Machine Learning based Vehicle Performance Analyzer

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Supervised Learning in Machine Learning

Supervised Learning is the types of machine learning in which machines are trained using well "labelled" training data, and on basis of that data,machines predict the output. The labelled data means some input data is already togged with the correct output.

In supervised learning,the training data provided to the machines work as the supervisor that teaches the machines to predict the output correctly . It applies the same concept as a student learns in the supervision of the teacher.

Supervised learning is a process of providing input data as well as correct output data to the machine learning model. The aim of a supervised learning algorithm is to find a mapping function to map the input variable(x) with the output variable(y).

In the real-world , supervised learning can be used for Risk Assessment, Image classification , Fraud Detection, spam filtering, etc.

Types of Supervised Learning:

Supervised learning can be further divided into two types of Problems

1.Regression

2.Classification

Regression:

Regression algorithms are used if there is a relationship between the input variable and the output variable. It is a used for the prediction of continuous variables such as weather forecasting ,Market Trends,etc. Below are some popular Regressions algorithm which come under supervised learning.

1.Linear Regression

2.Regression Tree

3.Non-Linear Regression

4.Batesian Linear Regression

5.Polynomial Regression

Classification:

Classification algorithms are used when the output variable is categorical, which means there are two classes such as Yes-No,Male-Female ,True-False,etc.
Spam Filtering,

Random Forest

Decision Trees

Logistic Regression

Support vector Machines

Advantages:

With the help of Supervised learning ,the mopdel can predict the output on the basis of prior experiences.

In supervised learning,we can have an exact idea about the classes of objects.

Supervised learning model helps us to solve various real--world problems such as fraud detection,spam filtering,etc.

Disadvantages:

Supervised learning models are not suitable for handling the complex tasks.

Supervised learning cannot predict the correct output if the test data is different from the training dataset.

Training requirewd lots of computation times.

In supervised learning,we need enough knowledge about the classes of object.

Unsupervised Learning in Machine Learning

In the previous topic,we learned supervised machine learning in which models are trained using labeled data under the supervision of training data.But there may be many cases in which we do not have labeled data and need to find the hidden patterns from the given dataset.So, to solve such types of cases in machine learning,we need unsupervised learning techniques.

Types of Unsupervised Learning

The unsupervised learning algorithm can be further categorized into two types of problems

1.Clustering

2.Association

Unsupervised Learning algorithms

Below is the list of some popular unsupervised learning algorithm

K-means clustering

KNN(k-nearest neighbors)

Hierarchal detection

Anomaly detection

Neural Networks

Principle Component Analysis

Independent Component Analysis

Apriori algorithm

Singular value decomposition

Advantages of Unsupervised Learning

Unsupervised learning is used for more complex tasks as compared to supervised learning because,in unsupervised learning,we don't have labeled input data

Unsupervised learning is preferable as it is east to get unlabeled data in comparison to labeled data.

Flask

Flask is a micro web framework written in python.It is easy and fast to implement with the knowledge of basic web development and REST APIs.How is it relevent to model building? Sometimes ,it might be necessary to run models in the server or cloud , and the only way is to wrap the model in a web application.Flask is the most popular library for such a task.

Random Forest

Random Forest is a popular machine learning algorithm that belongs to the supervised learning techniques. It can be used for both Classification and Regression problems in ML.It is based on the concept of ensemble learning,which is a process of combing multiple classifiers to solve a complex problem and to improve the performance of the model.

As the name suggests , "Random Forest is a classifier that contains a number of decisio -n trees on various subsets of the given dataset and takes the average to improve the predictive accuracy of that dataset."Instead of relying on one decision tree,the random forest takes the prediction from each tree and based on the majority votes of predictions,and it predicts the final output.

The greater number of trees in the forest laeds to higher accuracy and prevents the problem of overfitting.

Application of Random Forest Algorithm:

1.BANKING

Banking sector mostly uses this algorithm for the identification of loan risk.

2.MEDICINE

With the help of this algorithm,disease trends and risks of the disease can be identified.