UNIVERSIDAD POLITÉCNICA DE YUCATÁN

COMPUTATIONAL ROBOTICS ENGINEERING

GROUP: 9° “B”

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SUBJECT: MACHINE LEARNING

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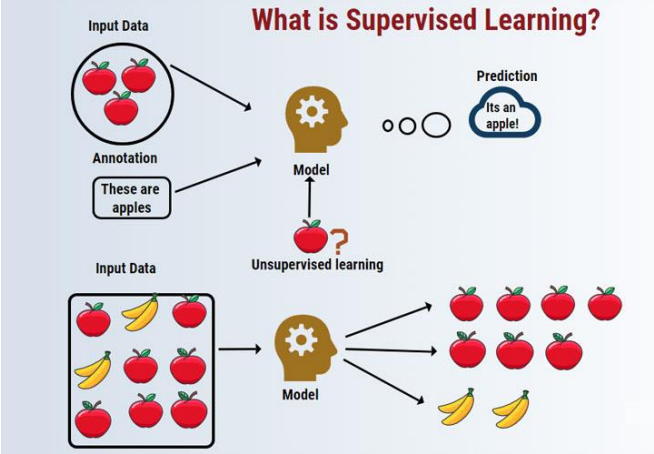
Supervised learning

What is supervised learning?

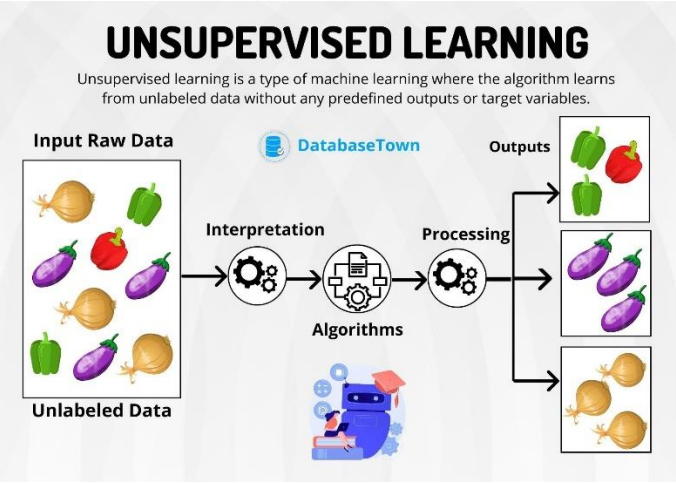
Supervised learning, also known as supervised machine learning, is a subcategory of machine learning and artificial intelligence. It is defined by its use of labeled datasets to train algorithms that classify data or predict outcomes accurately. As input data is fed into the model, it adjusts its weights until the model has been fitted appropriately, which occurs as part of the cross-validation process. Supervised learning helps organizations solve for a variety of real-world problems at scale, such as classifying spam in a separate folder from your inbox. [1]



Unsupervised learning

Unsupervised learning, also known as unsupervised machine learning, uses machine learning algorithms to analyze and cluster unlabeled datasets. These algorithms discover hidden patterns or data groupings without the need for human intervention.

Its ability to discover similarities and differences in information make it the ideal solution for exploratory data analysis, cross-selling strategies, customer segmentation, and image recognition. [2]



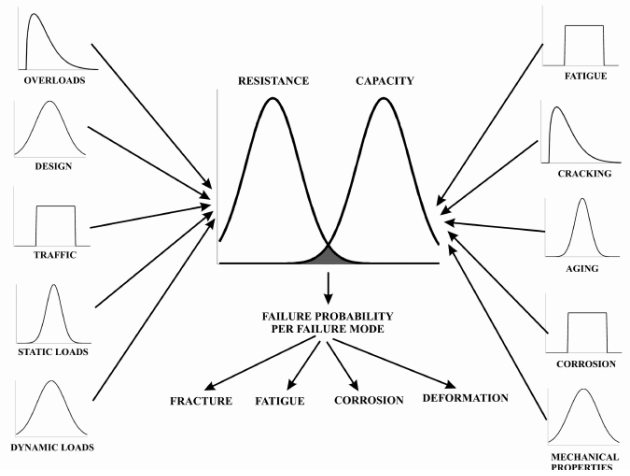
Probabilistic model

Probabilistic modeling is a statistical technique used to take into account the impact of random events or actions in predicting the potential occurrence of future outcomes.

