Future Connect Media

Machine learning Part D

Part of Future Connect Media's IT Course

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Topics to be covered:

- Naïve Bayes Classifier
- Naïve Bayes Types

Naïve Bayes Classifier

- A Naive Bayes classifier is a probabilistic machine learning model that's used for classification task. The classifier is based on the Bayes theorem.

Bayes Theorem:

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

Using Bayes theorem, we can find the probability of **A** happening, given that **B** has occurred. Here, **B** is the evidence and **A** is the hypothesis.

Assumptions in Naïve Bayes Classifier

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Predictors/features are independent, that is presence of one particular feature does not affect the other.

All the predictors have an equal effect on the outcome.

Types of Naïve Bayes Classifier

- Multinomial Naïve Bayes
- Bernoulli Naïve Bayes
- Gaussian Naïve Bayes

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- **Multinomial Naïve Bayes:**

This is mostly used for document classification problem, i.e., whether a document belongs to the category of sports, politics, technology etc. The features/predictors used by the classifier are the frequency of the words present in the document.

- **Bernoulli Naïve Bayes**

This is like the multinomial naive bayes, but the predictors are Boolean variables. The parameters that we use to predict the class variable take up only values yes or no, for example if a word occurs in the text or not.

- **Gaussian Naïve Bayes**

When the predictors take up a continuous value and are not discrete, we assume that these values are sampled from a gaussian distribution.