Machine Learning – Naive Bayes Algorithm

Introduction

Bayes theorem is named after Thomas Bayes from the 1700s. The Naive Bayes classifier is based on the premise of conditional probability, as given by the Bayes theorem as below

Naïve Bayes Classifier Algorithm

Where: A, B = events

P(A|B) = probability of A given B is true

P(B|A) = probability of B given A is true

P(A), P(B) = probabilities of A and B

Naive Bayes is a supervised learning algorithm which is used for solving classification problems. Bayes theorem describes the probability of an event occurring based on prior knowledge of conditions that might be related to the event [1]. For example, if winning a game is associated with having good breakfast. Bayes' theorem allows the chance of winning a game to be assessed more correctly by conditioning it on eating good breakfast than simply concluding that an individual is typical of winning a game.

Naïve Bayes algorithm is mainly used in text classification that includes a large dataset. It gives a more accurate result compared to other algorithm hence it is widely used in detecting spam email. Other areas of application include real time prediction – for making predictions in real time e.g weather forecast. In addition, it is used in recommendation system - this is used for filtering unseen information and predicting whether a user would like a given resource or not.

Naive Bayes algorithm is often employed in many areas/fields, some of which are as follows:

* Used in finance for risk evaluation.
* Used in digital facial identification/recognition
* it is used in health sector for example, in genetic testing - for evaluating the risk of an individual having a disease based on family history.
* It is used in news classification. For example, through text classification, Google News can recognize whether the news is sports, political etc.

In conclusion, Naïve Bayes classifier works well in complex situations. The advantage over other classifiers is in its ability of using small training data for estimating the parameters for classification.

References

1. Joyce, James (2003), ["Bayes' Theorem"](https://plato.stanford.edu/archives/spr2019/entries/bayes-theorem/), in Zalta, Edward N. (ed.), The Stanford Encyclopedia of Philosophy (Spring 2019 ed.), Metaphysics Research Lab, Stanford University, retrieved 2020-01-17
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