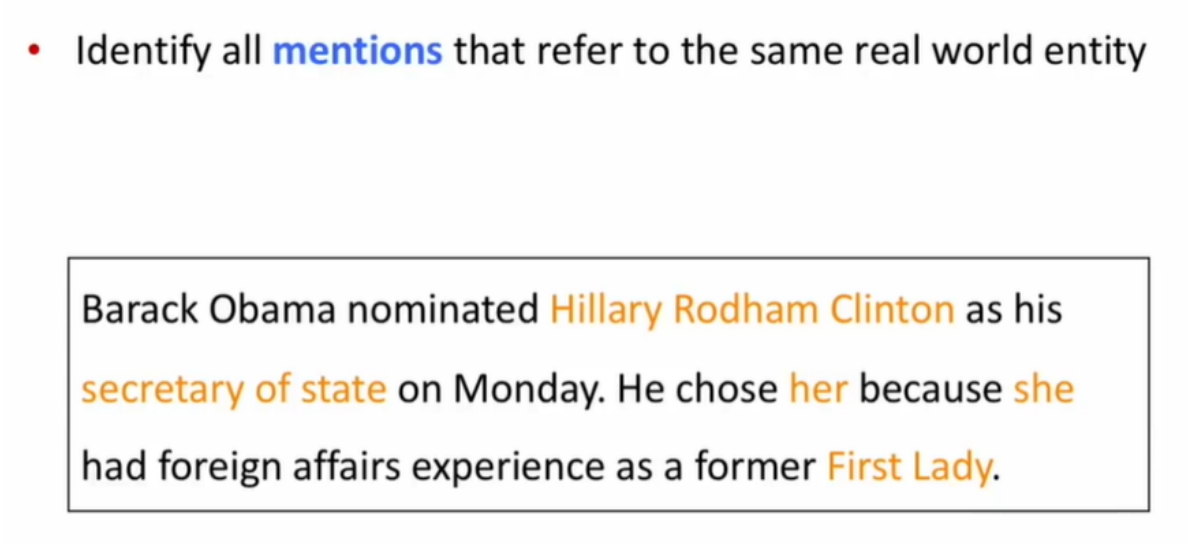
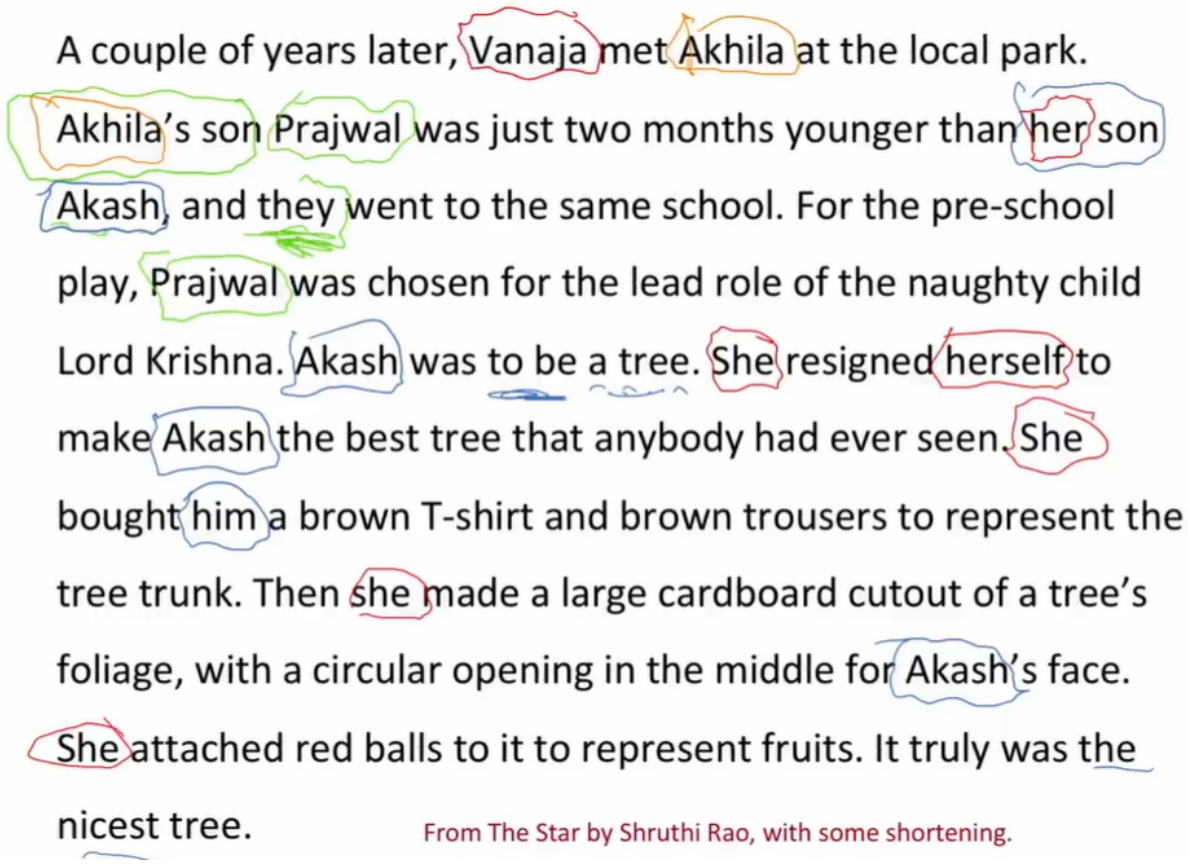
Coreference Resolution

