AN INDIRECT APPROACH TO TYPES OP SPEECH ACTS.

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Abstract

Consideration of the similarity between direct and indirect speech act understanding give rise to the notion that taxonomies of speech acts may not be helpful in modelling language understanding. A computer model which treats representations of direct and indirect speech acts similarly and succesfully has been implemented without any such taxonomy and without an explicit representation of the difference between direct and indirect speech acts.

Introduction.

Speech acts theory is of great interest to many workers from various disciplines interested in natural language. One of the problems that their work has highlighted is that of the indirect speech act: An utterance which the speaker makes carry an illocutlonary force more important than, and in addition to, the illocutlonary force derivable from the literal meaning of that utterance (Searle 1975).

Another problem which has received considerable attention (eg Austin 1962, Searle 1976, Dore 1977, Katz 1977, Vendler 1972 Hancher 1979, Stiles 1981 and many others) is the classification of speech acts into types. Here there are two questions:

1) What types of speech acts are there?
2) What should their criteria for classification be?

I am going to suggest in the following that these questions may be avoided as the notion of speech act types is not essential for natural language understanding (NLU). Furthermore I am going to reach this position by considering the understanding of a few direct and indirect speech acts and by arguing that direct and indirect speech acts may be understood by a single mechanism. For brevity the discussion is restricted to REQUEST and INFORM type speech acts.

An Example.

Consider such utterances as:-

1) Its cold in here.
2) Turn on the heater.
3) Shut the window.

Speech act theorists (eg Austin 1962, Searle 1969) tell us that (1) is an INFORM type (direct) speech act, whilst (2) and (3) are DIRECTIVE or REQUEST type (direct) speech acts. However it Is easy to visualize a situation in which a speaker (Mary, say) utters (1) and her hearer (John, say) infers that she actually meant to convey something in addition to that (ie (2), or (3), or (2) and (3)). Uttering (1) would then be termed making an "indirect" REQUEST. Let us call this situation case A.

Similarly, one could utter (2) or (3) and simultaneously convey the INFORM meaning of (1). However it is not usual to call either (2) or (3) "indirect INFORMs" as the INFORM is not their primary function. Let us call this case B.

Additionally, if Mary enters a cool room and says (3) to John, as she believes the window to be open, it would seem very strange to call (3) an indirect way of uttering the REQUEST (2) If John were to turn on the heater (as he knows that the window is already closed and that there is a heater which is turned off). (case C).

If it is accepted that case A above is a "classic" indirect speech act, how do we describe cases B and C? Case B cannot be described as a typical indirect speech act as it is less important to Mary that John infer (1) than that he confirm with her literal request (3). (That Is, if one accepts that the request is the more primary meaning in case A.) Possibly one could avoid the problem by describing case B as an Instance of a "background entailment" (Smith and Wilson 1979). and consequently claim that a different mechanism is used to understand (1) from the utterance of (2) in case B than the mechanism used to understand (2) from the utterance of (1) In case A. However, this possibility does not help in the analysis of case C.

In case C John responds cooperatively (Grice 1975, Perrault Allen and Cohen 1978,) to a request that Mary did not intentionally make. Note that this case does not seem to be accomodated by the work of Allen and Perrault who explicitly follow speech act theory in assuming that the speaker makes his utterances with the intention that the hearer recognizes his intentions (Allen 1979 pl07, Allen and Perrault 1980 pl70). However, to accomodate this case are we to say that (2) is understood from (3) by a different mechanism again than that used in cases A or B? Or are we to look instead for a single mechanism which can deal with all three example cases and for which "Indirect speech acts" are merely a special case?

A single mechanism is certainly the most elegant solution, and its presence is suggested by an examination of Mary's primary aim (or superordinate goal,) in making either utterance in cases A, B or C: She wishes to be warm.

Recognizing Mary's aim tells us John's action helped Mary to accomplish her goal even when he turned on the heater and did not obey her literal request to shut the window (ie case C).

