Human communication

2009/2010
Helen Pain and Susen Rabold
Lecture 1

Background:

Communication between agents, both human and computational, involves a number of activities:

- the generation of the communication, conveying it to some other agent,
- interpretation of responses from and interactions with the other agent,
- understanding of the communication by the other agent, and
- internalisation of the knowledge acquired from the communication for use in the future.

This course aims to convey:

1. Knowledge of the various activities involved in communication, and some of the methods used, through consideration of a small number of example systems;
2. Understanding of the difficulties and of what is feasible today and in the future.

This course will give:

- a basic insight into the cognitive events occurring in communication
- show that everyday communication is not as simple as it at first seems
- that it relies on a complicated set of rules which we all use automatically
- these only become evident when communication breakdowns occur.

Start of with an example…..

Taken from a recent research project:

Standup: **Facilitating language play in non-speaking children through computer-supported joke construction***

http://www.csd.abdn.ac.uk/research/standup/

Brings together a number of aspects of Human Communication

Will use it as an example later in the course

*EPSRC Grants GR/S15402/0 and GR/R83217/01

Human communication: humour

What do you get when you cross a monkey and a peach?

An ape-ricot.

What do you call a murderer with fibre?

A cereal killer.

What kind of vegetable can jump?

A spring onion.

What do you get when you cross cars and sandwiches?

Traffic Jam

How does a whale cry?

Blubber blubber.

How is a car like an elephant?

They both have trunks.

Based on JAPE (Binsted & Ritchie 1994, 1997) and developed in Standup project

Exercise 1:

Consider what knowledge is needed to understand such jokes - what different types of knowledge do you have to have?

1. Make individual notes
2. Compare with neighbours and construct list

What might the communicative function of such jokes be?

Can we automate this - what would we need to know and represent to do this?

What would be the purpose of this?

Would need a word list = Lexicon

- Part-of-speech (POS) tags
- Phonetic spelling, for computing:
  - homophones   time ↔ thyme
  - rhyme   pub ↔ tub
  - spoonerism   bare/spank ↔ spare/bank
- Compound nouns and their components
-       e.g. long time, traffic jam
- Distinct senses of a word/phrase,
  - e.g. match=sporting event, match=ignition stick
- Semantic relations:
  - synonyms   strange ↔ bizarre
  - hypernyms   thyme ↔ herb
  - meronyms   traffic ↔ car

---

e.g. Augmenting Wordnet

Starting point: **WordNet** (200k senses, synonyms, hypernym hierarchy, meronyms)

Phonetic forms: **Unisyn**: pronunciation dictionary, phonetic strings assigned to >115k word forms (Edinburgh accent)

Pictures: Widgit "conceptcodes" already linked to two picture libraries; linked to WordNet senses, manually.

Familiarity ratings: data from spelling lists, SemCor, Widgit conceptcode set, MRC psycholinguistic database, BNC

Topics: adopted hierarchy supplied with Widgit coding.

Excluded items: anything in Shorter Oxford "coarse slang" or "racially offensive", plus a few from personal knowledge.
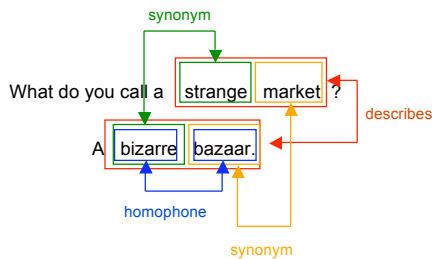
(Thanks to Widgit Software and Mayer-Johnson for pictures)

How could we automate this? JAPE: example of structure

synonym

What do you call a [strange | market] ?

A [bizarre | bazaar.]

describes

homophone

synonym

Purpose: need for language play

Word play is critical part of language development
- typically-developing (TD) children enjoy jokes and riddles
- provide opportunity to practise language, conversation and social interaction skills.

Jokes
- are a type of conversational narrative
- play an important role in the development of storytelling skills.

Role of punning riddles in language development
- pragmatics => turn taking, initiation etc.
- vocabulary acquisition

Children with speech and/or language disabilities do not always have language play opportunities
- Pre-stored rather than novel jokes
- little opportunity for independent vocabulary acquisition and word play

---

Standup goals

- **To build a tool that helps children with complex communication needs (CCN) to play with language:**
  - **generate novel puns** using familiar vocabulary,
  - **experiment** with different forms of jokes.
  - provide **social interaction** possibilities
  - **go beyond** the "needs" and "wants" of **AAC***

*AAC: augmentative or alternative ways to communicate for people with limited or no speech

---

NI telling a joke

HC Learning Outcomes 1

1. Demonstrate knowledge of the communication phenomena presented from contrasting disciplinary perspectives covered in this course by describing them.
2. Describe examples that illustrate ambiguity and other difficulties in human communication.
3. Discuss the strengths and weaknesses of computational models of communication, as illustrated by the examples covered in the course.
4. Describe the relationship between human communication and formal models of communication used in current technology.

HC Learning Outcomes 2

5. Demonstrate an understanding of methodologies used in research in human communication by designing and carrying out a simple empirical study.
6. Demonstrate and understanding of the relation between models and experimental data by describing how such data may be used in modelling example communication phenomena.
7. Demonstrate the use of simple techniques for analysing communication by applying them to example interactions.

Course Information

The course website is:
http://www.inf.ed.ac.uk/teaching/courses/hc1/
References will be made to papers and articles - sources of these will be provided for you to read
Source for this lecture:
http://www.csd.abdn.ac.uk/research/standup/
In particular:
Ritchie, G., Manurung, R., Pain, H., Waller, A., Black, R. and O'Mara, D. (2007) A practical application of computational humour. Pp. 91-98 in Proceedings of the 4th International Joint Conference on Computational Creativity, ed. Amilcar Cardoso and Geraint A. Wiggins. London.

Methods of Study

Work through the abstract concepts we talk about by finding your own concrete examples.

If you can generate your own examples, you understand. You will also begin to understand the problems in fitting the concepts to new examples.

When you do hit problems, raise them with someone - either fellow students, your tutor, or by electronic means.

Evaluation of learning…

- You will gain marks for bringing in your own examples
- show evidence of having thought the concepts through, even if you do not get it all right.
- if you can introduce material from other areas of your studies and show that you have related them to the material here - this demonstrates understanding.

Practicalities: Tutorials

Tutorials start next week

Tutorials meet in Appleton Tower following the Monday and Tuesday lectures

Do not change unilaterally, contact the ITO with proposed swaps (in person or send ITO contact form)

You can find your group assignment at
http://www.inf.ed.ac.uk/admin/itodb/mgroups/stus/hc1.html