction to Machine Learning

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👤 Created By	Ⓚ Khanh Vương
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Machine Learning Classification

There're two type of Machine Learning classification

Classify by Learning Method

Supervised Learning

- **Supervised Learning** is the most wide-used methods

- It's basic idea is to find the best parameters (or weight) for a specific equation, usually a Linear equation

- We will have a training dataset, which includes *features* and *labels, each feature* will match a specific *label*. Our mission is to find the best *weight* for all of those *features* so that for each parameter **x** that pass to the function **f(x)**, we will have the best approximate **y**, so we can expect that in the future, when we meet a new *feature* that doesn't exist in the training set, we will have the best approximate.

- **Supervised Learning** will be divided into two groups:

  - **Classification**: The output labels will be divided into finite groups.

  - **Regression**: The output labels will be a range of continuous values.

Unsupervised Learning

- While **Supervised Learning** focuses on the relationship between data and labels, **Unsupervised Learning** focuses on the relationship between data because outputs are unspecified, applicable to grouping or reducing the number of dimensions of data

- **Unsupervised Learning** will be divided into two groups:

  - **Clustering**: Divide all *features* to small categories base on the relationships between them.

  - **Association**: Is the problem when we want to discover a law based on many given data.

Semi Supervised Learning

- Many **Machine Learning** problems belong to this group because collecting labeled data is time consuming and expensive. Many types of data even require an expert to label them (medical photographs, for example). In contrast, unlabeled data can be collected at low cost from the internet.

Reinforcement Learning

- Similar to **Minimax** algorithm, evaluate the best possible outcome again and again

Classify by features

- **Regression Algorithms**

- **Classification Algorithms**

- **Instance-based Algorithms**

- **Regularization Algorithms**

- **Bayesian Algorithms**

- **Clustering Algorithms**

- **Artificial Neural Network Algorithms**

- **Dimensionality Reduction Algorithms**

- **Ensemble Algorithms**

References

- *https://machinelearningcoban.com/2016/12/27/categories/*

- *https://towardsdatascience.com/types-of-machine-learning-algorithms-you-should-know-953a08248861*