LIBRARIES USED IN MACHINE LEARNING

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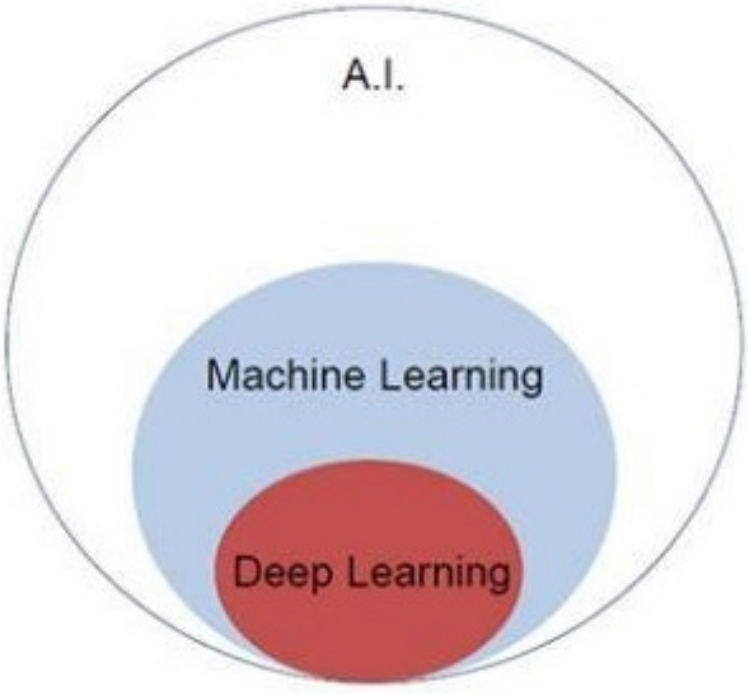
Contents

1 Introduction

We shall look at the libraries used in machine learning in python programming, note you can implement these machine learning models on a website.



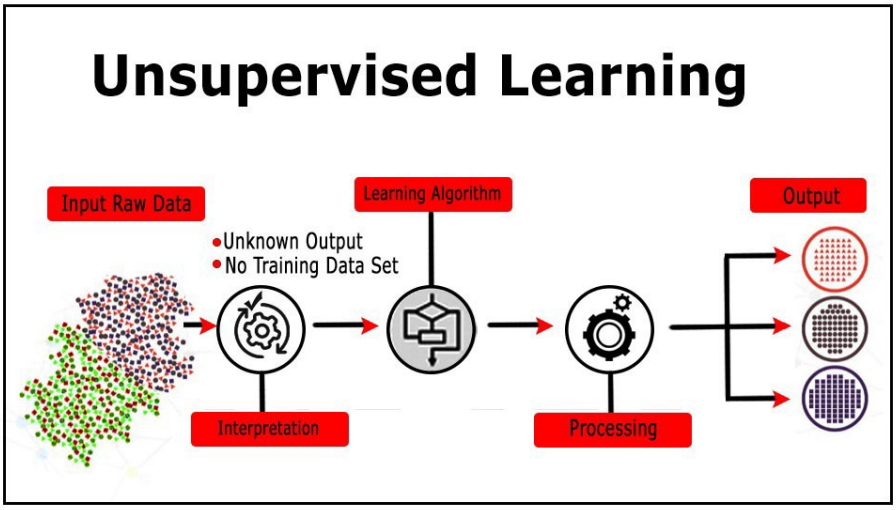
Machine learning includes a section of machine learning and deep learning is a

part of machine learning. The ability of program which follows machine learning concepts is to improve its performance of observed data. The main motive of data transformation is to improve its knowledge in order to achieve better results in the future, provide output closer to the desired output for that particular system. Machine learning includes "pattern recognition" which includes the ability to recognize the patterns in data.
The patterns should be trained to show the output in desirable manner.
Machine learning can be trained in two different ways

-Supervised training

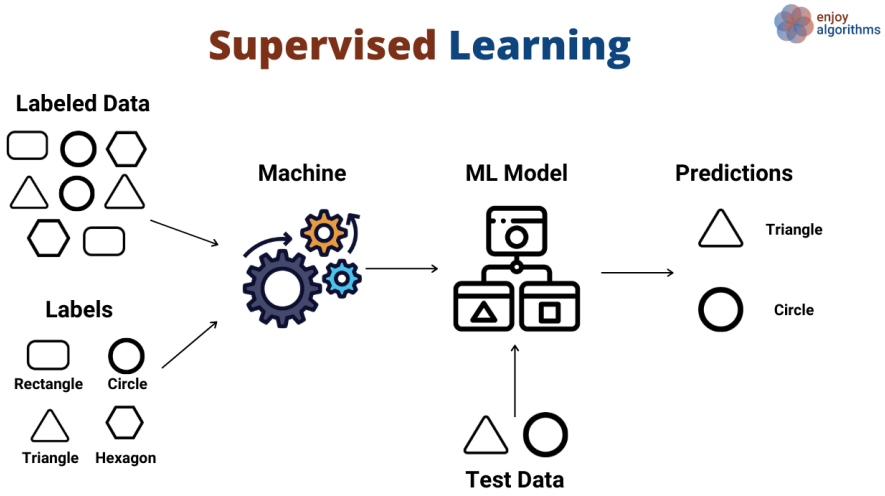
-Unsupervised training

Unsupervised learning is a machine learning technique in which the system is trained using unlabeled data, where the system is not provided with any information about which class each example belongs to. The system looks for patterns and similarities in the data, and groups them based on shared characteristics, using internal knowledge features.



