Finding answers to questions

Rieks op den Akker Human Media Interaction University of Twente, Enschede

Wat is NLP eigenlijk?

NLP is naar Nederland overgekomen vanuit de Verenigde Staten. ... Maar NLP is niet alleen voor de professionele hulpverlening. Het is ook uitermate geschikt ... biz.inter.nl.net/Educare.NL/TXT/MsnIp.html - 10k - I<u>n cache - Gelijkwaardige pagina's</u>

NLP = Vinden van oplossingen

NLP houdt zich niet bezig met problemen maar met oplossingen. Voor wie is NLP bedoeld? NLP is voor mensen die op een of andere manier (iets) willen veranderen, verbeteren.

NLP and AI

- What does natural language processing have to do with AI ?
- · Computable models
- Answers are computed given a question

A famous experiment

"Can machines think $\ref{eq:constraint}$ (A.M. Turing, Computing machinery and intelligence 1950)

Finding an answer to this question is not a matter of statistics... ("a Gallup poll")

"The imitation game" Three players: a man, a woman and an interrogator Object of the game:

The interrogator has to determine who is the man and who is the woman.

How ? By asking questions?

The imitation game

We then replace the man by a machine

Is it easier for the interrogator now to determine who is the woman than in the first game?

"This question replaces the original question "can machines think?" "

Abstract communication by exchange of text (``teletyping")

Ingedients of QA

- · Question presentation
- · Question types
- Data information knowledge
 - Open/closed domain
 - Restricted/unrestricted
 - Structured dbase
- · Answer presentation

From QA to Dialog

Terry Winograd, A procedural model of language understanding, 1973.

``Question answering systems have had to deal with the entire language process, but they have been severely limited in the breadth of their language ability"

``Much of the structure of language comes from its being a proces of communication between an intelligent speaker and hearer, occuring in a setting." (including ...`the knowledge each participant has about the other's ideas.")

Meaning without understanding?

"This paper describes an attempt to explore the interconnections between the different types of knowledge required for language understanding."

``It is based on a computer program that ``understands'' language in a limited domain by including a model of the subject being talked about and a context of discourse."

Case for analysing the ``interaction of different ``sorts of knowledge":

The use of pronouns "Sam and Bill wanted to take the girls to the movies, but they didn't have any money". (SIC! 1973! USA!)

Multi-modal QA Dialog

- IMIX (2003-2008, sponsored by NWO)
- · Multimodality
 - Questions
 - Data
 - Answer presentation
- · Follow-up questions

Corpus analysis (what do people need?)

Dialogue act theory for QA: user needs

· Different kinds of user utterances:

- questions

- feedback to a previous answer
- attempts to comprehend or verify a previous answer
- Multimodality-specific findings:
 - Users ask a lot of questions about pictures
 - Multimodal user behaviour is relatively easy to interpret: references are resolved
 - relatively easily

FQ and information need: non task specific

- In our corpora, we identified some non task specific kinds of information need:
 - trying to comprehend or evaluate the answer
 - need to expand the answer to include obviously missing information
 - need for clarification of technical details (turned out to be difficult to distinguish)

Dialogue act theory for QA: other 2.78% acknowledge 12.70% IR needs reformulation 4.35% fuq 56.52% negative 20.00% Is the question an FQ? verify-question 3.65% What referents does the FQ refer to? required for adding search terms and rewriting anaphor 22.15% elf-contained fuq 24.92% How should the FQ be rewritten? required for rewriting elliptic 6.77% pp attachment 9.85% other 23.08% missing referent 13.23%



Annotated Meeting Corpus

- Dialogue acts
- Addressing
- Topics
- · Adjacency pairs



A naive method for finding answers to questions in conversations

- The answer to a question is the first act performed by the addressee of the eliciting act. (based on turn-giving rule SSJ)
- Evaluation: compare the outcome with the annotated b-part of the adjacency pair with the question as a-part

	A	MI			AMIDA				
	pattern	GOOD	WRONG	Total	pattern	GOOD	WRONG	Total	
	AEB	196	47(25s)	243	ABB	57	25(11s)	82	
	AEC	0	26	26	ABC	0	18	18	
	AEA	0	8	8	ABA	0	2	2	
	Total	196	81	277	Total	57	45	102	
	P3> P2> P0>	Tal •P0: Wł •P3: Uh •P3: Uh	ile 2: Tables iat do you , it's really , I think th	with pe 1 think, y hat fan	rformance o , is it fanc , we ca	of the raiv cy? an say it	e method		
Go	es wron	ig when	ı you take	e the f	irst act a	fter the	questior	ı	

- Does it matter who gave the answer ?
 Trust, politics,
- Does it matter in what context the answer was given?
 - Time
 - Place
 - Cultural / political situation ?



Is Interaction Computable ?



