

Language and Computation

week 12, Thursday, April 17

Tamás Biró

Yale University

tamas.biro@yale.edu

<http://www.birot.hu/courses/2014-LC/>



Practical matters

- **Pre-reading:** intros to JM 22, 23, 25
- <http://birot.hu/courses/2014-LC/readings.txt>
- Assignments 4 and 5.



Today

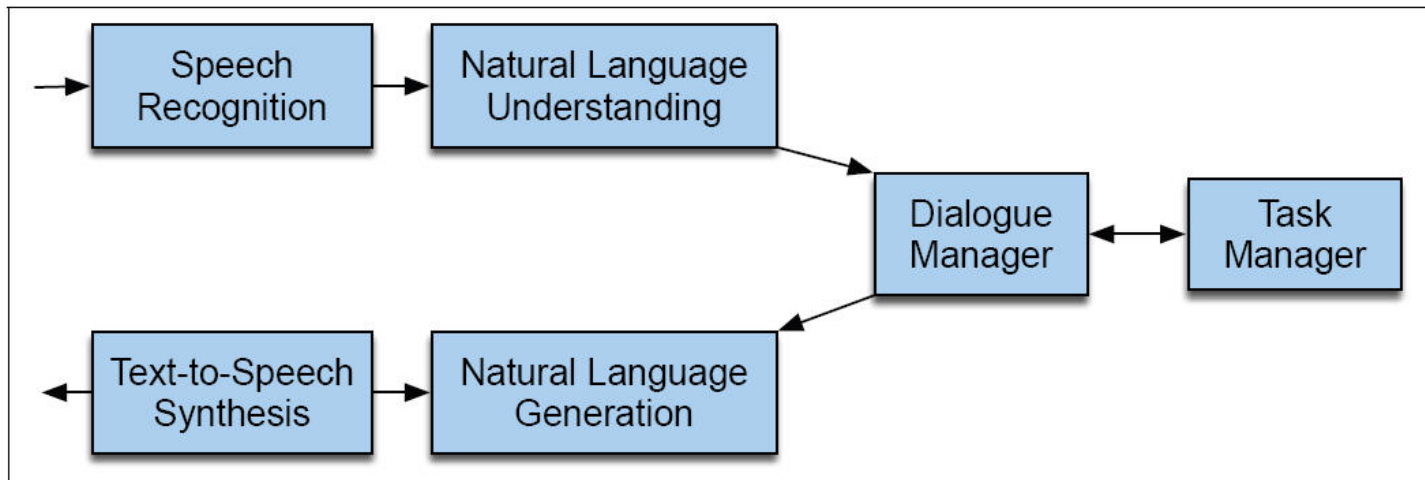
- Discourse and dialogue systems
- Selected topics in computational discourse



Computational discourse



Dialogue and Conversational Agents



Discourse

Above the sentence-level:

Discourse: a coherent structured group of sentences.
Such as monologues and dialogues.

Structure and coherence due to

- Linguistic elements, such as
 - Sentence connectors (*thus, but, subsequently. . .*) and other *discourse markers*
 - Pronouns and other referring expressions
- Non-linguistic elements

Challenges for computational discourse

Among many others. . .

- Parsing the structures above the sentence level.
- Reference phenomena and anaphora (pronoun) resolution
- Turn-taking
- Detecting errors and corrections
- Detecting speech acts, conversation acts

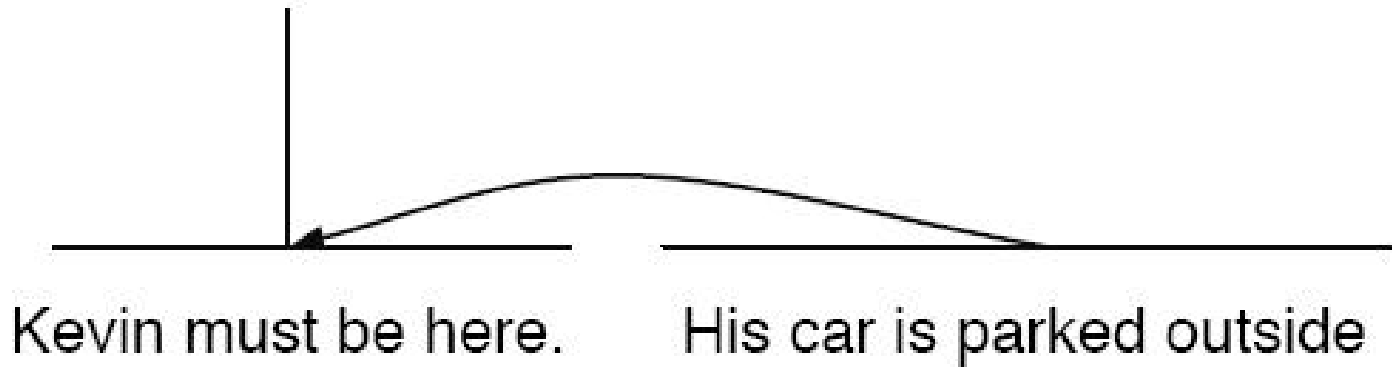


Challenges for computational discourse

Theoretically, two approaches:

