

# Understanding Texts in Attempto Controlled English

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# Claim on the Attempto Web-Site

*"... once written, texts in Attempto Controlled English (ACE) can be read and understood by anybody ..."*

- true statement or exaggeration?
- problems understanding technical texts in full natural language
  - software specifications
  - instruction manuals
- can ACE as controlled language with a logical basis solve the understanding problem?
- my conclusion:
  - only to a certain extent
  - requires cooperation of authors and readers

# Human Conversations

- interactive verbal communication between two or more people
- underlie explicit and implicit social rules, linguistic rules, timing constraints
- speakers and listeners usually take turns
- series of utterances, signs of assent/dissent, clarifying questions
- mutually expected and required cooperation between speakers and listeners to achieve a successful communication

# My Claim

- understanding an ACE text
  - does not concern solely the reader
  - requires a cooperation between author and reader
- author-reader relation
  - can be considered a restricted form of conversation
  - underlies similar rules and constraints
- cooperation needs contributions from both author and reader

# Contributions of the Author: Form

- since antiquity many guidelines of good writing style
- ACE Trouble Shooting Guide
  - general hints on constructing and interpreting ACE texts
  - pitfalls and how to avoid them
  - solutions for often occurring problems
- ACE parser generates a paraphrase of the ACE input
  - can clarify difficulties
  - can eliminate discrepancies between the meaning of an ACE text enforced by the ACE interpretation rules and meanings suggested by common sense
- hints, guidelines and writing rules contribute to the understanding of an ACE text, but do not address the essential and most critical point, namely the content of the text

# Contributions of the Author: Content

- claim: effective communication requires cooperation between author and reader
- Grice introduced the cooperative principle in verbal conversations
- principle can also be applied to the author-reader case
- cooperative principle binds foremost the author as the producer of the ACE text, but also the reader who relies on the author to adhere to the principle
- Grice derived four maxims that substantiate the cooperative principle
  - Maxim of Quality: The text should be true.
  - Maxim of Quantity: The text should be complete without superfluous information.
  - Maxim of Relevance: The text should be relevant with respect to the topic described.
  - Maxim of Manner: The text should be perspicuous.
- one further author contribution addressed later

# Contributions of the Reader

- assumptions: reader cannot contact author, has only author's ACE text
- important concept in verbal conversations: repair
- repair occurs when speakers correct themselves, but usually when listeners ask questions, give signs of assent/dissent
- reader cannot ask the author, but can quasi "ask" the ACE text
  - can submit it to the ACE parser to generate a paraphrase
  - can derive logical inferences from it
- RACE: first-order reasoner for ACE with equality
  - consistency checking
  - deduce one ACE text from another one
  - answer ACE questions on the basis of an ACE text

# Contributions of the Reader: Repair

- RACE offers 11 forms of questions
  - asking for state of affairs: *yes/no* questions
  - asking for subjects or objects: *who, whose, what, which*
  - asking for adverbs or prepositional phrases: *how, where, when*
  - asking for aggregation (cardinalities, amounts): *how many, how much*
  - asking for verbs: *what does ... do*
- RACE generates some presuppositions & implicatures as logical deductions
  - existence: noun => *there is*, noun => *there are*
  - indefinite existence: noun => *there is somebody*, noun => *there is something*
  - possessives imply ownership: *X of Y* => *Y has X*, *Y's X* => *Y has X*
  - generalised determiners: *some X* => *one X / at least one X / more than one X / ...*

# Question "why?"

- RACE can ask for all details of the ACE text, but ...
- ... RACE cannot answer the important question "why?" that would reveal the intentions and the decisions of the author
- information on the ACE text itself, meta-information
- there are no ACE language constructs for meta-information
- possible way to provide meta-information: ACE comments
- comments must be formulated by the author as the source of the meta-information
- comments can contain any information using a richer language than ACE

# Summary

- understanding an ACE text as intended by its author is a difficult problem
- problem does not concern the reader alone
- problem can be partially eliminated by a cooperation between the author and the reader
- cooperation requires contributions from both the author and the reader

# Common Sense Reading vs. ACE Reading

The common sense reading of an ACE text and its reading according to the ACE interpretation rules can differ, as the following – admittedly contrived – text shows.

ACE input:

*A manager calls a subordinate. He gives him an order.*

Common sense reading:

*A manager calls a subordinate. He gives him an order.*

Paraphrase generated by the ACE parser APE shows interpretation rules:

*There is a subordinate X1.*

*There is a manager X2.*

*The manager X2 calls the subordinate X1.*

*The subordinate X1 gives an order to the manager X2.*

ACE reading:

*A manager calls a subordinate. He gives him an order.*