

# Comprehensive Models Towards for Feature Extraction and Recognition in Machine Learning

K. Kishore Kumar, H. Venkateswara Reddy



**Abstract:** *The scientific study of algorithms and statistical Models is often referred to as Machine learning that computer Systems use to perform specific tasks without using explicit Instructions, relating patterns and interfaces instead. Ongoing Improvements in data frameworks just as computerization of Business forms by associations have prompted a quicker, simpler and progressively precise information investigation. Information Mining and AI procedures have been utilized progressively in the Examination of information indifferent fields extending from Medication to fund, training and vitality applications. Artificial Intelligence procedures make it conceivable to deduct important additional data from that information handled by information mining. Such important and noteworthy data causes associations to build up their future arrangements on a sounder premise, and to increase significant points of interest as far as time and cost. This investigation applies grouping calculations utilized in information mining and AI methods on that information got from people during the professional direction procedure, and attempt to decide the most suitable calculation. In this paper we study all methods and techniques used in data mining and machine learning and decide the best algorithm for machine learning*

**Index Terms:** *Data Mining, Machine learning, Algorithms, Techniques, Dimensionality reduction.*

## I. INTRODUCTION

Information Mining (DM) is that the strategy of finding previously obscure information from the colossal number of databases. Different terms conveying a uniform significance to handling is information preparation from databases, information extraction, information or example examination, and information digging. It predicts future patterns, practices, and information driven choices. to encourage accommodating information, the information should be preprocessed. Data preprocessing might be an imperative strategy in handling to correct an inappropriate data blessing inside the dataset [1]. Data innovation might be an innovation presented for picking up power on information examination.

the basic and basic information examination and grouping techniques were known to the planet by presenting information handling. The dataset contains a high element of information, as a result of this the presentation of the information mining rule gets debased. The high spatiality issue is settled abuse, an extremely significant system referenced as spatiality Reduction.

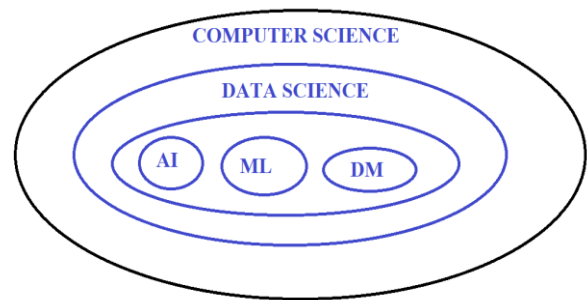


Fig-1 Data mining Vs Machine Learning

## II. DIMENSIONALITY REDUCTION

In a few genuine applications, different choices are used in a preliminary to shape positive right characterization. On the off chance that every one of those alternatives are acclimated develop classifiers, at that point they work in high measurements, thus the instructive technique becomes propelled which finishes in high characterization blunder. Thus, there is an interest to decrease the spatial property of the component region before the arrangement. the chief target of spatial property decrease is to rebuild the high dimensional information tests into the low dimensional region such as the fundamental data contained at interims the information is safeguarded. When the spatial property gets diminished, it assists with boosting the nature of the classifier and it lessens the system multifaceted nature [2]. Steady with the received methodology dimensionality decrease procedures are separated into highlight choice and have extraction [2]. Figure one appeared above depicts the association between information preparation and AI.

**Data mining:** Data mining is that the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems.

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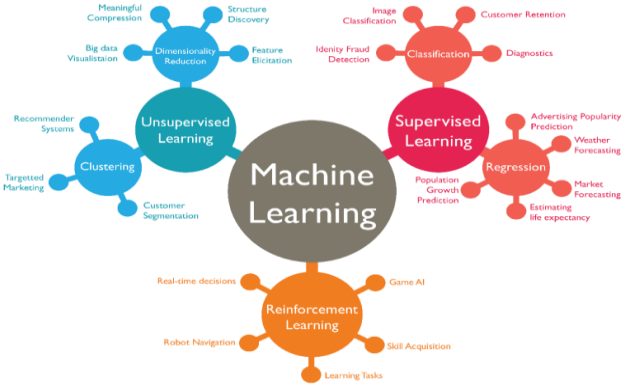
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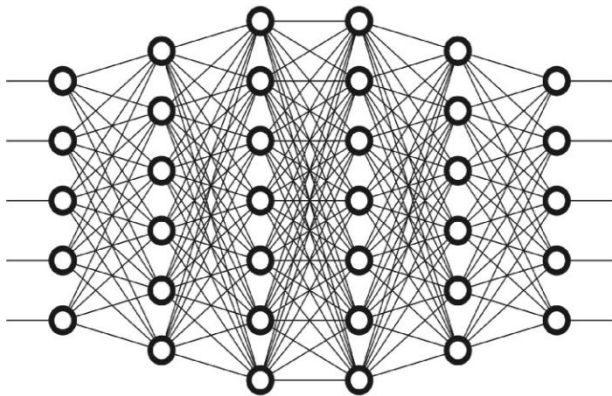
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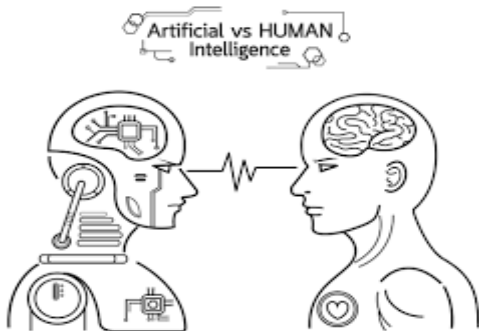
**Machine Learning:** Machine learning is that the scientific study of algorithms and statistical models that computer systems use to perform a selected task without using explicit instructions, counting on patterns and inference instead. it's seen as a subset of AI .



