Machine Learning Project

Classification of news articles

Jakob Sahlström jasa5691@student.uu.se
Anders Lindström anli6945@student.uu.se
Jesper Dürebrandt jedu6357@student.uu.se

Wednesday 23rd April, 2014

Abstract

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

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

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

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

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

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

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

the final classifier can be written as

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

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 *multinominal* model. The main difference is that

the Bernoulli model does not take into account the frequency of a word which the multinominal model does.

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 multivariate Bernoulli and the multinominal model. They are explained in detailed both theoretically and empirically and in general the multinominal 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.