Collaboration and Antagonism in Estonian Spoken Dialogues: Corpus Analysis[*]

Mare Koit
University of Tartu
Institute of Computer Science
2 J. Liivi St., Tartu, 50409 Estonia
mare.koit@ut.ee

Abstract

Calls from an education company to different institutions are analyzed where salesclerks argue for taking training courses by customers. Salesclerks indicate usefulness of a course as an argument in most cases, i.e. they try to persuade customers. Customers may develop collaboration with a salesclerk, looking together for arguments for taking a course, or be antagonistic, finding counter-arguments. Our further goal is to build a dialogue system where the computer follows norms and rules of human-human communication.

1 Introduction

Analysis of human-human dialogues can provide information about their structure and linguistic features with the purpose of developing dialogue systems which interact with a user in natural language [McTear, 2004; Jurafsky and Martin, 2000].

Our current research is done on the Estonian Dialogue Corpus (EDiC).[1] We investigate the conversations where the goal of one partner, A, is to get another partner, B, to carry out a certain action D. Such communication process can be considered as exchange of arguments pro and con of doing D. Because of this, we have modelled the reasoning processes that people supposedly go through when working out a decision whether to do an action or not [Koit and Õim, 2004]. In this paper, we consider dialogues where salesclerks of an education company call another institution (a manager or administrator) and offer courses.

The paper is organized as follows. Section 2 represents our reasoning model which will form the basis of an argumentation model. Section 3 gives an overview of the empirical material and preliminary results. In sections 4-6, a corpus analysis is carried out and customers' tactics are illustrated. Section 7 represents some ideas for developing an argumentation model, and some conclusions are made in section 8.

[1] http://math.ut.ee/~koit/Dialoog/EDiC.html

2 Argumentation that Involves Reasoning

Our reasoning model as a naïve theory of mind consists of two functionally linked parts [Koit and Õim, 2004]: a model of human motivational sphere, and reasoning procedures. We represent the model of motivational sphere of a subject by the vector of weights

w = (w(are-resources), w(pleasantness), w(unpleasantness), w(usefulness), w(harmfulness), w(is-obligatory), w(is-prohibited), w(punishment-for-doing-a-prohibited-action), w(punishment-for-not-doing-an-obligatory-action)).

Components (resources for doing D, its pleasantness, unpleasantness, etc.) have numerical values.

In the motivational sphere three basic factors that regulate reasoning of a subject concerning D are differentiated: his/her wishes, needs and obligations. We call these factors WISH-, NEEDED- and MUST-factors, respectively. There are three reasoning procedures in our model which depend on the factor that triggers the reasoning. Each procedure represents steps that a subject goes through in the reasoning process (computing and comparing weights of different aspects of D), and the result is the decision to do or do not do D. As an example, let us present a reasoning procedure triggered by NEEDED-determinant.

```
Precondition: w(usefulness) > w(harmfulness)

1) Are there enough resources for doing D? If not
then 8.
2) Is w(pleasantness) > w(unpleasantness)? If not
then 5.
3) Is D prohibited? If not then 7.
4) Is w(pleasantness)+w(usefulness) >
w(unpleasantness)+w(harmfulness)+w(punishment-for-
doing-a-prohibited-action)? If yes then 7 else 8.
5) Is D obligatory? If not then 8.
6) Is w(pleasantness)+w(usefulness)+w(punishment-
for-not-doing-an-obligatory-action) >
w(unpleasantness)+w(harmfulness)? If yes then 7
else 8.
7) Decision: to do D.
8) Decision: not to do D.
```

A communicative strategy is an algorithm which is used by a participant of communication to achieve his/her com-

municative goal. The participant A having the goal that the partner B decides to do D can realize his/her communicative strategy in different ways (using different arguments for): stress pleasantness of D (i.e. *entice* B), stress its usefulness (*persuade* B), or stress punishment for not doing D if it is obligatory (*threaten* B). We call these concrete ways of realization of a communicative strategy communicative tactics. That can be considered as argumentation: A, trying to direct B's reasoning to the positive decision (to do D), proposes various arguments for doing D while B, when opposing, proposes counter-arguments.

There exist three tactics for A in our model: enticing, persuading, and threatening. These tactics are connected with the reasoning procedures WISH, NEEDED, and MUST, respectively. Both of enticing and threatening can be excluded here because a salesclerk as an official person has to communicate cooperatively, impersonally, friendly, peacefully (i.e. to stay in a fixed point of the communicative space). S(h)e only can persuade a customer. The general idea underlying the tactic of persuading is that A proposes arguments for usefulness of D trying to keep this weight high enough and the values of other aspects brought out by B low enough so that the sum of weights of positive and negative aspects of D would bring B to the decision to do D [Koit and Õim, 2004].