What is probabilistic modeling

Based on the fact that randomness or uncertainty plays a role in predicting outcomes, predictive modeling is used in a wide variety of fields and disciplines, from predicting the weather to potential nuclear fallout.

In the realm of marketing these types of models are most often used to explore consumer behavior and, more specifically, in the mobile ecosystem, in the pursuit of a more holistic view of campaign performance. [3]

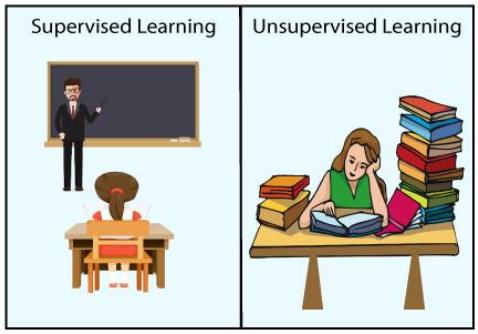


Difference between supervised and unsupervised learning

Supervised learning is the machine learning task of learning a function that maps an input to an output based on example input-output pairs.A wide range of supervised learning algorithms are available, each with its strengths and weaknesses. [4]

Unsupervised learning is a type of machine learning that looks for previously undetected patterns in a data set with no pre-existing labels and with a minimum of human supervision.

Supervised learning needs supervision to train the model. Unsupervised learning does not need any supervision to train the model. Supervised learning can be categorized in Classification and Regression problems. Unsupervised Learning can be classified in Clustering and Associations problems. [5]



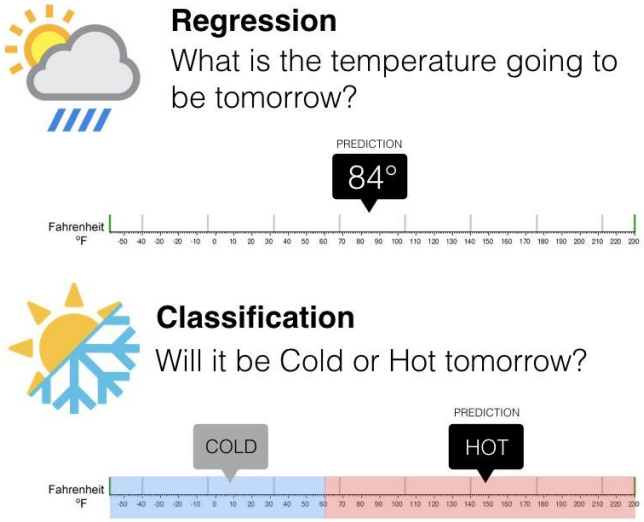
Difference between classification and regression

The most significant difference between regression vs classification is that while regression helps predict a continuous quantity, classification predicts discrete class labels. There are also some overlaps between the two types of machine learning algorithms.

- A regression algorithm can predict a discrete value which is in the form of an integer quantity
- A classification algorithm can predict a continuous value if it is in the form of a class label probability

Let's consider a dataset that contains student information of a particular university. A regression algorithm can be used in this case to predict the height of any student based on their weight, gender, diet, or subject major. We use regression in this case because height is a continuous quantity. There is an infinite number of possible values for a person's height.

On the contrary, classification can be used to analyse whether an email is a spam or not spam. The algorithm checks the keywords in an email and the sender's address is to find out the probability of the email being spam. Similarly, while a regression model can be used to predict temperature for the next day, we can use a classification algorithm to determine whether it will be cold or hot according to the given temperature values. [6]



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