

Categorisation of conversational games in free dialogue over spatial scenes

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1 Aims

- **Corpus annotation** for building conversational agents (rather than discourse analysis)
- Segment dialogue in sub-parts according to non-linguistic criteria: **dialogue games**
- The **task** participants engage in is reflected in **linguistic features**, e.g. the assignment of FoR (Dobnik et al., 2015, 2016).
- Dialogue segmentation is therefore useful for **ML applications**.

2 The Cups Corpus

- Corpus of free conversations over perceptual scenes
- Similar to Map Task (Anderson et al., 1991) but conversational roles may change freely
- Swedish: 985 turns and English: 598 turns

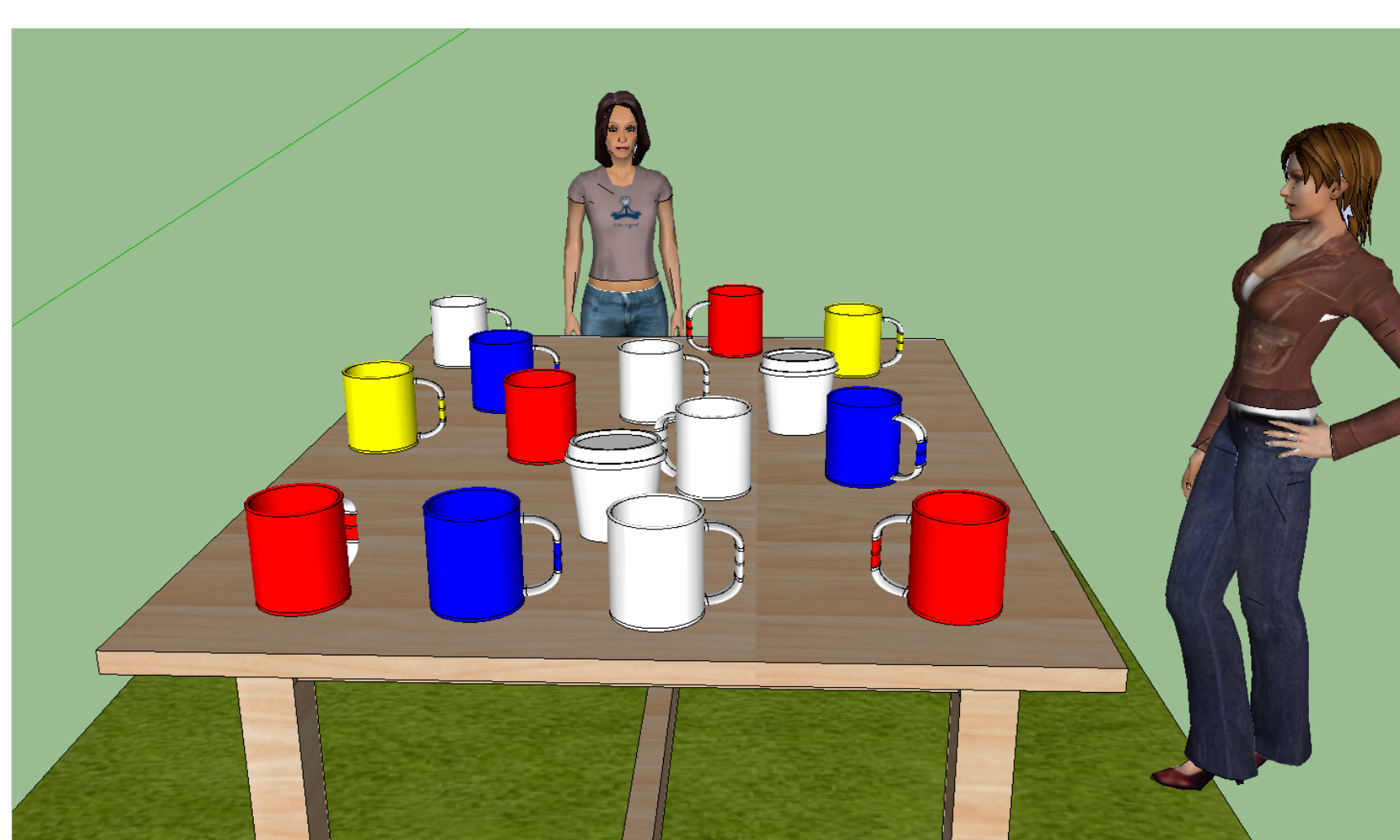


Figure 1: The table scene from the global perspective and as seen by Participant 1. The numbers indicate objects hidden from that participant's view.

3 Conversational games

- Segmentation of a conversation by its underlying non-linguistic goal or project (Grosz and Sidner, 1986; Kowtko et al., 1992; Bangerter and Clark, 2003)
- Utterances necessary to fulfil the intentions leading to a conversational goal
- Annotation in two steps:
 1. game segmentation
 2. assigning the segments a **game type**

4 Game segmentation

- Identifying the scope of a game
- Game
 - a sequence of turns, assigned an id from 1
 - related to the same goal
 - the goal is fulfilled in a mutual agreement or abandoned
 - threaded and embedded games, e.g. clarification.

