Detecting Depression in Social Media using Fine-Grained Emotions

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INTRO

ABSTRACT

Social media is the most popular way for people to share information. People with health disorders usually share their concerns for advice, support or to relieve suffering. This is an opportunity to proactively detect these users and refer them to professional help. This research proposes a new representation called Bag of Sub-Emotions (BoSE).

INTRODUCTION

- Depression is the most common mental disorder.
- Several papers have already explored the use of linguistic and sentiment analysis to detect depression.
- Based on those findings, the proposition to model emotions in a fine-grained way is a new way to detect depression.

HYPOTHESIS

Emotions can be better, and more flexible, represented at a lower level, instead of only using broad categories such as 'anger', 'joy', 'negative' or 'positive'.
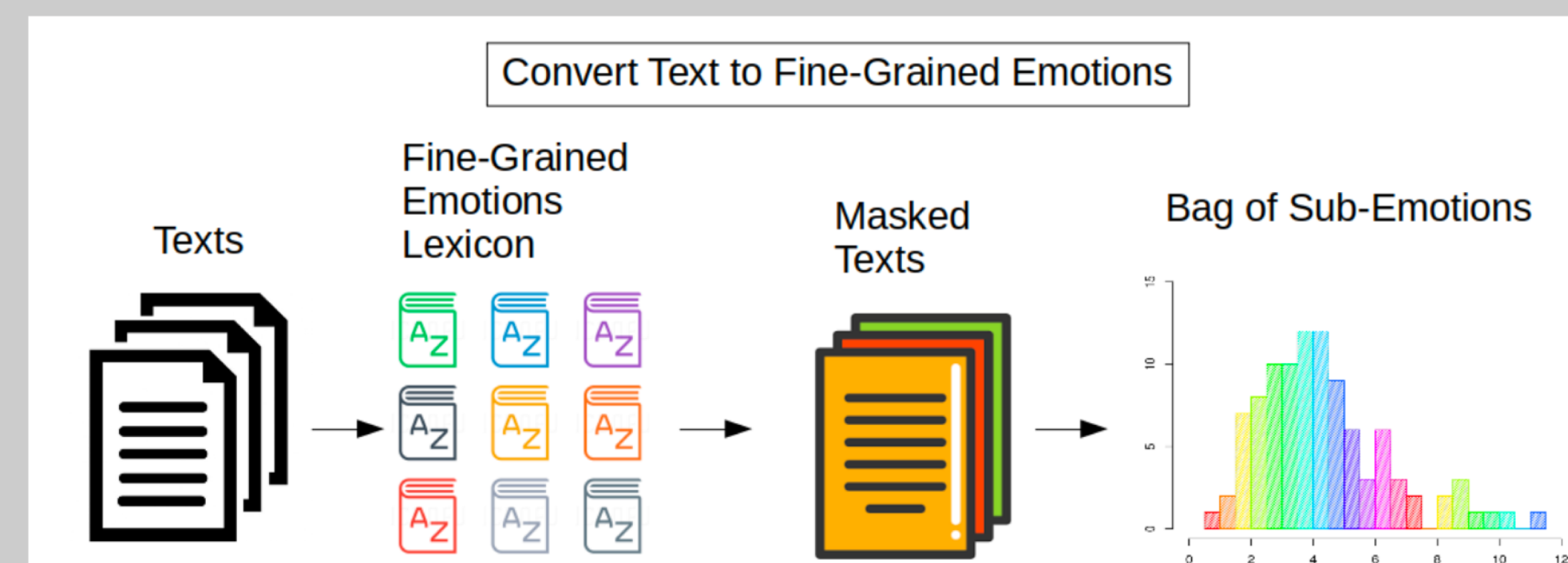
METHODOLOGY
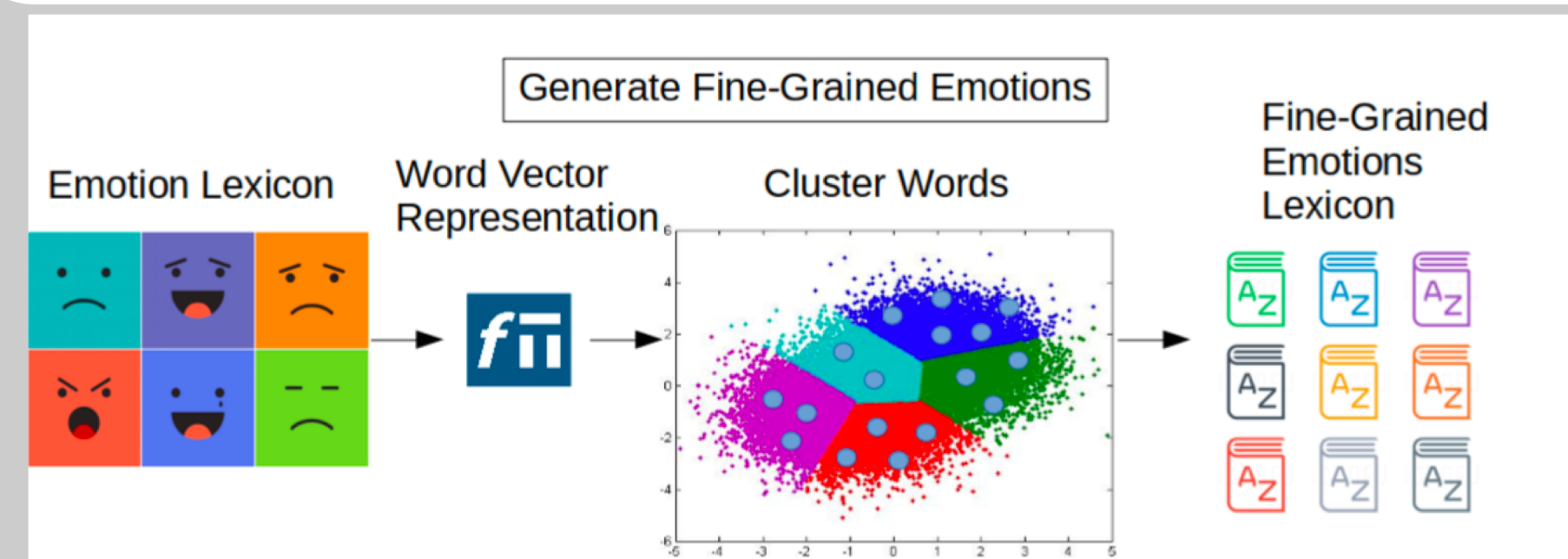
Emotion Lexicon: Based on 8 recognized emotions (anger, anticipation, disgust, fear, joy, sadness, surprise and trust) and 2 main sentiments (positive and negative)

