



## Concern-Alignment for Negotiation and Joint Inquiry in Dialogues

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### Abstract

‘Concern Alignment in Conversations’ project aims, through empirical examinations of real-life conversations, to establish a theoretical and descriptive framework to capture discourse structures and underlying rational and affective processes in human-human joint planning interactions at dialogue act exchange level. Concern alignment model has been developed to address convergent negotiation for consensus-building and open-ended joint exploration for maximal satisfaction of participants observed in real-life dialogues.

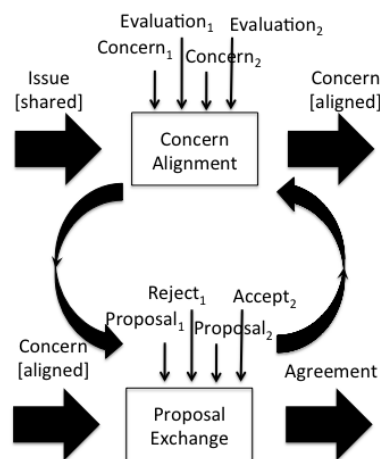


Figure 1: A concern alignment model for dialogue structures in consensus-building conversations.

## 1 Concern alignment

Concern align model (Katagiri et al., 2013; Katagiri et al., 2015) of dialogues assumes that real-life dialogues, which almost always involve some form of consensus decision-making, consist of two conceptually distinguishable processes: concern alignment and proposal exchange (Figure 1). A group of people, when engaging in a conversation to pursue a joint course of actions among themselves on certain objectives (*issues*), start by expressing what they deem relevant on the properties and criteria on the actions to be settled on (*concerns*). When they find that sufficient level of alignment of their concerns is attained, they proceed to propose and negotiate on concrete choice of actions (*proposals*) to form a joint action plan. for speech acts performed by utterances, we stipulate a set of dialogue acts at the level of concern alignment in terms of functions a discourse segment perform in consensus-building (Table 1).

## 2 Convergent negotiation for consensus-building

We collected and analyzed medical consultation dialogues between obesity patients and nurses. The main purpose of the consultation was to come up with patient life-style improvement plans. We observed that in most of the sessions, the nurse sequentially tried out improvement suggestions for patients by selecting out of predetermined set

Table 1: Discourse acts in concern alignment

Concern alignment	
C-solicit	solicit relevant concerns from partner
C-introduce	introduce your concern
C-eval/positive	positive evaluation to introduced concern
C-eval/negative	negative evaluation to introduced concern
C-elaborate	elaborate on the concern introduced
Proposal exchange	
P-solicit	provide relevant proposal from partner
P-introduce	introduce your proposal
P-accept	provide affirmation to introduced proposal
P-reject	indicate rejection to introduced proposal
P-elaborate	modify the proposal introduced

A-B:	C-introduce:(stop smoking)	⇒	B-A:	C-eval/negative:(no intention)
A-B:	C-introduce:(reduce smoking)	⇒	B-A:	C-eval/negative:(already tried)
A-B:	C-introduce:(use non-smoking pipe)	⇒	B-A:	C-eval/negative:(tongue tingling)
B-A:	C-introduce:(cost money)	⇒	A-B:	C-eval/positive:(acknowledge)
B-A:	C-introduce:(choose tobacco rather than eating)	⇒	A-B:	C-eval/negative:(not good)
B-A:	C-introduce:(consider when short on money)	⇒	A-B:	C-eval/positive:(good)
B-A:	C-introduce:(withdrawal syndrome)	⇒	A-B:	C-eval/positive:(acknowledge)
B-A:	C-introduce:(smoker communication)	⇒	A-B:	C-eval/positive:(acknowledge)
↓				
A-B:	P-introduce:(consider stop smoking when prices go up)			
B-A:	P-accept: (stop smoking when prices go up)			

Figure 2: An example of dialogue sequential organization in convergent negotiation.

B-A:	P-introduce:	<i>proposed web-based community makes value assessment for each of the small services provided by community members</i>
A-B:	C-introduce:	<i>method of assessment</i>
B-A:	P-introduce:	<i>assessment based on evaluation feedbacks by small service recipients</i>
...		
A-B:	C-introduce:	<i>aim for a market place to promote exchange of small services between members through matching their skills and needs</i>
(or)		
A-B:	C-introduce:	<i>aim for a mutual support community for promote social interactions among members</i>
B-A:	C-eval/positive:	<i>community for social interaction</i>
...		
A-B:	C-introduce:	<i>assessment based on monetary value</i>
A-B:	C-eval/negative:	<i>not suitable for promoting social interactions</i>
B-A:	P-introduce:	<i>assessment and exchange based on community local points</i>

Figure 3: An example of dialogue sequential organization in joint exploration of concern space.

of potential life-style improvement routes and by making adjustments based on patients feedbacks. This type of convergent negotiations can be captured by the exchange of concerns and their evaluations followed by exchange of proposals and their acceptances (Figure 2).

### 3 Joint exploration of concern space

Business consultation dialogues between entrepreneur candidates and venture capital consultants tend to have a lot of room for potential concerns to be considered beyond obvious factors such as production method, cost or target market. Dialogues often go back and forth between concerns and proposals, reflecting the exploratory nature of identifying relevant concerns to put together a successful business proposal. Concerns are not only employed to support or to criticize proposals, but they can also be employed to clar-

ify goals and to direct the course of breaking down of proposals, e.g., by presenting multiple choices between competing concerns (Figure 3).

Newly introduced concerns provide enrichment to the structures of potential space of concerns, and invite participants to jointly advance toward successful and concrete proposals. Concern alignment captures the dynamics of concern space exploration.

## 4 Future Directions

We have identified two contrasting processes in consensus-building dialogues. We believe the concept of multi-issue negotiation (Traum et al., 2008; Katagiri et al., 2014) can be applied to provide a computational underpinning to the process of convergent negotiation. We are working on the development of computational models for joint concern space exploration.

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