The tactics for B are collaboration and antagonism. In the first case, B is interested in doing D and in collaboration with A is looking for arguments that support his/her positive decision. In the second case, B only uses arguments against D, his/her goal is opposite with A's.

Still, both A and B may implement a mixed strategy – change their communicative tactics during a conversation.

3 Used Corpus and Preliminary Results

For this paper, 30 calls are taken from EDiC where salesclerks of an education company offer different courses to customers.

The dialogues can be divided into two groups: 1) the salesclerk (A) and the manager or personnel administrator (B) of another organization are communicating for the first time (6 dialogues), 2) they have been in contact previously (24 dialogues). The action D is 'to take the offered course'.

In a previous work [Koit, 2006], we investigated A's tactics while (s)he argues for doing D. Let us summarize the results.

All the dialogues where A and B are communicating for the first time end with an agreement to keep the contact (A promises to send catalogues, to call B later). B does not accept nor reject a course but postpones the decision. A typical dialogue starts with A's introduction and an overview of the company. A's statements can be considered as arguments for taking a training course. Then A offers courses, pointing to activities of B's organisation. A asks B to tell more about B's institution in order to get more arguments for usability of courses for B, and offers them again.

Most of the calls represent situations where A and B have been in contact before. B agrees to take a course only in one conversation, (s)he agrees with reservations in two dialogues, and refuses in one dialogue. In the remaining dialogues, A and B come to the agreement to keep the contact like in case of the first communication. A always starts a conversation recalling a previous contact. The introductory part is quite long, A behaves very politely and friendly. In this way, A prepares his/her proposal and herewith makes a refusal more difficult for B. In the main part of a dialogue, A gives various arguments for the usability of the courses, and meanwhile asks questions in order to learn more about B's institution and have new arguments for doing D.

In this paper, we concentrate on B's tactics – collaboration and antagonism.

4 Collaboration

4.1 First Contact

A's final goal is that B decides to do D (to take a course). In our 6 dialogues, A does not achieve the goal, still, all the calls end with an agreement to keep the contact, and A may hope that B will come to the positive decision.

Let us consider an example. A introduces himself, gives an overview of his company (it offers courses of management, marketing, sale, customer service, secretary training), and asks whether B has made training plans for his employees (i.e. an indirect proposal to take a course). B argues that his staff is small, only 20 employees, and he has got many offers from other training companies (i.e. a refusal with two arguments). Then A tries to awake B to a certain course by asking about customers of B's firm. After that an offer is made to send a catalogue[2]:

```
A:jaa (.) seline küsimus oleks nüd=et=et kui saa-
daks teile (.) omapoolse pakkumise kataloogi näol
I have such a question – if I'd send a catalogue
to you about our courses?
B:ei no mis selle vastu ei ole mul midagi eks sis
vaatab mis mis hinnad on=jah
no, I have nothing against, I'll study the prices
```

Therefore, B is interested in courses. Now, he takes the initiative starting to check the presence of resources and usability of doing D.

a) Location
```
B:a kus te asute
where are you located?
A:asume: (.) ´Tallinas Uhmri tänav üheksa
we are located in Tallinn, Uhmri Street nine
```
b) Training room
```
B:et teil on seal koolituskeskus sis ka või
and do you have a training centre there?
A:jah meil sin kohapeal teeme ´lahtisi kursusi aga
me: e teeme ka firma´siselt e kui kui lepitakse
nimodi ´firmaga kokku aga sin kohapeal on lahtised
jah (.)
```

---

[2] Trancription of conversation analysis is used in the examples.

yes, we carry out open courses here but we can make courses in a firm if it is agreed so, we make open courses here, yes

c) Quality of the course

B:no se on mingi rahvusvaheline suhtlemiskursus sis

is it an international conversation course then?

A:no see on jah selline spetsiaalne no se on kata- loogis ka kirjas et

yes, it is such a specific course, it is described in the catalogue

d) Preliminary conditions

B:se on see et peab keelt oskama ka

is it that one has to know language too?

e) Target group

B:no teil on ikka põhiliselt juhtidele ja sellis- tele spetsialistidele

and do you have (courses) mainly for managers and specialists?

A:jah ma usun teile sobiks juhid ja sekretärid et selline et sellised valdkonnad et sekretäri kursu- sed on ka: olemas täitsa

yes, I think that (courses for) managers and secretaries would be suitable for you, such fields as secretary courses exist too, yes

At the end of conversation, A and B agree that A sends a catalogue and calls B again a week later.