From the above it would seem that John (or any hearer,) is capable of inferring at least some of Mary (or any speaker's,) superordinate goal(s) in making an utterance. However the hearer of an utterance can not tell in advance which of the speaker's utterances will Indicate higher unsatisfied goals (le ie be "indirect speech acts"). Therefore it seems that the hearer must continually examine each of the speaker's utterances for such allusions. This must be so even for so called direct REQUESTS, as In case C. Consequently the hearer must process direct and indirect speech acts identically and use the same inference procedures in order to understand both fully.

What then is the function of Searle's REQUEST speech act type? As hearers may choose not to accede to REQUESTS, or decide to cooperate in other ways (case C), it would seem that REQUESTS only suggest, or INFORM, the hearer as to the speaker's desires. Perhaps then REQUESTS may be little more than INFORMS in which the speaker expresses precisely the course of action she wishes the hearer to take. That is, from the point of view of the understander of speech acts it may not be relevant that utterances (2) and (3) are REQUESTS, as long as the hearer can detect from them the speaker's superordinate goal(s). It therefore seems that the notion of different speech act types is not necessary for NLU**

Additionally, it Is clear from the literature that the classification of speech acts into types is primarily for analytic purposes (Austin 1962, Stiles 1981 etc) and it is not stated anywhere that that this classification is essen-tial to the understanding process. This may seem strange considering the attention that typologies of speech acts have received but I believe this to be more a reflection of the differing aims of the workers from the various disciplines Involved in the area (ie Philosophy, Linguistics, Psychology etc) and those of Computational Linguistics.

Two suggestions have been made so far then,
1) that the notion of a speech act type is not essential for NLU.
2) that direct and Indirect speech acts may be understood by the same mechanism.

A Computer model.

A computer model has been programmed using the above ideas which is capable of understanding some Indirect speech acts. The model copes with representations of cases A, B and C in its form of English. This involves only two types of mental predicates, (following Perrault Allen and Cohen 1978, Cohen 1978, Allen 1979: eg SPEAKER INTENDS, HEARER KNOWS etc.) and uninterpreted propositions (eg: that A HAS THE SALT). Additionally, the model uses a notion of mutual belief (MB) (see Shiffer 1972, Smith 1982). Mutual belief is necessary for the following reason: If a speaker makes some utterance successfully, he can reason that the hearer now knows the contents of that utterance. Similarly the speaker knows that the hearer knows etc. Whilst such processing may be limited in practice (Clark and Marshall 1981), it is necessary in this implementation of the theory for knowledge states to be derivable to any depth from a mutually believed item.

The two participants in the conversation are modelled as concurrently executing production systems (ie, the model is more similar to that of Power(1979) than that of Allen(1979).***). They have independent agendas and beliefs and communicate by one special rule which the production interpreter recognizes as an INFORM speech act. This is the only type of Speech Act that the system knows about. The result of this act is to make the contents of the utterance mutually believed. That is, not only does the hearer know the contents of the utterance, but the speaker knows the hearer knows etc. This differs from Allen and Perrault's (1980) formulation of INFORM which only results in the hearer knowing the utterance's contents.

The model operates as follows: The participants are given initial belief states. One of them is then given an intention to achieve some goal. If this goal or intention leads to the subgoal of making an utterance, the second participant tries to infer the first participant's superordinate goal(s) in making just that utterance. This inference process exploits the fact that the production rules used in making plans are applicable in reverse, (ie given some result state the participants may infer the goal state that gave rise to that result.)

