

Part I: Discourse – Hemanth Kumar Battula

From Sharid Loáiciga

Q1- What's the difference between Anaphora Resolution and Coreference Resolution? Please explain.

Sol. Coreference always implies identity of reference. Coreference does not need to depend on identity of sense but strictly require co-referential terms to refer to the same entity. Coreference is when two mentions refer to the same entity in the world. Co-reference resolution finds all mentions to the same entity in the text. End-to-End neural networks using machine learning algorithms are used to solve coreference resolution.

Anaphora can hold expressions that have same sense but may still have different referents. The relation of anaphora is when a term(anaphor) refers to another term (antecedent) and the interpretation of the anaphor is in some way determined by the interpretation of the antecedent. Anaphora resolution finds the antecedent for a given 3rd person pronoun or the pronoun to which it refers to. Hobbs algorithm, Lappin and Leass Salience model are used for anaphora resolution.

Coreference and anaphora can be distinct but most of anaphoric reference is co-referential. Co-reference is one of the process through which anaphora is encoded.

Q2- What's the role of parsing in Anaphora Resolution and Coreference Resolution? Please explain.

Sol. The NLP has a big pipeline. It starts with Sentence segmentation, tokenization, POS tagging, Lemmatization, Stop words, Dependency Parsing, Noun Phrases, Named entity recognition and finally Anaphora/Coreference resolution. All these steps are involved based on what need to be achieved. This step wise pipe line would make the resolution more easy.

Consider two sentences:

Hemanth lives in Gothenburg.

It is not the capital of Sweden.

Parsing helps to build a tree that assigns single parent word to each word in the sentence. It also helps to identify the relationship that exists between the words. Finding noun phrases would help to group together the words that represent a single idea or thing. We can use the information from the dependency parse tree to automatically group together words that are all talking about the same thing.

At this point we have important things like POS, how words relate to each other and which words talk about which entities. Using different coreference or anaphora algorithms the parsing trees are used to know the subject of the text. So in the second line "It" should represent Gothenburg as it's the main subject based on

parsing. Hence parsing the text helps finding coherence in discourse by grouping all constituents according to syntactical relations.

From ([Ivana Kruijff - 2002, Discourse Structure and Discourse Relation - Exercises](#))

Q3- Explain and illustrate with example how discourse structure correlate with anaphora, i.e. the availability of discourse referent

Sol. By using the pipe line for NLP we can find coherence in discourse by the syntactical relation between different constituents grouping together, later find the coreference and anaphora resolution contributing to the cohesion of the discourse.

Example:

Look at the woman there, she wears a beautiful hat.

Here woman and she are co referential and they refer to the same entity in discourse situation. Any time a given expression points to a linguistic expression it is an anaphora. Pronouns are typical anaphors and there may be other types as well.(verb, adverbs, prepositions).

The main point of confusion that arises concerns the presence of anaphora without coreference.

Eg: No man said he was not hungry.

Anaphora is present in this sentence, since the pronoun he, an anaphor, is pointing back at its antecedent no man. But the antecedent no man does not pick out an actual entity in the discourse world. This means is that coreference is not present, but anaphora is.

Q4- What indicators of discourse segmentation have been proposed by various researchers?

Sol. Discourse can be partitioned into segments, which can be connected in a limited number of ways. The discourse structure can be cohesion based, content based.

Example:

There was a guy who wished to marry princess. But then she must be real princess. He travelled all around the world to find such a girl.

In cohesion based the relation between 'Guy', 'princess', 'she', 'princess', 'he', 'girl' are taken into consideration.

In Content based 'wished to marry', 'find' , 'travelled' are taken into consideration.

By being able to identify the references in a discourse, we may be able to determine the structure of the text and analyze it for information retrieval, sentiment analysis, spam filtering etc.

From (Jurafsky&Martin, 2009), Chapter 21

Q5- Hobbs (1977) cites the following examples from his corpus as being problematic for his tree-search algorithm:

- (21.96) Sites at which the coarse grey pottery of the Shang period has been discovered do not extend far beyond the southernmost reach of the Yellow river, or westward beyond its junction with the Wei.
- (21.97) The thin, hard, black-burnished pottery, made in shapes of angular profile, which archaeologists consider as the clearest hallmark of the Lung Shan culture, developed in the east. The site from which it takes its name is in Shantung. It is traced to the north-east as far as Liao-ning province.
- (21.98) He had the duty of performing the national sacrifices to heaven and earth: his role as source of honours and material rewards for services rendered by feudal lords and ministers is commemorated in thousands of inscriptions made by the recipients on bronze vessels which were eventually deposited in their graves.

____ In each case, identify the correct referent of the underlined pronoun and the one that algorithm will identify incorrectly. Discuss any factors that come into play in determining the correct referent in each case, and what type of information might be necessary to account for them.

Sol.

(21.96): Correct referent: yellow river

Algorithm identifies: The coarse grey pottery

The algorithm should be capable of identifying the context and name of two rivers to find the antecedent of pronoun by using the key word Junction

(21.97): For last 'it':

Correct referent: Shantung

Algorithm Identifies: Shatung

For first 'it':

Correct referent: the thin, hard, black, burnished pottery

Algorithm Identifies: The Site

In a subordinate clause the algorithm should omit the NP immediately found the preceding pronoun.

(21:98): Correct referent: The feudal lords and ministers

Algorithm Identifies: Bronze Vessels

If the algorithm omits the first c-commanding NP when the pronoun is "their", it might have worked.

Part II: Dialogue

From www.ello.uos.de

Q6 - Try to locate the speech acts of

- *divorcing*, - ASSERTIVE
- *answering*, - REPRESENTATIVE
- *complaining*, - EXPRESSIVE
- *betting*, - COMMISIVE
- *condoling*, - EXPRESSIVE
- *declaring guilty*, - DECLARATION

in Searle's classification of speech acts.

Adapted from www.ello.uos.de

Q7 - Consider the following cartoon and analyze the caller's question and Calvin's answer on the basis of the distinction made between direct and indirect speech acts.

Sol: Calvin literally took word by word and mis interpreted what the caller wanted to convey. The caller actually requested to Calvin to actually hand over the phone to his father so that he can speak to him but Calvin mis interpreted thinking that he was actually asking permission to talk to his father. If it would have been a direct conversation and not on phone Calvin would have considered the facial expressions and body language to identify what he actually wanted than being rude, which he did over the phone.

From Sylvie Saget

Q8 - Explain in your own words why latency is a problem to address for dialog systems

Sol: Latency or the response time of the speaker actually depends on the knowledge about the topic of two persons communicating. When two real human beings talk on something on which only one person has knowledge about the other person could not answer promptly. In such situations the other speaker would understand merely on body language and would try to understand.

When it comes to computers, people are easily annoyed as they would not be able to understand whether the computer is processing the information or trying to reply or it doesn't. Especially when a lot of input is provided to a computer it would take a lot of time to process the text and understand the context for the computer to reply on which the speaker might get annoyed. It would be great if the computer could promptly reply to give it some time to reply after the question and then process the information could help. Usually humans have a tendency to get an answer as soon as something is requested which doesn't work with computers.