Your Title

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Todo list

Contents

Abstract

Thesis requirements

- Your thesis is written in ACM style with two columns (`documentclass[sigconf]acmart`).
- It is maximally 10 pages long, excluding the title page and the appendix, but including references, figures, etc

1 Introduction

Text classification is considered as one of the most important challenges within natural language processing. Classifying documents is vital, as it enables users to easily query and retrieve useful information. Moreover, it allows the automization of many processes such as spam classification and sentiment analysis. Given the wide variety of application, many algorithms have been developed to tackle the problem (Aggarwal & Zhai, 2012).
Bayesian Classifiers are considered a class of classification algorithms, and they classify document based on word occurences within documents. This word presence is used to calculate the probality that certain documents are part of a topic. The two prominent versions of bayesian classifiers are multi-variate Bernoulli models and multinomial models. Another widely used class of text classificatiers are support vector machines (SVM). Within SVM the algorithm creates linear hyperplanes which split the data into classes based on a bag-of-words representation of texts. Using kernel tricks hyperplanes can be constructed which can find more compex relations than linear (Aggarwal & Zhai, 2012).
Recently, deep neural networks have been employed on classification problems as well. Most notably convolutional neural nets (CNN) have outperformed other methods on baseline classification problems. CNN have been generaly been used on image data, but research in word and document embedding spaces such as Word2Vec (Mikolov, Chen, Corrado, & Dean, 2013) and Paragraph2Vec (Le & Mikolov, 2014) allow the use of CNN on text as well. Transforming words within documents into a multi-dimensional vectors allows the use of convolutional filters, which shift over the documents and detect patterns within documents (Kim, 2014).
In contrast to many of the baseline challenges within text classification, real-world application of classification often involves other challenges as well. Within this research documents of Dutch municipalities are classified, which is a difficult task due to three properties. Firstly, no labelled training data is available, which means that training needs to be done on data from the central document. Secondly, many of the documents are multi-topic and it is interesting to discuss how well algorithms deal with this. Thirdly, within classes a large variety of documents exist, as the documents differ in length and style. The research question and subquestions are thus:

- How well does CNN perform on classifying Dutch municipality documents compared to SVM and Bayesian Classifiers?
  - How does the detail of topics influence the performances of all algorithms?
  - What thresholds are optimal in detecting topics of multi-labeled documents.
  - How well do the performances of the algorithms on the dataset of the central government generalize to the dataset of the municipalities?
  - How can all algorithms be optimized to deal with the large in-class variety of the topics?

Within the next chapter, the literature review, current approaches to the mentioned challenges and the general idea behind the algorithms is further ex-

plained. Then the specific set-up for this research is discussed within the methodology, which also provides information on how the research questions are answered. The results of this research is described next, and provides a detailed overview of the performance of all algorithms with various evaluation metrics. Lastly, the answers to the research questions are formulated and the conclusions from this article are discussed.

2 Related Work

Deze sectie bestaat uit een aantal "blokken", waarin je per blok de relevante literatuur beschrijft.

Neem alleen literatuur op die van belang is voor jouw onderzoeksvraag en deelvragen.

Typisch heb je 1 blok voor je hoofdvraag en per deelvraag **RQi** een blok.

2.1 RQ1

2.2 RQ2

3 Methodology

3.1 Description of the data

Data verzameling en beschrijving van de data

Hoe is de data verzameld, en hoe heb jij die data verkregen?

Wat staat er in de data? Niet alleen maar een technisch verhaal, maar ook inhoudelijk. DE lezer moet een goed idee krijgen over de technische inhoud en wat het betekent.