Unsupervised learning algorithms are commonly used in clustering problems, where the goal is to group similar examples together. For example, a system could be trained on a dataset of photos with no accompanying information, and it would cluster the photos based on visual similarities.

Supervised learning is a machine learning technique in which the system is trained using a labeled dataset, where each example is associated with a desired output value. During training, the system minimizes a specific loss function that represents the error between the predicted output and the desired output.



Once training is complete, the accuracy of the model is evaluated using a validation set, which consists of examples that are disjoint from the training set. The validation set is used to measure the performance of the model on new, unseen data, and to determine if the model has overfit the training data. By using a validation set, we can ensure that the model has learned to generalize well to new examples.

What Does social media such as tiktok use to recommend videos?

Collaborative filtering: is used to recommend videos to users based on

their past interactions, such as likes, comments, shares, and watch time, as well as the preferences of similar users. This technique is particularly effective in recommending videos that are popular among a user's social network.

Content-based filtering: is used to recommend videos to users based on the content of the video, such as the music, hashtags, captions, and visual features. This technique is useful in recommending videos that are similar in style or content to videos that a user has engaged with in the past.

Deep learning: is also used by TikTok to improve video recommendation. This technique involves training neural networks on large amounts of data to learn complex patterns and relationships in the data. TikTok uses deep learning to analyze user behavior and video content to identify what makes a video popular and engaging.

Does social media track what i click on their website for machine learning process.

Yes, social media platforms often track what users click on their website or app for machine learning purposes, particularly for personalized recommendations and targeted advertising. This is done through various techniques such as tracking cookies, user behavior analysis, and user feedback mechanisms.

By analyzing the user's behavior on their website or app, social media platforms can gather data on the user's preferences and interests, which can be used to train machine learning models to provide personalized recommendations and targeted advertising. For example, if a user frequently clicks on videos related to cooking, the platform may recommend more cooking-related content to the user in the future.

It's worth noting that most social media platforms provide users with options

to control their data privacy and limit the amount of data that is collected and used for machine learning. However, it's important for users to be aware of the data that is being collected and how it is being used to make informed decisions about their data privacy.

Common libraries of Machine Learning.

1) TensorFlow: This is an open-source library developed by Google, used for building and training neural networks.

2) PyTorch: This is an open-source machine learning library developed by Facebook, which provides tensor computation with strong GPU acceleration.

3) Keras: This is a high-level neural networks API, written in Python, and runs on top of TensorFlow, Theano, or CNTK. It is easy to use, and ideal for rapid prototyping.

4) Caffe: This is a deep learning framework developed by Berkeley AI Research and community contributors. It is used for image classification, segmentation, and other tasks.

5) MXNet: This is an open-source deep learning framework used for training and deploying neural networks.

6) Torch: This is a scientific computing framework with wide support for machine learning algorithms, it is written in Lua, and is used in many applications, such as computer vision, natural language processing, and speech recognition.

7) SciPy: This is a Python-based ecosystem of open-source software for mathematics, science, and engineering. It contains modules for optimization, linear algebra, signal and image processing, and more, which are useful for building neural networks.

8) Theano: This is a Python library for fast numerical computation that can be run on either CPU or GPU, and can be used to define, optimize, and evaluate mathematical expressions involving multi-dimensional arrays.

2 Libraries Analysis

TensorFlow: TensorFlow is an open-source library developed by Google for building and training machine learning models, including deep neural networks. It provides a framework for constructing computational graphs, which represent the flow of data through a set of mathematical operations, such as matrix multiplication, convolution, and activation functions.

```python
import tensorflow as tf

# Create a scalar constant with value 100
scalar = tf.constant(100)

# Create a vector constant with values [1, 2, 3, 4, 5]
vector = tf.constant([1, 2, 3, 4, 5])

# Create a matrix constant with values [[1, 2, 3], [4, 5, 6]]
matrix = tf.constant([[1, 2, 3], [4, 5, 6]])

# Create a cube matrix constant with values [[[1], [2], [3]], [[4], [5], [6]], [[7], [8], [9]]]
cube_matrix = tf.constant([[[1], [2], [3]], [[4], [5], [6]], [[7], [8], [9]]])

# Print the shape of each constant using the get_shape() method
print(scalar.get_shape())    # Output: ()
print(vector.get_shape())    # Output: (5,)
print(matrix.get_shape())    # Output: (2, 3)
print(cube_matrix.get_shape())  # Output: (3, 3, 1)
```

```
()
(5,)
(2, 3)
(3, 3, 1)
```

Tensor Data Structure: Tensors are used as the basic data structures in TensorFlow language. Tensors represent the connecting edges in any flow diagram called the Data Flow Graph. Tensors are defined as multidimensional array or list.

Rank Unit of dimensionality described within tensor is called rank. It identifies the number of dimensions of the tensor. A rank of a tensor can be described as the order or n-dimensions of a tensor defined.
A 3 by 3 matrix is a rank-2 tensor, also known as a 2-dimensional tensor, because it has two dimensions: rows and columns.

In general, a matrix with m rows and n columns is a rank-2 tensor with shape (m, n). For example, a 2 by 4 matrix is a rank-2 tensor with shape (2, 4), while a 5 by 5 matrix is a rank-2 tensor with shape (5, 5).

Shape The number of rows and columns together define the shape of Tensor.