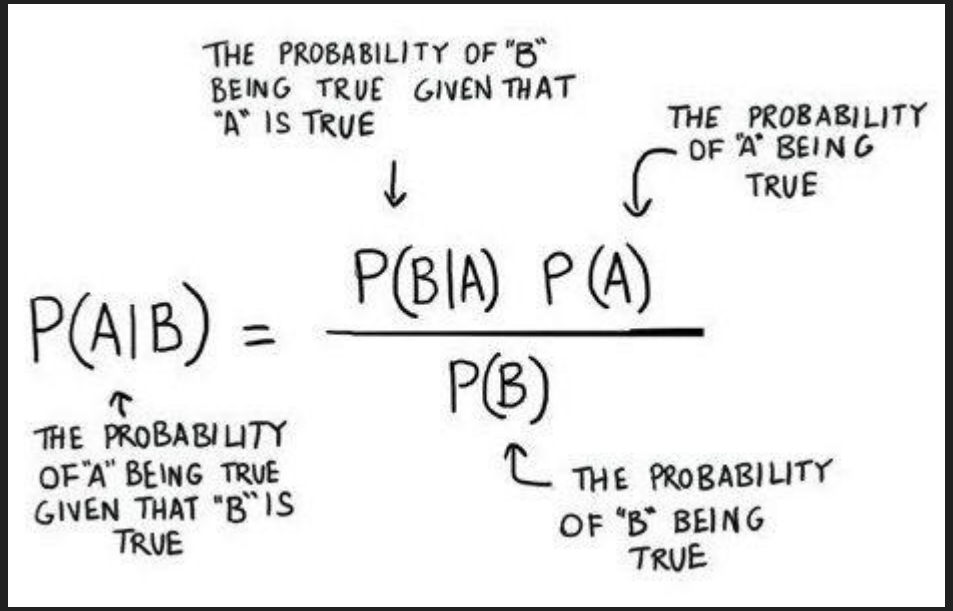
Naive Bayes Classifier | ML LAB 6

What is Bayes Theorem?



Bayes theorem talks about Conditional probability.

Multinomial Naive Bayes theorem

$$V_{NB} = \underset{vj \in v}{\operatorname{argmax}} P(v_j) \prod_{i \in positions} P(a_i|v_j)$$

Why choose Multinomial Naive Bayes?

- Because our dataset has discrete values.

- Eg. movie ratings ranging 1 and 5 as each rating will have certain frequency to represent)
- This works well for data which can easily be turned into counts, such as word counts in text.
- It is regularly used in natural lanaguage processing (NLP) problems
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What is CountVectorizer?

CountVectorizer is a great tool provided by the scikit-learn library in Python. It is used to transform a given text into a vector on the basis of the frequency (count) of each word that occurs in the entire text.

Example of CountVectorizer

> *document = ["One Geek helps Two Geeks", "Two Geeks help Four Geeks", "Each Geek helps many other Geeks at GeeksforGeeks."]*

	at	each	four	geek	geeks	geeksforgeeks	help	helps	many	one	other	two
document[0]	0	0	0	1	1	0	0	1	0	0	0	1
document[1]	0	0	1	0	2	0	1	0	0	0	0	1
document[2]	1	1	0	1	1	1	0	1	1	0	1	0

Accuracy Score

In multilabel classification, the function returns the subset accuracy. If the entire set of predicted labels for a sample strictly match with the true set of labels, then the subset accuracy is 1.0; otherwise it is 0.0.

Precision Score

- The precision is the ratio **tp / (tp + fp)** where **tp** is the number of **true positives** and **fp** the number of **false positives**. The precision is intuitively the ability of the classifier not to label as positive a sample that is negative.
- The best value is 1 and the worst value is 0.

Recall Score

- The recall is the ratio **tp / (tp + fn)** where **tp** is the number of **true positives** and **fn** the number of **false negatives**. The recall is intuitively the ability of the classifier to find all the positive samples.
- The best value is 1 and the worst value is 0.

Confusion Matrix