**NAÏVE BAYES CLASSIFIER**

Naive Bayes is an algorithm that uses Baye’s theorem. Baye’s theorem is a formula that calculates a probability by counting the frequency of given values or combinations of values in a data set.

Naive Bayes Model works particularly well with text classification and spam filtering.

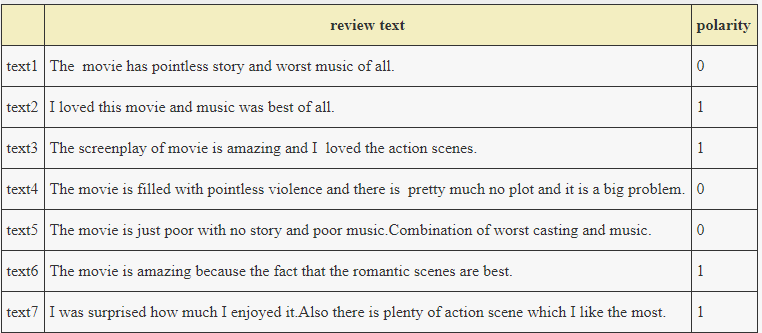
**Advantages** of working with NB algorithm are:

* Requires a small amount of training data to learn the parameters
* Can be trained relatively fast compared to sophisticated models

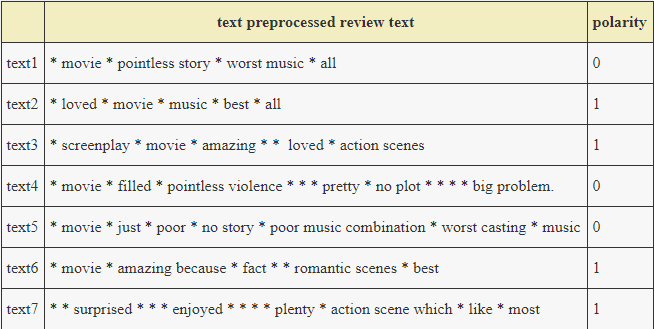
**The main disadvantage** of NB Algorithm is:

* It’s a decent classifier but a bad estimator
* It works well with discrete values but won’t work with continuous values (can’t be used in a regression)

Let’s take a toy example of movie text and review and it’s sentiment polarity (0->negative, 1->positive).



**Step1**: Text Preprocessing



**Step2**: **Bag of Words Representation**



**Step 3: Apply Laplace Smoothing**

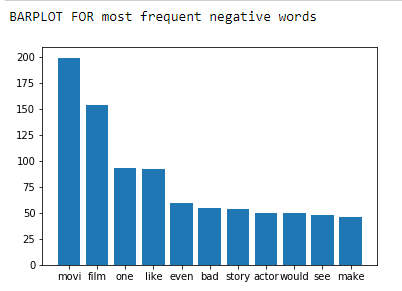
**Step 4:** Apply Multinomial Naive Bayes

**Step 5**:  Predict the output using Multinomial Naive Bayes classifier

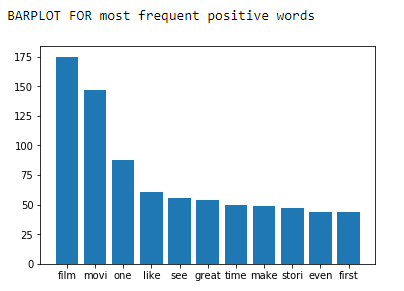
**Step 6**: Find test accuracy and train accuracy

**Step 7**: Plot a confusion matrix and heatmap - A confusion matrix is a table that allows us to visualize the performance of a classification algorithm.

Finding the most frequent words used in both positive and negative reviews. We have taken a sample of positive and negative words and found out the frequency of most frequent words used.

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Here we observe that words like “bad” are frequently used which depicts negative reviews.



Here we observe that words like “great” are frequently used which depicts positive reviews.