AGILE SOFTWARE

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What is Artificial Intelligence

The Human intelligence inside the Computer is called Artificial intelligence.

or

Artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans and other animals.

MACHINE LEARNING

Making machines to learn like a human beings.
A branch of artificial intelligence, concerned with the design and development of algorithms that allow computers to evolve behaviors based on empirical data.

As intelligence requires knowledge, it is necessary for the computers to acquire knowledge.
Machine Learning is the field of computer science that uses statistical techniques to give computer systems the ability to learn with Data, without being explicitly programmed

SUPERVISOR LEARNING

If someone teaches somethings and we learn called supervisor learning.
or in simple words, Learning from from Someone in implementing it.
Features:

- Learn from someone
- Features and Labels
- Regression and classifications

UN-SUPERVISOR LEARNING

Learning on our own and working on it is known Un-supervisor Learning.

The model learns through observation and finds structures in the data. Once the model is given a dataset, it automatically finds patterns and relationships in the dataset by creating clusters in it. What it cannot do is add labels to the cluster, like it cannot say this a group of apples or mangoes, but it will separate all the apples from mangoes.

Suppose we presented images of apples, bananas and mangoes to the model, so what it does, based on some patterns and relationships it creates clusters and divides the dataset into those clusters. Now if a new data is fed to the model, it adds it to one of the created clusters.

REINFORCEMENT LEARNING

Involves in Rewards and penalties
It is the ability of an agent to interact with the environment and find out what is the best outcome. It follows the concept of hit and trial method.
The agent is rewarded or penalized with a point for a correct or a wrong answer, and on the basis of the positive reward points gained the model trains itself. And again once trained it gets ready to predict the new data presented to it.

PPDD

- Prescriptive Analytics.
- Predictive Analytics.
- Descriptive Analytics.
- Diagnostic Analytics.

ML(Machine Learning) is used for predictive Analysis(Using Past data, Predict the future).

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Regression Algorithm : Continuous or used for continuous data prediction.
classifications Algorithm : to classify or use to take decisions

- Linear Regression - Regression Algorithm
- Logistic
- Decision
- random
- SVM(support vector system)
- K Nearest Neighbour
- Naive Bayes

Linear Regression: Linear regression is used in which value of dependent variable is predicted through independent variables. A relationship is formed by mapping the dependent and independent variable on a line and that line is called regression line which is represented by Y= a*X + b.
Logistic Regression: In logistic regression we have lot of data whose classification is done by building an equation. This method is used to find the discrete dependent variable from the set of independent variables. Its goal is to find the best fit set of parameters. In this classifier, each feature is multiplied by a weight and then all are added. Then the result is passed to sigmoid function which produces the binary output.
Decision Tree: It belongs to supervised learning algorithm. Decision tree can be used to classification and regression both having a tree like structure. In a decision tree building algorithm first the best attribute of dataset is placed at the root, then training dataset is split into subsets. Splitting of data depends on the features of datasets. This process is done until the whole data is classified and we find leaf node at each branch. Information gain can be calculated to find which feature is giving us the highest information gain. Decision trees are built for making a training model which can be used to predict class or the value of target variable.
Support vector machine: Support vector machine is a binary classifier. Raw data is drawn on the n- dimensional plane. In this a separating hyperplane is drawn to differentiate the datasets. The line drawn from centre of the line separating the two closest data-points of different categories is taken as an optimal hyperplane. This optimised separating hyperplane maximizes the margin of training data. Through this hyperplane, new data can be categorised.

Naive-Bayes: It is a technique for constructing classifiers which is based on Bayes theorem used even for highly sophisticated classification methods. It learns the probability of an object with certain features belonging to a particular group or class. In short, it is a probabilistic classifier. In this method occurrence of each feature is independent of occurrence another feature. It only needs small amount of training data for classification, and all terms can be precomputed thus classifying becomes easy, quick and efficient.
KNN: This method is used for both classification and regression. It is among the simplest method of machine learning algorithms. It stores the cases and for new data it checks the majority of the k neighbours with which it resembles the most. KNN makes predictions using the training dataset directly.
K-means Clustering: It is an unsupervised learning algorithm used to overcome the limitation of clustering. To group the datasets into clusters initial partition is done using Euclidean distance. Assume if we have k clusters, for each cluster a center is defined. These centres should be far from each other, and then each point is examined thus added to the belonging nearest cluster in terms of Euclidean distance to nearest mean, until no point remains pending. A mean vector is re-calculated for each new entry. The iterative relocation is done until proper clustering is done. Thus for minimizing the objective squared error function process is repeated by generating a loop..

LIBRARIES USED FOR MACHINE LEARNING

- Numpy
- Scipy
- Matplotlib (For creating Graphs)
- Pandas (For Data Analysis)
- Scikit Learn(From python to write machine learning program or Contains All ML Algorithms)

WHAT ARE THE STEPS IN MACHINE LEARNING

- There are 5 basic steps used to perform a machine learning task:

  Collecting data: Be it the raw data from excel, access, text files etc., this step (gathering past data) forms the foundation of the future learning. The better the variety, density and volume of relevant data, better the learning prospects for the machine becomes.

  Preparing the data: Any analytical process thrives on the quality of the data used. One needs to spend time determining the quality of data and then taking steps for fixing issues such as missing data and treatment of outliers. Exploratory analysis is perhaps one method to study the nuances of the data in details thereby burgeoning the nutritional content of the data.

  Training a model: This step involves choosing the appropriate algorithm and representation of data in the form of the model. The cleaned data is split into two parts – train and test (proportion depending on the prerequisites); the first part (training data) is used for developing the model. The second part (test data), is used as a reference.

- . **Evaluating the model:** To test the accuracy, the second part of the data (holdout / test data) is used. This step determines the precision in the choice of the algorithm based on the outcome. A better test to check accuracy of model is to see its performance on data which was not used at all during model build.
- **Improving the performance**: This step might involve choosing a different model altogether or introducing more variables to augment the efficiency. That's why significant amount of time needs to be spent in data collection and preparation. Be it any model, these 5 steps can be used to structure the technique and when we discuss the algorithms, you shall then find how these five steps appear in every model!