**Deep Learning:** Deep learning is a component of a broader family of machine learning methods supported artificial neural networks with representation learning. Learning are often supervised, semi-supervised or unsupervised

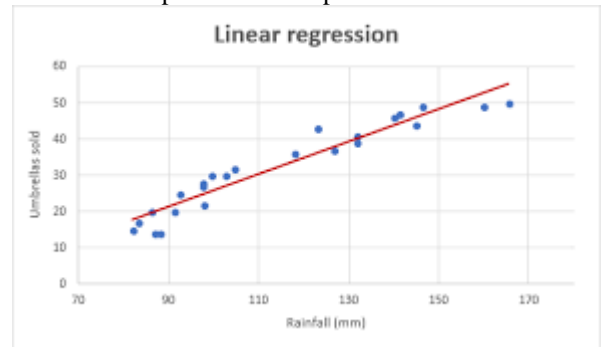


**Artificial Intelligence:** In computing, AI , sometimes called machine intelligence, is intelligence demonstrated by machines in contrast to the natural intelligence displayed by humans.



## III. FEATURE EXTRACTION TECHNIQUES

**1. Linear Regression:** Regression may be a method of modeling a target value supported independent predictors. This method is usually used for forecasting and checking out cause and effect relationship between variables. Regression techniques mostly differ supported the amount of independent variables and therefore the sort of relationship between the independent and dependent variables.



The line within the above graph is mentioned because the best fit line. Supported the given data points, we attempt to plot a line that models the points the simplest. [3] Linear Relationship between independent variables(x) and dependent variables(y) linear equation  $y = a_0 + a_1 * x$

**2. Logistic Regression :** Logistic regression may be a classification algorithm wont to assign observations to a discrete set of classes. a number of the samples of classification problems are Email spam or not spam using the logistic sigmoid function to return a probability value. Logistic Regression may be a Machine Learning algorithm which is employed for the classification problems, it's a predictive analysis algorithm and supported the concept of probability.[4]The hypothesis of logistic regression tends it to limit the value function between 0 and 1. Therefore linear functions fail to represent it because it can have a worth greater than 1 or but 0 which isn't possible as per the hypothesis of logistic regression.  $0 < h\theta(x)$

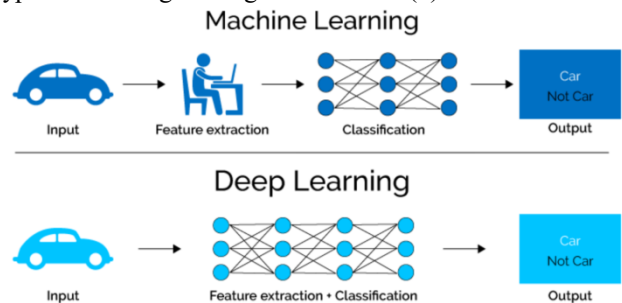
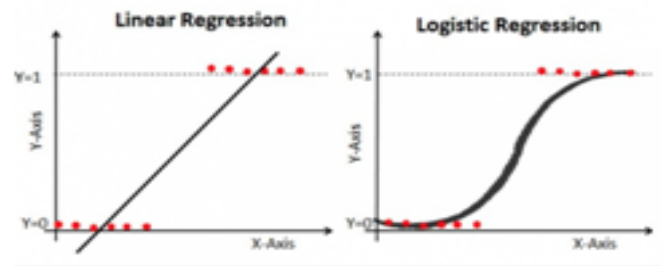


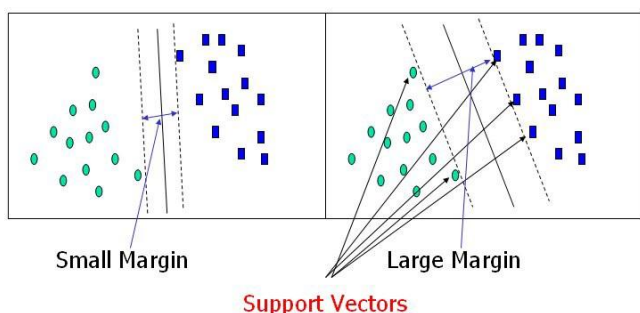
Figure 1: Machine Learning VS Deep Learning



**3. Decision Tree** A choice tree might be a tree-like diagram with hubs speaking to where we pick a characteristic and pose an inquiry; edges speak to the responses to the inquiry, and thusly the leaves speak to the specific yield or class mark.