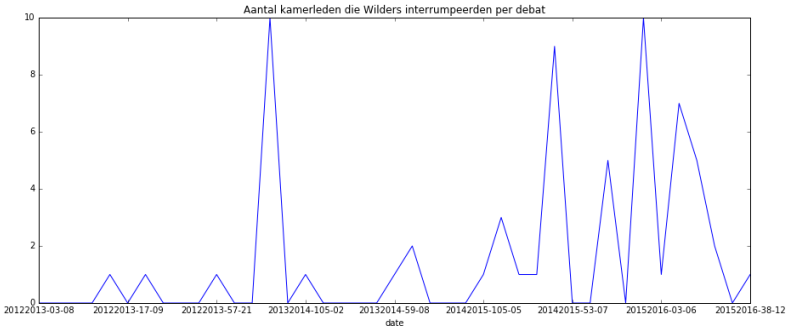

Figure 1: Aantal interrupties van Wilders in de Tweede Kamer door de tijd (periode 2012-2016).

3.2 Wat plotjes en tabelletjes

Zie het IPython Notebook `PandasAndLatex.ipynb` voor de code om vanuit pandas een poltje op te slaan en een dataframe als tabel op te slaan. Het werkt ideaal!

De interrupties van Wilders staan beschreven in Figure 1 en Tabel 1.

date	indegree	interruptie_volgorde
20122013-03-08	0.0	
20122013-07-16	0.0	
20122013-100-03	0.0	
20122013-100-06	0.0	
20122013-17-06	1.0	Pechtold-3
20122013-17-09	0.0	
20122013-21-04	1.0	Pechtold-3
20122013-22-08	0.0	
20122013-32-06	0.0	
20122013-48-23	0.0	
20122013-57-21	1.0	Pechtold-6
20122013-76-03	0.0	
20122013-76-06	0.0	
20132014-05-02	10.0	Roemer-4 Van Haersma Buma-4 Pechtold-4 Slob-5 ...
20132014-06-04	0.0	
20132014-105-02	1.0	Pechtold-10
20132014-105-06	0.0	
20132014-14-03	0.0	
20132014-14-06	0.0	
20132014-52-18	0.0	
20132014-59-08	1.0	Klaver-3
20142015-02-08	2.0	Pechtold-6 Slob-4
20142015-03-06	0.0	
20142015-09-09	0.0	
20142015-100-05	0.0	
20142015-105-05	1.0	Pechtold-2
20142015-111-04	3.0	Pechtold-6 Kuzu-8 Klaver-3
20142015-111-07	1.0	Pechtold-2
20142015-39-71	1.0	Pechtold-2
20142015-41-07	9.0	Samsom-2 Pechtold-3 Kuzu-6 Zijlstra-5 Van Ojik...
20142015-53-07	0.0	
20142015-61-23	0.0	
20142015-79-07	5.0	Klaver-10 Gesthuizen-3 Voordewind-2 Pechtold-6...
20142015-95-06	0.0	
20152016-02-07	10.0	Pechtold-5 Slob-7 Klaver-11 Kuzu-24 Öztürk-1 S...
20152016-03-06	1.0	Pechtold-5
20152016-14-02	7.0	Klaver-9 Roemer-4 Samsom-2 Van Haersma Buma-5 ...
20152016-14-05	5.0	Van Haersma Buma-13 Pechtold-4 Zijlstra-1 Klav...
20152016-27-03	2.0	Segers-4 Kuzu-10
20152016-38-10	0.0	
20152016-38-12	1.0	Klein-2

Table 1: Door wie werd Wilders onderbroken en hoe vaak per debat.

3.3 Methods

Hoe je je vraag gaat beantwoorden.

Dit is de langste sectie van je scriptie.

Als iets erg technisch wordt kan je een deel naar de Appendix verplaatsen.

Probeer er een lopend verhaal van te maken.

Het is heel handig dit ook weer op te delen nav je deelvragen:

3.3.1 RQ1

3.3.2 RQ2

4 Evaluation

Met een subsectie voor elke deelvraag.

In hoeverre is je vraag beantwoord?

Een mooie graphic/visualisatie is hier heel gewenst.

Hou het kort maar krachtig.

5 Conclusions

Hierin beantwoord je jouw hoofdvraag op basis van het eerder vergaarde bewijs.

5.1 Acknowledgements

Hier kan je bedanken wie je maar wilt.

References

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A Slides