All the dialogues where A and B communicate the first time, are collaborative. A reaches an intermediary goal – to evoke B's interest to courses. That can be considered as a step towards the final goal – B's decision to take a course.

4.2 Continuing Conversation

If A and B have already been in contact then B has received a catalogue and knows which courses are offered. In the next example, B has not made a decision but he is still inter- ested in taking a course.

A: kas on ka mingeid põhimõttelisi otsuseid (.) vastu võetud?

did you make some principal decisions?

B:ei. (.) ütleme nii et ma ei ole (...) peale minu enda ei ole nüüd hetkel ma ei ole arutanud nüüd suuremas ringis ütleme oma inimestega kes mida tahaks näha ja kes millist koolitust endale nagu jätkukoolitust kasvõi kes tahaks näha mil- list. (.) ma ise sin ka ei osand ütleme kui ma käisin läbi (.) ot oli se nüt (.) mm

no, let's say that I did not discuss it in a big- ger circle, let's say with my people who want to take a training course, I similarly could not say after the course, what it was

A:kas oli marketingi planeerimise kursus (--)=

was it a marketing planning course?

B:=just just et ma ei osand nüt sit valida milline se peaks olema selle jätkukursus,

yes yes, I could not choose a follow-up course from this set

B takes the initiative, asking questions about courses, and arguing why he did not make the final decision.

B:meil on sin: plaanis ütlem- mul enda inimestega on plaanis: (.) ee >veel sellel nädalal on üks nõupidamine< s ma kuulen nende arvamust ja ja järgmine nädal on meil jälle sinn ee teisi tippju- hte kohal,

we have planned to discuss with our people, and we have many other top managers together the next week

In case of collaboration, B actively looks for arguments for doing D.

5 Antagonism

Pure antagonism is expressed in one dialogue. B has studied the catalogue, and made the negative decision.

B:aga jah ei mul on se läbi ´vaadatud=ja (.) kah- juks ma pean ütlema=et (.) et teie (.) seda meile (.) ei suuda ´õpetada (.) mida (.)´mina (.) tahan.

but yes, I have studied it and unfortunately, I'll say that you are not able to teach what I want

A is looking for new arguments and asks a question:

A:jaa. ja mida konkreetselt ee ´teie tahate? (...) mt mida te silmas ´peate.

yes, but what do you want? what do you consider?

B:no (.) meie (.) äritegevus on (.) ehitamine.

well, our business is building

/--/

=sest see teie kursus sobib tõesti (.) kus on (.) ´puhas (.) puhas kaubandus ,(.) aga kahjuks (.) ´meil ta ei ole.

your course suits for pure commerce but unfortu- nately we do not have it

A prepares a new argument, pointing to negotiations:

A: e j:aa:, nüd kas (.) näiteks (.) lepingute ´saamisel (.) mt e tegelete te ka lä- bi´rääkimistega.

yes, but do you have negotiations to get contracts?

B:no ikka. (.)

well, yes

A:mt et se=on ka üks ´valdkond (.) mida me: (.) ´käsitleme.=

that is one of our fields

B finds a counter-argument:

B:õige aint=et ee (.) kahjuks (.) e (.) et jõuda läbirääkimiste´ni (.) ON SEE (.) hhh mis mis selle (.) hhh primaarne on (.) alati see (.) ´hind. (.) ja kui oleme ´seles jõudnud niiöelda kokkulep- pele=sis ülejäänud teevad meil ära (.) ´advokaadid. (.)

right but unfortunately, the price is primary, before negotiations, if we have agreed with the price then our lawyers make the rest of the work

A finds a new argument:

A:mt ja. (.) et me ei puuduta nüd ´inseneri mis puudutab ´inseneri tööd seda ´küll mitte=aga just mis puudutab seda kuidas (.) kliendile ´läheneda kuidas ära põh=

yes, we do not consider engineering but how to come near to a customer, how to argue

B:=meil on ´primaarne (.) ´inseneritöö.

engineering is primary for us

A does not give up:

A:või kuidas ise hindate on seda võimalik ´paremini teha?=

how do you evaluate that, is it possible to do that better?

B:=kahtlemata. (.)

sure

A:ja (.) mis on selleks ´vaja et näiteks (.) p:aremini teha (.)

and what is needed to do that better?