They're used in non-direct choosing with a simple straight choice surface. Choice trees arrange the models by arranging them down the tree from the premise to some leaf hub, with the leaf hub giving the grouping to the occasion. Every hub inside the tree goes about as a test suit for a couple of characteristics, and each edge dropping from that hub relates to at any rate one of the potential responses to the test suit. [5] This process is recursive in nature and is rehashed for each sub tree established at the new hubs.

**4.Support Vector Machine :**The target of the help vector machine calculation is to search out a hyperplane in N-dimensional space(N — the measure of highlights) that particularly orders the information focuses. To isolate the 2 classes of information focuses, there are numerous conceivable hyper planes that would be picked. Our goal is to search out a plane that has the most extreme edge, for example, the most extreme separation between information purposes of the two classes. Augmenting the edge separation gives some support all together that future information focuses are regularly arranged with more confidence.[6]Hyper planes are choice limits that help characterize the data focuses. The information focuses on falling on either side of the hyperplane and is regularly credited to various classes. Likewise, the element of the hyperplane relies on the measure of highlights. On the off chance that the measure of information highlights is 2, at that point, the hyperplane is basically a line. In the event that the measure of info highlights is 3, at that point, the hyperplane turns into a two-dimensional plane. It gets hard to envision when the measure of highlights surpasses 3.



**5. NavieBayes :**Naive Bayes Classifiers believe the Bayes' Theorem, which is predicated on contingent probability or in simple terms, the likelihood that an occasion (X) will happen as long as another event (Y) has already happened. Essentially, the theory allows a hypothesis to be updated whenever new evidence is introduced.[7] The equation below expresses Bayes' Theorem within the language of probability:

$$P(X|Y)=P(Y|X)P(X)/P(Y)$$

“P” is that the symbol to denote probability.  
 $P(X | Y)$  = The probability of event X Occurring as long as Y has occurred.  
 $P(Y | X)$  = The probability of the event Y occurring as long as X has occurred.  
 $P(X)$  = The probability of event Y (hypothesis) occurring.  
 $P(Y)$  = The probability of event X (evidence) occurring.

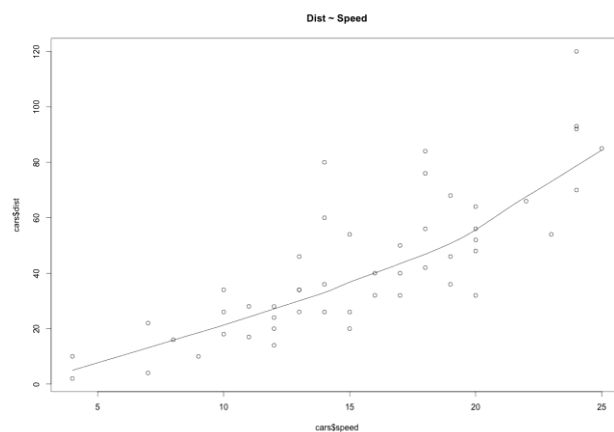
**6.kNN:**K-Nearest Neighbors (KNN) is one among the only algorithms utilized in Machine Learning for regression and classification problems. KNN algorithms use data and

classify new data points supported similarity measures (e.g. distance function). Classification is completed by a majority vote to its neighbors.[8] the info is assigned to the category which has the closest neighbors. As you increase the amount of nearest neighbors, the worth of k, accuracy might increase.

**7. K-means:** K-Means grouping is a solo learning calculation that, in light of the fact that the name insights, find a rigid number (k) of bunches during a lot of information. A bunch might be a gathering of information focuses that are assembled on account of likenesses in their highlights. While utilizing a K-Means calculation, a bunch is characterized by a centroid, which might be a point (either fanciful or genuine) at the center of a group. Each point during an informational collection is a segment of the group whose centroid is most firmly found. to put it basically, K-Means discovers k number of cancroids, at that point appoints all information focuses to the nearest group, with the point of keeping the centurions little.

#### IV EVALUATION RESULTS

All the methods that are discussed above are implemented with R-language some of the plots generated with the help of R-Programming languages are given below



#### V CONCLUSION

In this paper we have studied several different methods and techniques that are used by machine learning algorithms for classification, clustering and decision making by this we conclude that in future we are going to take any one method or technique as mentioned above in machine learning and it should to be useful for solving and taking an intelligent decision for any real time problem.

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