5 Game type coding scheme

5.1 Games related to interaction

1. **Clarify (Clar):** reduce uncertainty in the common ground and repair miscommunication but do not to request new information

GU-SE-P4

- 46 P1: mellan den blå och gula, framför Katie, ser jag en mugg med lock och utan handtag?
I can see a cup with a lid, but without a handle between the blue and yellow, in front of Katie.
- 47 P2: Står den lite längre bort från Katie (lite mer mot mitten) än den gula och den blå?
Is it located a bit further away from Katie (a bit closer to the middle) then the yellow and blue?
- 48 P1: lite mot mitten inte exakt mellan den blåa och gula
A bit towards the middle, not exactly between the blue and yellow
- 49 P2: OK, den muggen kan jag se
Okay, I can see that cup.

2. **Task management (TaMa):** negotiate and align tactics how to approach solving a task

GU-SE-P2

- 67 P2: Ok men jag kan beskriva exakt hur mina vita muggar står. Låter bra?
OK, but I can describe exactly where my white cups are. Sounds good?
- 68 P1: Gör så.
Do so.

3. **Establishing Perspective (EsPe):** explicitly establish the FoR assignment for the following conversation in the common ground

GU-SE-P7

- 133 P2: kan du börja med från katie?
Can you start with the Katie's perspective?
- 134 P2: det är lättare för mig att hålla reda på
It's easier for me to keep track of.

4. **Miscellaneous (Misc):** social chatter, greetings and other conversational glue to establish familiarity and provide motivation

GU-SE-P7

- 1 P2: hej flannelskjortan! (som din karaktär har på sig)
Hello flannel shirt! (that you avatar is wearing)
- 2 P1: jaha, en flannelskjorta
Aha, a flannel shirt.
- 3 P1: hej t-shirt med konstigt tryck
Hello t-shirt with a strange print
- 2 P2: ok, då ska vise
OK, let's see

5.2 Task-related games

1. **Descriptive (Desc):** a systematic investigation of objects in the scene where one partner takes on the role of a describer and the other of a follower

GU-SE-P5

- 36 P1: okej, nästa rad mot mitten
Okay, next row towards the middle.
- 37 P1: från mitt håll står det en take-away bakom den vita muggen
From my perspective I can see a take-away behind the white cup.
- 38 P1: snett vänster om
Diagonally to the left.
- 39 P2: Ok. Här det en vanlig vit mugg strax till höger om den vita närmast dig.
OK. Here there is a regular white cup a bit to the right of the white closest to you.
- 40 P2: Till höger och innåt bordet då.
To the right and towards the table, that is.

- 41 P1: okej, den ser jag
Okay, I can see that one.

2. **Specification (Spec):** establish a common focus on a specific object or a part of the scene

GU-SE-P7

- 258 P1: på den första rad ska det finnas en mugg jag inte ser mellan den röda och vita?
On the first row, there should be a cup which I can't see. Between the red and white?
- 259 P1: *din
**your*
- 260 P2: mm, en take away
Mhm, a take-away
- 261 P1: ok, npterat
OK, noted.

3. **Global (Glob):** finding and describing objects on a global level, i.e. the table

GU-SE-P5

- 157 P2: Ok. En ny recap. Jag har fem röda, tre blå, fem vita, två gula och tre takeaways.
Ok, a new recap. I have five red, three blue, five white, two yellow and three take-aways.
- 158 P2: Med de jag har ritat in.
With the ones I marked down.
- 159 P1: okej, jag ska räkna mina
Okay, I will count mine.
- 160 P1: ja det verkar stämma
Yes, that seems correct.

6 Evaluation

- **Game segmentation:**
 - a single coder with inter-test reliability after a month: 78%, N = 794
 - In 85% of cases the latter annotation was preferred
- **Game identification:**
 - a novice coder with no background in the field: $\kappa = 0.74$ (N = 67)
 - common confusions: *Spec-* and *Desc-* games (4) and *Spec-* and *Clar-* games (4)

	CLAR	DESC	ESPE	GLOB	MISC	SPEC	TAMA	Total
CLAR	7	0	0	1	0	3	0	11
DESC	0	14	0	0	0	0	0	14
ESPE	2	1	2	0	0	0	0	5
GLOB	0	2	0	6	0	0	0	8
MISC	0	0	0	0	3	0	0	3
SPEC	1	4	0	0	0	14	0	19
TAMA	0	0	0	0	0	0	7	7
Total	10	21	2	7	3	17	7	67

Table 1: Confusion matrix for annotators

7 Summary and conclusions

- Free dialogue can also be broken down into smaller recurring units
- Functional and thematic games
 - structuring and managing interaction
 - communicating thematic information
- Classification is not exhaustive
- Simpler than, e.g. HRC MapTask (Kowtko et al., 1992) and DAMSL (Jurafsky et al., 1997)
- ... but our goal is to provide the scope information for features for ML approaches

