Introduction to Linguistics
165: Computational Linguistics

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What is computational linguistics?

- Formal tools for computing with natural language structure: lexicon, phonology, morphology, syntax
- Automatically classifying documents (Spam detection)
- Automated speech recognition by computers
- Automated spelling and grammar correction
- Information retrieval (web search!) and extraction
- Machine translation
- Question answering (Ask.com)
- Automated document summarization
Why study computational linguistics?

- Financial payoff!

...if someone told me I had to make a million bucks in one year...I'd grab a copy of [a computational linguistics textbook] and start a web text-processing company.

-- Peter Norvig, director of research, Google
Why study computational linguistics?

- **Scientific interest!**

  I have emphasized in my writings on this subject that the challenge to psychological theory made by linguists to provide an adequate theory of language learning may well be regarded as the most significant intellectual challenge to theoretical psychology in this century. At the present time numerous difficult problems of providing a completely adequate scientific theory of language learning and language performance are enough to make even the most optimistic theorist uneasy. In very developed areas of science or mathematics, it is familiar to find the statement made that certain kinds of problems are simply far beyond the resources currently available but that certain more restricted problems are amenable to serious attack and likely solution.

  -- Patrick Suppes, Lucie Stern Professor of Philosophy, Emeritus
Why study computational linguistics?

• Fun!

[At least, I hope to convince you of that over the next eleven weeks!]
NLP is everywhere in technology
In web search, there’s NLP under the hood.
In web search, there’s NLP under the hood.
In web search, there’s NLP under the hood.
Predictive text has hit mobile

Today’s meeting:

What’s up Craigster?

Final Keynote walk-through.

How’d it go?

The meeting was...
Predictive text has hit mobile
Computers can answer NL questions
Machine Translation is becoming reality

- [https://www.youtube.com/watch?v=5W5QgcQoKLM — start about 6:30 into the video](https://www.youtube.com/watch?v=5W5QgcQoKLM — start about 6:30 into the video)
Machine Translation is becoming reality

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NLP lets us study the history of culture too.
...and the history of language itself
Examples you can try at home

• Machine translation. It works pretty well sometimes!
Examples you can try at home

• ...and sometimes it doesn’t work nearly as well.

Translate

Whichever restaurant he decides to eat at, I'm going to another.

Choose a restaurant, and me and I'll go for another.

Translate

Whether you decide to eat restaurant in, I would be different.
What we’ll do today, and in the course

• This is a hands-on course designed to get you familiar with using computers to process human language
• You’ll learn how to do this with some computational tools, especially the programming language Python
• Class time will be a mix of lectures (MW) and practicum sessions (F)
• You’ll have both pen-and-paper and simple computer-programming assignments
• We’ll set up the key computational tools you’ll need are on instructional servers
• Though you’ll definitely do well to install Python and NLTK on your own computer or laptop!