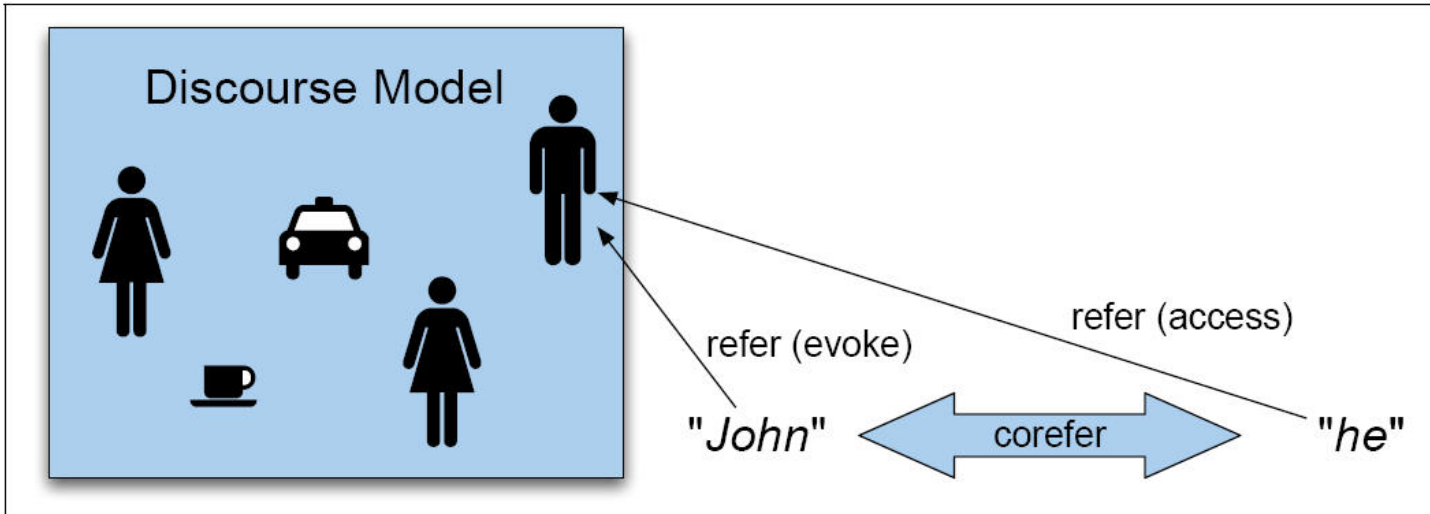
- Imitate human mind: computational model of the world, in general and of the specific context, which is updated after a full semantic analysis of each sentence.
- Approximations:
 - machine learning,
 - corpus based,
 - probabilistic,
 - etc.

Anaphora resolution



John_i is a good friend of Kevin_j. He_{i/j?} loves Mary.

Anaphora resolution



Chomsky's binding principles

John washed himself.

John asked Marry to wash himself.

- **Principle A:** Reflexives must have a local antecedent.
- **Principle B:** Pronouns must not have a local antecedent.

(Locality defined by c-command.)

Features for Pronominal Anaphora Resolution

John saw a beautiful 1961 Ford Falcon at the used car dealership. (U_1)

He showed it to Bob. (U_2)

He bought it. (U_3)

	He (U_2)	it (U_2)	Bob (U_2)	John (U_1)
strict number	1	1	1	1
compatible number	1	1	1	1
strict gender	1	0	1	1
compatible gender	1	0	1	1
sentence distance	1	1	1	2
Hobbs distance	2	1	0	3
grammatical role	subject	object	PP	subject
linguistic form	pronoun	pronoun	proper	proper

Coreference resolution

- *John Smith_i is a professor. Mr. Smith_i works at Yale.*
- *My neighbors are John_i and Marry_j.
He_i is a doctor and she_j is a lawyer.*
- *Last night I walked my dog_i. Max_i was very happy.*



Speech acts

Locutionary act:	the utterance of a sentence with a particular meaning
Illocutionary act:	the act of asking, answering, promising, etc., in uttering a sentence
Perlocutionary act:	the (often intentional) production of certain effects upon the feelings, thoughts, or actions of the addressee in uttering a sentence

Performative sentences.

Illocutionary force: *You can't do that.*

- Assertives:** committing the speaker to something's being the case (*suggesting, putting forward, swearing, boasting, concluding*)
- Directives:** attempts by the speaker to get the addressee to do something (*asking, ordering, requesting, inviting, advising, begging*)
- Commissives:** committing the speaker to some future course of action (*promising, planning, vowing, betting, opposing*)
- Expressives:** expressing the psychological state of the speaker about a state of affairs (*thanking, apologizing, welcoming, deploring*)
- Declarations:** bringing about a different state of the world by the utterance (including many of the performative examples above; *I resign, You're fired*)

See you next week!

