Learning a Theory of Marriage (and other relations) from a Web Corpus

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Motivation

• Long-term goal of NLP: Natural language understanding (just like humans do!)

• NLP has been very successful at interpreting individual words, sentences and documents:
  • POS tagging
  • Syntactic parsing
  • Semantic parsing
  • Word sense disambiguation
  • Co-reference resolution
  • ...

But texts contain much more information than is stored on the surface level

Can we infer some of this knowledge using NLP methods and make it available to the computer?

Idea

How do humans learn what a concept such as "marriage" typically involves?

Various possibilities:
• Look it up in a dictionary
• Ask other people
• Wait for the right person and give it a try yourself
• Look at other married couples and observe what they're doing...

Computers can't yet fall in love, but they can crawl texts quite well!

Let's have a look at the whole web and what it tells us about married couples!

Extraction of relations from the corpus

• Compile a list of all married couples in the knowledge base
• Crawl the web corpus and look for sentences which contain the names of two married people
• Extract the relation the two people are in
• Requires a lot of NLP machinery
  – Boilerplate removal
  – Splitting documents into sentences
  – Tokenisation
  – POS tagging
  – Dependency parsing
  – ...

Output

say sth.  tell sth.
see  get engaged to
join  file for divorce from
visit  travel with
marry

Applying a weighting scheme

That looks great, but is this what we typically have in mind when we think about marriage?

Not quite. Not only married people meet and visit each other!

**Aim:** Work out which relations are specific to married couples  **Idea:** Use a parsed background corpus and look how many instances there are

Resources used

• **Web corpus** ClueWeb09: 2 TB compressed – a good portion of the WWW on disk
• Freebase (a state-of-the-art **knowledge base** with structured information about 2 million people)
• Lots of processors

Results:

**Typical of marriage**
be someone's wife
be engaged to
date
meet
divorce
file for divorce from
tie knot with
love
expect child with

**Less typical**
hit someone
defend
remember
turn to
rejoin
promise sth.
bury
remind
look at