What is Coreference Resolution?

识别一段text中指代相同的entity。



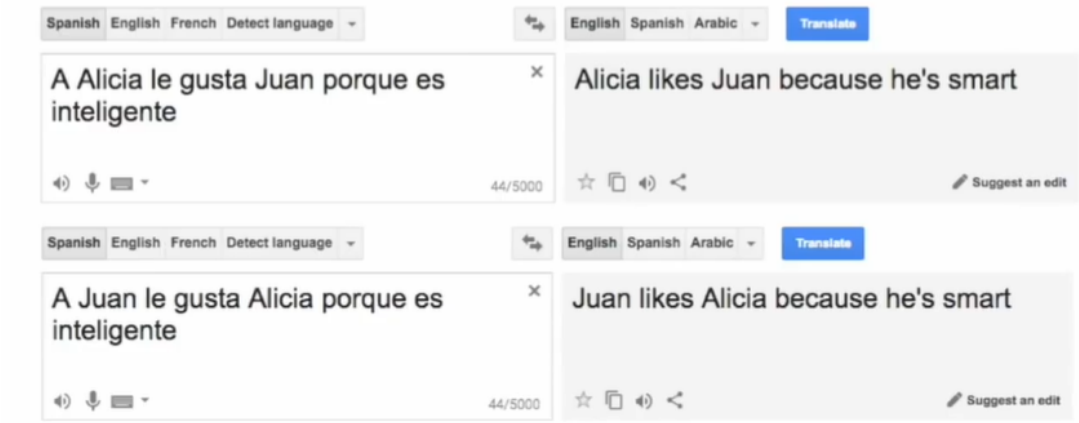
例子:



coreference resolution的应用:

- information extraction/ qa/ summarization
- machine translation, 用cr可以具体知道具体指代的主语

- languages have different features for gender, number, dropped pronouns, etc.



- dialogue systems

"Book tickets to see James Bond"

"Spectre is playing near you at 2:00 and 3:00 today. How many tickets would you like?"

"Two tickets for the showing at three"

Two Steps

1. mention detection: 识别出所有的mentions
2. mention cluster: 对mentions进行聚类

Mention Detection

- Mention: span of text referring to some entity
- Three kinds of mentions:

1. Pronouns
   - I, your, it, she, him, etc.
2. Named entities
   - People, places, etc.
3. Noun phrases
   - "a dog," "the big fluffy cat stuck in the tree"

1. Pronouns
   - Use a part-of-speech tagger

2. Named entities
   - Use a NER system (like hw3)

3. Noun phrases
   - Use a parser (especially a constituency parser – next week!)

有一些bad mentions, 如"It is sunny"的it并不是mention。可以通过train一个二分类器判断是否计入mention，或者cr结束后再判断丢弃。

用neural方法，可以end2end找出mention，甚至end2end完成cr。

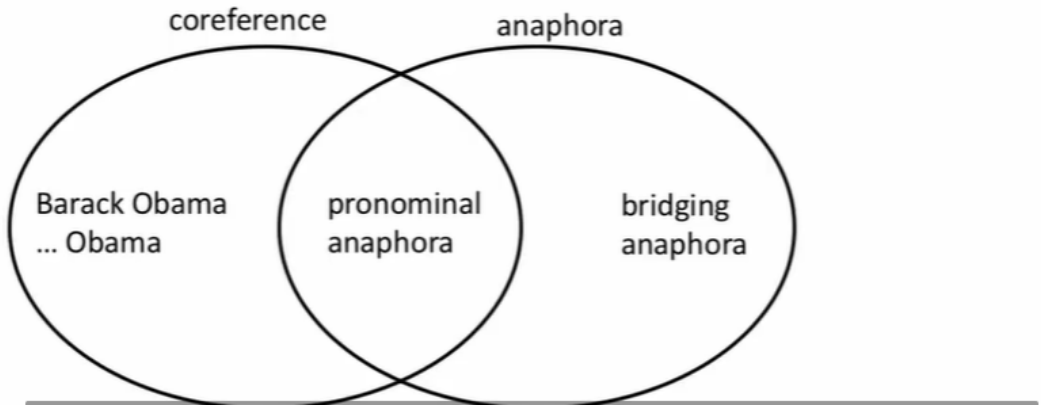
Coreference (linguistics)

