University *of Ljubljana*
Faculty *of Computer and Information Science*

Offensive language exploratory analysis

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Abstract

asdasdasd

Keywords
Keyword1, Keyword2, Keyword3 ...

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Introduction

In the last few years social media grew exponentially and with it also the ability of people to express themselves online. By enabling people to write on different online platforms without even identifying themselves it lead to a new era of freedom of speech. As this new medium for communication and writing brought many positive things, it also has its downside. Social media has become a place where heated discussions happen and often result in insults and hatred. It is an important task to recognize hate speech and to prevent it.

Hate speech is defined as *abusive or threatening speech or writing that expresses prejudice against a particular group, especially on the basis of race, religion, or sexual orientation.*[1]. However, we can see that the definiton is very vague. Having said that, the goal of our paper is to help distinguish different types of hate speech and find the specific keywords of its subgroups in order to explain its structure. This could help with its identification and classification.

There has been done a lot of research regarding the hate speech, however these works are usually focused on the classification of hate speech. One of the first works include [2] who built the decision tree based classifier Smokey for abusive message recogniton and classification. Some other works that focus mainly on classification include [3] who compare the classification accuracy of models trained on expert and amateur annotations, [4] who use convolutional neural networks for classification into four predefined categories, and [5] who use different natural language processing techniques for expanding datasets with emotional information for better classification. In the last years, especially deep learning models are often used for detection and classification of hate speech, such as [6] who propose a sophisticated method that is a combination of a deep neural network architecture with transfer learning. There is a also a lot of related work that focuses on creating large datasets such as [7] who create a large-scale, multilingual, expert based dataset of hate speech.

What is less common in the research area of hate speech is analysis of relationships between different types of hate speech and the importance of specific keywords.

That is why we we use smth to do smth etc. torej neki o teh modelih ki jih boma uporabljala. Pa neki o tem kere classe npr mama oz keri obstajajo pa kere boma midva raziskovala

This paper is organized as follows:...

Data

We use four publicly available datasets for our exploratory analysis. We combine datasets [3], [6], and [8] into one large dataset (reffered to as Dataset SRB) as they include same categories of hate speech. We make labels *sexism*, *racism*, and *both* from [3] and [6]; regarding the third dataset ([8]) we tranform labels *hostile sexism* into *sexism*, as tweets with such labels are already included in the first two datasets, and *benevolent sexism* into *benevolent*. We exclude *None* label from all datasets as we do not need it for the analysis.

The fourth dataset (reffered to as Dataset AHS) that we use [**?**] has 4 additional categories *abusive, hateful, spam, and normal*, where we again exclude the latter category, as we are not interested in tweets that do not include hate speech.

We show the distribution of individual categories from datasets SRB and AHS in Figures 1 and 2, respectively.

Equations

You can write equations inline, e.g. $\cos\pi = -1$, $E = m \cdot c^2$ and α, or you can include them as separate objects. The Bayes's rule is stated mathematically as:

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}, \tag{1}$$

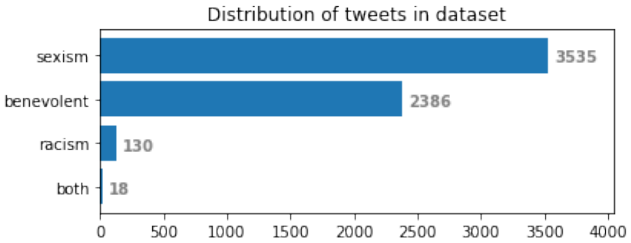

Figure 1. This figure shows the distribution of hate speech categories in the first dataset. We can see that sexism and benevolent are well represented, whereas racism and both are far less frequent.

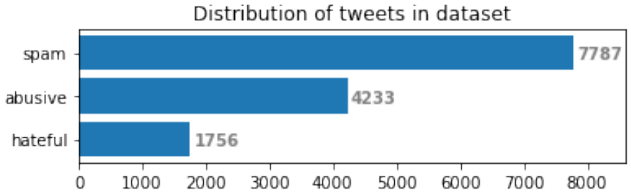

Figure 2. DODAJ OPIS

where A and B are some events. You can also reference it – the equation 1 describes the Bayes's rule.

Lists

We can insert numbered and bullet lists:

1. First item in the list.
2. Second item in the list.
3. Third item in the list.

- First item in the list.
- Second item in the list.
- Third item in the list.

We can use the description environment to define or describe key terms and phrases.

Word What is a word?.

Concept What is a concept?

Idea What is an idea?

Random text

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Figures

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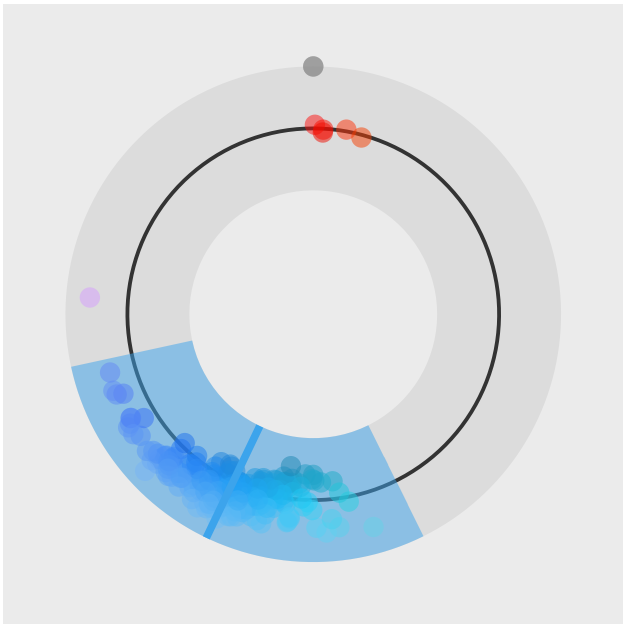

Figure 3. A random visualization. This is an example of a figure that spans only across one of the two columns.

