
COREFERENCE RESOLUTION: DRAFT (ASSIGNMENT 1)

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March 29, 2020

ABSTRACT

Abstract content (to be added later).

1 Introduction

Coreference resolution is a task where the goal is to identify and group together all entity mentions that refer to a common entity in the text. Generally, the task can be thought of as a combination of mention detection and mention clustering and many approaches explicitly perform these two steps when doing coreference resolution. The mention detection step deals with the detection of all entities that refer to some entity in the text. Mention clustering then divides the entities into groups based on the entity they refer to.

In our work, we focus on coreference resolution for Slovene language, which has not been the subject of much research. For our experiments, we use the coref149 dataset [1] which is a corpus of 149 documents annotated with coreference information. We first evaluate an existing end-to-end approach and compare it to an approach performing the two steps of coreference resolution separately. Additionally, we modify the end-to-end approach, adding explicit information about additional morphological properties such as part of speech tags, and evaluate it.

The rest of the paper is structured as follows. In Section 2 we provide an overview of existing approaches to coreference resolution. In Section 3 we describe the used end-to-end approach to coreference resolution, as well as our modifications of it. In Section 4 we provide the results of our work, which we then discuss in Section 5. In Section 6 we summarize our work and provide some possible directions for further research.

2 Related Work

Most coreference resolution systems deal with two tasks: mention detection and mention clustering.

Traditionally, the task of mention detection was performed via analysis of parse trees and the use of heuristics [2]. The problem with hand-crafting rules is that they are language-specific and can be hard to define for less-researched languages.

The mention clustering task is where the approaches differ substantially. One approach is to treat it as a binary classification problem, where the goal is to determine whether two mentions are coreferent or not [3] [4]. The problem of this approach is that it treats all coreference candidates independently, so it cannot choose the most probable candidate when multiple valid ones exist. A different way to do mention clustering, which solves this problem, is with mention

ranking [5]. In this approach, candidates for coreference are scored in some way and the best scoring candidate is proclaimed as the coreferent mention. The benefit of this approach is that it does not consider candidates in isolation, but rather in comparison to other mentions. An approach which takes this even further is the entity-mention approach [5]. Here, the models are trained to determine whether the currently considered mention belongs to some preceding coreference cluster [6]. In our work, we make use of the span ranking approach, which is a modification of the mention ranking approach.

Recently, an end-to-end approach was introduced [7], where the two steps are combined and learned together using deep neural networks. This approach considers all spans of tokens up to specific length as candidates for coreference. The spans are then scored in isolation and as mention pairs to produce a final coreference score, which is used in the span ranking coreference resolution framework. Because the approach only considers pairs of mentions when scoring candidates, it can produce globally inconsistent clusters. An approach by Lee et al. [8] solves this by iteratively refining the obtained coreference clusters.

The end-to-end approach was further researched and improved upon, for example by using more sophisticated contextualized embeddings [9], but is the case in most of the other areas in nature language processing, the research is mostly focused on the English language. Some examples of research done for other languages include a Lithuanian rule-based approach [10] and approaches for Polish [11] and Basque [12] that use neural networks.

3 Methods

4 Results

5 Discussion

6 Conclusion

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