B repeats his counter-argument:

```
B: e selleks on vaja (...) $ ütlen veelkord $ (.)
põhjalikke inseneriteadmisi (.) ja (.) oskust käi-
tuda: tellijatega.
deep engineering knowledge is needed, I repeat,
skills to behave with customers
```

A finds an argument again:

```
A:mt jah. .hh et see ´teine pool on: (.) tegeli-
kult ka nüd ´meie valdkond. [et e esimene::]
yes, actually, the second part is our field
```

Anyway, B does not give up, and the dialogue ends with a resolute refusal. In this dialogue, both participants try to take initiative. A implements the tactic of enticing but B does not capitulate.

6   Mixed Tactics

In most cases, B having studied a catalogue, starts a conversation with antagonism but goes over to collaboration. In a typical dialogue, B indicates missing resources:

```
B:tändap ´arvame ´ikkagi=et ee hh ´jääb vist
´meile ee ´kalliks see se ´koolitus
it means, we think the training is too expensive
for us
```

A is looking for arguments:

```
A:milline oleks teile se ´sobiv hind (1.0)
which would be a suitable price for you?
```

B argues that another training company offers a similar course for a cheaper price. Still, the course is short, some important topics are not considered. Nevertheless, A can not decrease the price. On the contrary, the price will increase if B does not make the decision quickly.

```
A:ja=ja (.) >´selest vist oli ´juttu juba< et ´see
see ´hind mis ´hetkel on meil ´lahtiste
´kursuste=puhul (1.0) et ene ´kahekümne´kolmandat
´juunit kui te tahate ka näiteks ´sügiseks
regist´reerida
yes, yes our price is valid until June 23rd as we
talked, if you want to register for autumn
B:jah
yes
```

A and B agree that A will call B later. B has to weigh the harmfulness of high price and the usefulness of rich repertoire of topics of the proposed course.

7   Argumentation Model

Let us return to the model of the motivational sphere of a subject (Section 2). In our dialogues, A's arguments refer only the first five components of the vector (resources for doing D, its pleasantness, unpleasantness, usefulness and harmfulness). When persuading, A tries to direct B's reasoning in such a way that B would trigger the reasoning procedure NEEDED. Therefore, the most important arguments handle usefulness of doing D. Possible counter-arguments can be various – B may point to missing resources, unpleasantness, harmfulness, etc.

B's tactics are based on the reasoning model. In case of collaboration, B is looking for the positive outcome of the reasoning procedure (step 7 in the reasoning procedure NEEDED), i.e. which weights of D's aspects have to be changed, in order to come to the decision 'to do D' – how to obtain missing resources, to increase the usefulness and pleasantness, and to decrease harmfulness and unpleasantness of D. In case of antagonism, B, on the contrary, is looking for the negative outcome (step 8). All arguments used by A and/or B are statements about D's aspects, and different statements have different weights – some arguments weigh more than others.

6   Conclusion and Future Work

We investigated the conversations where the goal of one participant, A, is to get the partner B to carry out a certain action D. Such communication process can be considered as exchange of arguments pro and con of doing D. Because of this, we have modelled the reasoning processes that people supposedly go through when working out a decision whether to do an action or not.

The goal of this paper was to verify our argumentation model on Estonian spoken human-human dialogues. Calls of salesclerks of an education company were analysed in order to find out how do customers avoid to make a final decision.

An experimental dialogue system is implemented which in interaction with a user can play the role of both A or B. At the moment the computer operates with semantic representations of linguistic input/output only, the surface linguistic part of interaction is provided in the form of a list of ready-made utterances which are used both by the computer and user.

Our next aim is to refine our argumentation model.

References

[Jurafsky and Martin, 2000] Daniel Jurafsky and James H. Martin. *Speech and Language Processing: An Introduction to Natural Language Processing, Speech Recognition, and Computational Linguistics.* Prentice-Hall, 2000.

[Koit, 2006] Mare Koit. Argumentation in Negotiation Dialogues: Analysis of the Estonian Dialogue Corpus. In *Proc. of the Workshop W2 on Computational Models of Natural Argument. 17th European Conference on Artificial Intelligence*, 173-176, Riva del Garda, Italy, 2006.

[Koit and Õim, 2004] Mare Koit and Haldur Õim. Argumentation in the Agreement Negotiation Process: A Model that Involves Natural Reasoning. In *Proc. of the Workshop W12 on Computational Models of Natural Argument. 16th European Conference on Artificial Intelligence*, 53–56, Valencia, Spain, 2004.

[McTear, 2004] Michael F. McTear. *Spoken Dialogue Technology. Toward the Conversational User Interface.* Springer, 2004.