Word vector: For each word using pre-trained Wikipedia subword-embeddings

Cluster of words: Creating subgroups by emotion using the Affinity Propagation (AP) clustering algorithm

Text masking: Each word gets replaced with the label of its closest fine-grained emotion.
Example: The text *'Leave no stone unturned'* will be masked as *'fear2 negative8 anger10 anticitpation3'*.

Text representation: Based on the masked documents, a frequency histogramm of their fine-grained emotions gets computed
  -> **BoSE** representation:
  - *BoSE-unigrams*: number of occurrences of each fine-grained emotion
  - *BoSE-ngrams*: number of occurrences of fine-grained emotion sequences

Anger			Surprise		
anger1	*anger2*	*anger3*	*surprise1*	*surprise2*	*surprise3*
abomination	growl	battle	accident	art	magician
fiend	growling	combat	crash	museum	wizard
inhuman	thundering	fight	disaster	artwork	magician
abominable	snarl	battler	incident	gallery	illusionist
unholy	snort	fists	collision	visual	sorcerer

Examples of words grouped by fine-grained emotions

RESULTS

OBSERVATIONS

01. The approach of this paper outperformed the traditional BOW representation in both data sets (eRisk 2017, eRisk 2018). This indicates that the consideration of emotional information is essential for the detection of depression in social media.

02. The approach of this paper obtained comparable results to the best reported approaches in both data sets.

CONCLUSION

BoSE obtained better results than the proposed baseline models. The simplicity and interpretability of this approach in comparison to the competition approaches is important to point out. This method is also promises results in detecting other mental disorders.