anaphora是在同一段text中的指代; coreference是指在这个世界上，某两个词就是同一个指代。

anaphoric relations不一定是coreference的。

We went to see a concert last night. The tickets were really expensive.

- This is referred to as bridging anaphora.



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Four Kinds of Coreference Models

Knowledge-based

Hobbs algorithm

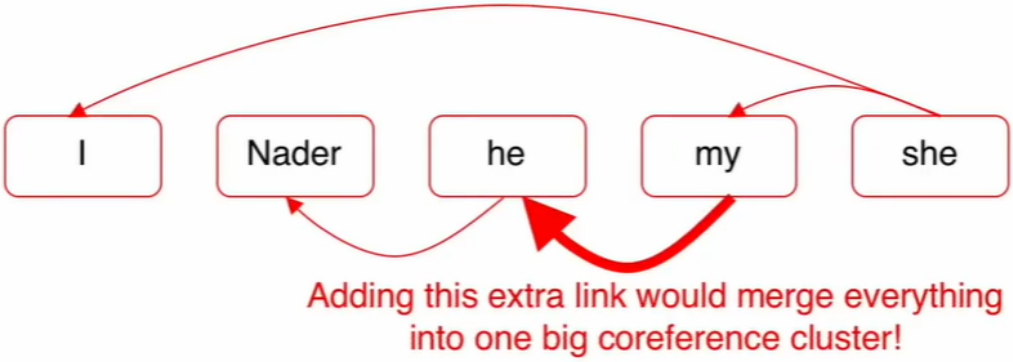
Mention Pair

每一对mentions，用一个二分类器前者是antecedent的概率。

Mention Pair Test Time

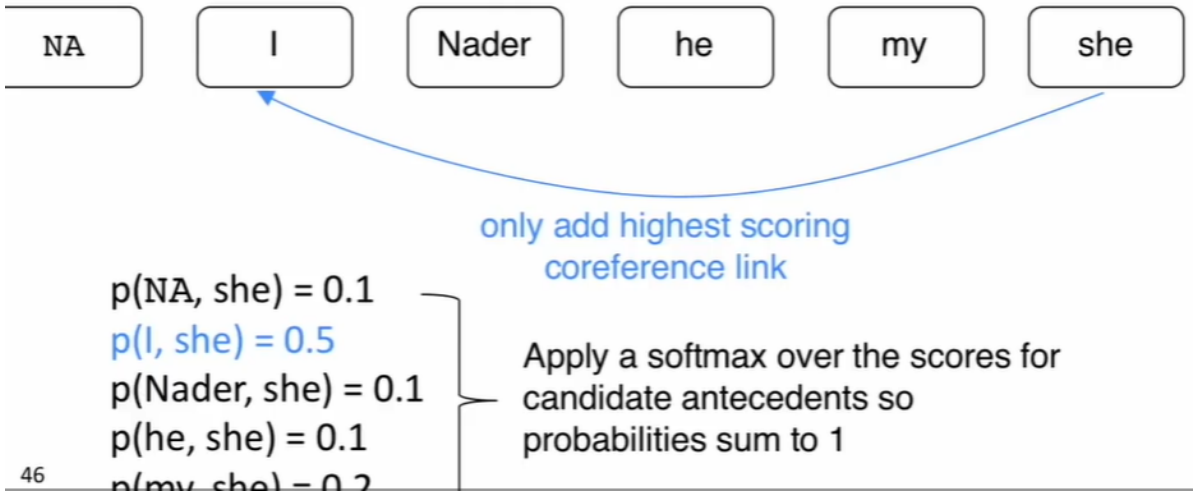
- Coreference resolution is a clustering task, but we are only scoring pairs of mentions… what to do?
- Pick some threshold (e.g., 0.5) and add **coreference links** between mention pairs where $p(m_i, m_j)$ is above the threshold
- Take the transitive closure to get the clustering

*"**I** voted for **Nader** because **he** was most aligned with **my** values," **she** said.*



Mention Ranking

- Assign each mention its highest scoring candidate antecedent according to the model
- Dummy NA mention allows model to decline linking the current mention to anything ("singleton" or "first" mention)



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具体论文略