Machine Learning Project
Classification of news articles

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Abstract

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1 Introduction

Describe the problem Related work here maybe? Introduction and stuff

2 Theory

2.1 Naive Bayes classifier

Let c be the class and $A = a_1, \ldots, a_n$ be the attributes of a document. Then with Bayes Theorem

$$p(c|A) = \frac{p(A|c)p(c)}{p(A)}, \tag{1}$$

the attributes A is classified as class C if and only if

$$f_b(A) = \frac{p(c|A)}{p(\neg c|A)} \geq 1, \tag{2}$$

where $f_b(A)$ is called a *Bayesian* classifier. Assuming all attributes are independent given the class,

$$p(A|c) = p(a_1, \ldots, a_n|c) = \prod_{i=1}^{n} p(a_i|c)$$

the final classifier can be written as

$$f_{nb}(A) = \frac{p(c)}{p(\neg c)} \prod_{i=1}^{n} \frac{p(a_i|c)}{p(a_i|\neg c)} \tag{3}$$

where f_{nb} is called the *Naive Bayesian* classifier.

Two models that uses the Naive Bayes assumption are the *multi-variate Bernoulli* model and the *multinomial* model. The main difference is that in the Bernoulli model the attributes are binary, indicating if a word from a vocabulary has occurred at least once or not. In the multinomial model the frequency of words are taken into account.

3 Method

Method and stuff

4 Results

Result and stuff

5 Related work

Naive Bayes models are widely used because of it's simplicity and efficiency. A. McCallum and K. Nigam compares the two most common models, the multi-variate Bernoulli and the multinomial model, in the realm of document classification. They are explained in detailed both theoretically

and empirically and in general the multinomial model outperforms the Bernoulli model [2].

6 Conclusions & Future work

Conclusion and stuff

References

[1] Andrew McCallum and Kamal Nigam. A comparison of event models for Naive Bayes text classification, 1998.

[2] Harry Zhang. The Optimality of Naive Bayes, 2004.