On the other hand, Figure 4 is an example of a figure that spans across the whole page (across both columns) of the report.

Tables

Use the table environment to insert tables.

Code examples

You can also insert short code examples. You can specify them manually, or insert a whole file with code. Please avoid inserting long code snippets, advisors will have access to your repositories and can take a look at your code there. If necessary, you can use this technique to insert code (or pseudo

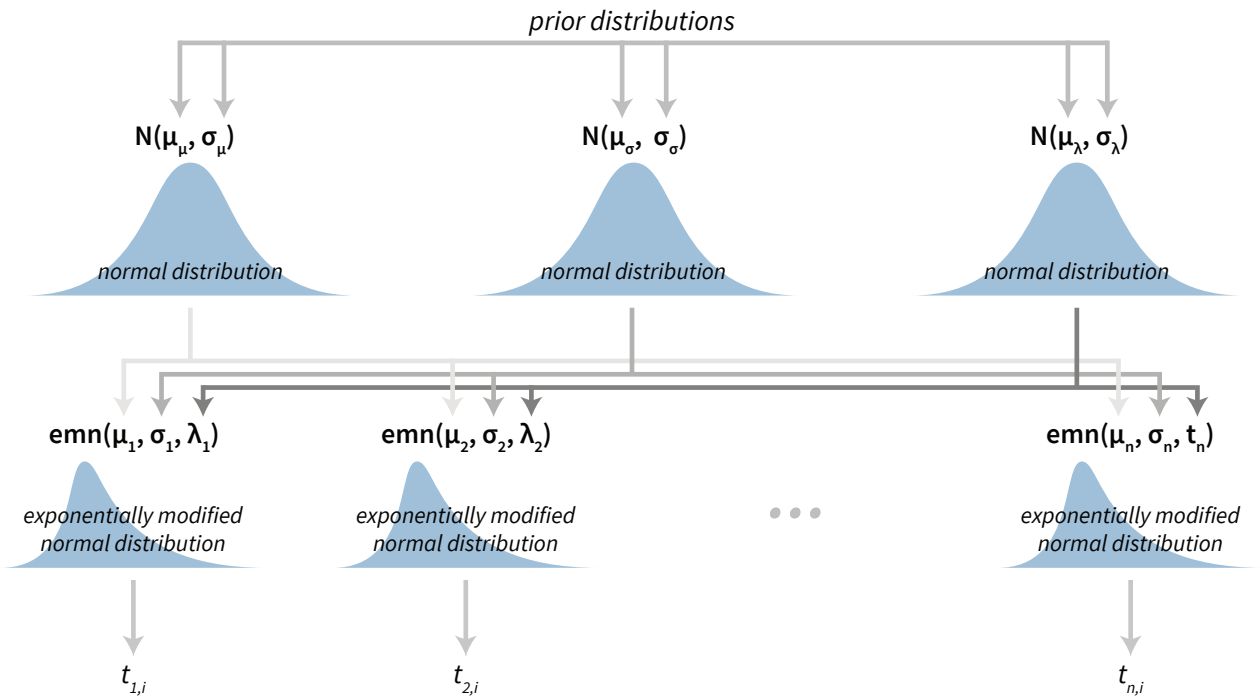

Figure 4. Visualization of a Bayesian hierarchical model. This is an example of a figure that spans the whole width of the report.

Table 1. Table of grades.

Name		
First name	Last Name	Grade
John	Doe	7.5
Jane	Doe	10
Mike	Smith	8

code) of short algorithms that are crucial for the understanding of the manuscript.

Listing 1. Insert code directly from a file.

```
import os
import time
import random

fruits = ["apple", "banana", "cherry"]
for x in fruits:
  print(x)
```

Listing 2. Write the code you want to insert.

```
import(dplyr)
import(ggplot)

ggplot(diamonds,
          aes(x=carat, y=price, color=cut)) +
  geom_point() +
  geom_smooth()
```

Results

Use the results section to present the final results of your work. Present the results in a objective and scientific fashion. Use visualisations to convey your results in a clear and efficient manner. When comparing results between various techniques use appropriate statistical methodology.

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Discussion

Use the Discussion section to objectively evaluate your work, do not just put praise on everything you did, be critical and exposes flaws and weaknesses of your solution. You can also explain what you would do differently if you would be able to start again and what upgrades could be done on the project in the future.

Acknowledgments

Here you can thank other persons (advisors, colleagues ...) that contributed to the successful completion of your project.

References

[1] *hate speech*. Lexico.com.

[2] Ellen Spertus. Smokey: Automatic recognition of hostile messages. In *Aaai/iaai*, pages 1058–1065, 1997.

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[8] Akshita Jha and Radhika Mamidi. When does a compliment become sexist? analysis and classification of ambivalent sexism using twitter data. In *Proceedings of the second workshop on NLP and computational social science*, pages 7–16, 2017.