This method contrasts with that used by Allen(1979) which involves several heuristics.***

Having inferred such a superordinate intention for the speaker, the hearer will then find a rule which embodies Grice's(1975) Cooperative principle. He will apply this rule and in doing so will (in Perrault Allen and Cohen's (1978) terms,) adopt the speaker's goal as his own. This means that Mary's uttering (1), (2), or (3) will lead John to infer that Mary wishes to be warm. Therefore John wishes her to be warm. Consequently he will shut the door, close the window, or do whatever else is appropriate. His actions and utterances are determined by his knowledge of the situation of which Mary's utterance (and his inferences from it,) form just a part. It is not important to him that Mary uttered a REQUEST or an INFORM speech act: It only matters that he is able to detect her most primary intention (or goal) in making that speech act.

The implication for NLU from this work is that not only is the notion of speech act types redundant, but so is the difference between "direct" and "Indirect" speech acts. Indeed, what is in classical terras a direct REQUEST used to convey its literal meaning may lead the hearer to disregard the speaker's superficial intention in favour of some action more consistent with the speaker's ultimate goal.

Notes

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** This idea has appeared previously in Ellman (1980) with an argument based upon the function versus content of several types of speech acts, and also in Clark and Carlson (1982). These authors reached this position from a discussion of Mutual Belief.

*** A full comparison of this work with that of Allen et al. is done in Ellman (forthcoming).

Acknowledgement

References

Allen J.F.(1979) "A Plan Based Approach to Speech Act Recognition" University of Toronto Ph.d Thesis (Technical Report 131/79)

Allen J.F. and Perrault C.R. (1980) "Analyzing Intention in Utterances" AI, 15 ppl43-178

Austin J.L.(1962) "How to do things with words". Oxford University Press (OUP) London.

Clark H.H. and Marshall C.R. (1981) "Definite Reference and Mutual Knowledge" in "Elements of Dlscource Understanding" Joshi A.K., Sag I., and Webber B (eds.) CUP

Clark H.H. and Carlson T.B. (1982) "Speech Acts and Hearer's Beliefs" in Smith N. (1982)

Cohen P.R.(1978) "On Knowing What to Say: Planning Speech Acts" University of Toronto Ph.d Thesis (Technical Report 118/78)

Cohen P.R. and Perrault C.R. (1979) "Elements of a Plan Based Approach to speech Acts" Cog. Sci. 177-212

Dore J. (1977) "Children's illocutionary acts", in "Advances in discourse processes 1" R.O. Freedle (ed.) Ablex: Norwood N.J.

Ellman, J. (1980) Speech Acts: Representing Requesting and Understanding M.Sc. thesis, University of Essex

Ellman J. (forthcoming) "On Understanding Speech Acts Indirectly" University of Warwick Ph.d Thesis.

Grice H. P. (1975) "Logic and Conversation" in Syntax and Semantics 3.

Hancher M. (1979) "The classification of cooperative illocutlorfary acts" Lang. Soc. 8, p 1-1A

Katz J.J. (1977) "Propositional structure and illocutionary force" Harvester press.

Perrault,Allen, and Cohen (1978) "Speech Acts as a basis for Understanding Dialogue coherence" in TINLAP2 Waltz D. (ed) ACM.

Power R.(1979) "The Organization of Purposeful Dialogues" Linguistics 17, 107152

Schiffer S.R. (1972) "Meaning" OUP London

Searle J.R.(1969) "Speech Acts" CUP London

Searle J.R.(1975) "Indirect Speech Acts" in Syntax and Semantics 3 "Speech Acts" (1975) Cole P. and Morgan J.L.(eds) AP NY.

Searle J. R.(1976) "A classification of Illocutionary acts" Lang. Soc. 5, pp 1-23

Smith N. and Wilson D. (1979) "Modern Linguistics: The results of Chomsky's revolution" Penguin Books, Harraondswoth U.K.

Smith N.V. ed (1982) "Mutual Knowledge" AP NY

Stiles B.(1981) "Classification of Intersubjective Illocutionary Acts" Lang. Soc.10,227-249

Vendler Z.(1972) "Res Cogitans: an essay in Rational Psychology" Ithaca: Cornell University press.