

“Are you telling me to put glasses on the dog?” Content-Grounded Annotation of Instruction Clarification Requests in the CoDraw Dataset

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Abstract

Instruction Clarification Requests are a mechanism to solve communication problems, which is very functional in instruction-following interactions. Recent work has argued that the CoDraw dataset is a valuable source of naturally occurring iCRs. Beyond identifying when iCRs should be made, dialogue models should also be able to generate them with suitable form and content. In this work, we introduce CoDraw-iCR (v2), extending the existing iCR identifiers with fine-grained information grounded in the underlying dialogue game items and possible actions. Our annotation can serve to model and evaluate repair capabilities of dialogue agents.

Introduction If someone requests you to put glasses on a dog, you may doubt yourself: *Is that really what I am supposed to do?* Before attempting that, you’d likely seek confirmation, for instance, by posing a clarification request. In real life, dogs do fine without glasses, but, as we see in Figure 1, that is indeed a correct action in the context of a scene construction dialogue game.

In instruction following settings, ambiguous or underspecified instructions may elicit clarification requests when the instruction follower realises they cannot act properly without further information. These are Instruction Clarification Requests (iCRs), namely CRs that occur in Clark’s 4th level of communication (Clark, 1996), when an utterance (here, an instruction) is understood generally, but not at the level of uptake (Schlöder and Fernández, 2014).

We have recently argued that the CoDraw dataset (Kim et al., 2019) is a rich and large source of spontaneous iCRs (Madureira and Schlangen, 2023). We identified iCRs among all instruction follower utterances and proposed using the annotation to model the tasks of knowing *when* to ask and to reply to an iCR. However, knowing *what* and *how* to ask are also topical devices for a competent instruction follower dialogue model. To account for that, we continue this initiative by adding information



Figure 1: A communication problem occurring and being resolved with the aid of clarification requests in an instruction following interaction (CoDraw, ID 9429, CC BY-NC 4.0, scene from Zitnick and Parikh (2013)). When an instruction is not clear enough, the instruction follower asks for clarification, in order to act accordingly (here, placing cliparts in the scene).

about the *content* and *form* of iCRs, in order to allow modelling and evaluating the subsequent task of *generating* iCRs, not yet explored in this corpus.

Our annotation complements CoDraw-iCR (v1) by adding mood categories and by mapping each utterance to its corresponding objects and action-related attributes. We show that this sample is an appealing ensemble of mostly unique surface forms through which interesting relations in co-occurring objects and attributes emerge, making it a handy resource for further CR research. The data and documentation is available for the community at <https://osf.io/gcjhz/>, which also contains a link to an extended version of this summary.

Background Clarification Requests are a multifaceted phenomenon in dialogue, with vast literature on categorising, documenting and modelling their various realisations as well as their relations to other utterances and to the context (Purver et al., 2003; Gabsdil, 2003; Rodríguez and Schlangen,

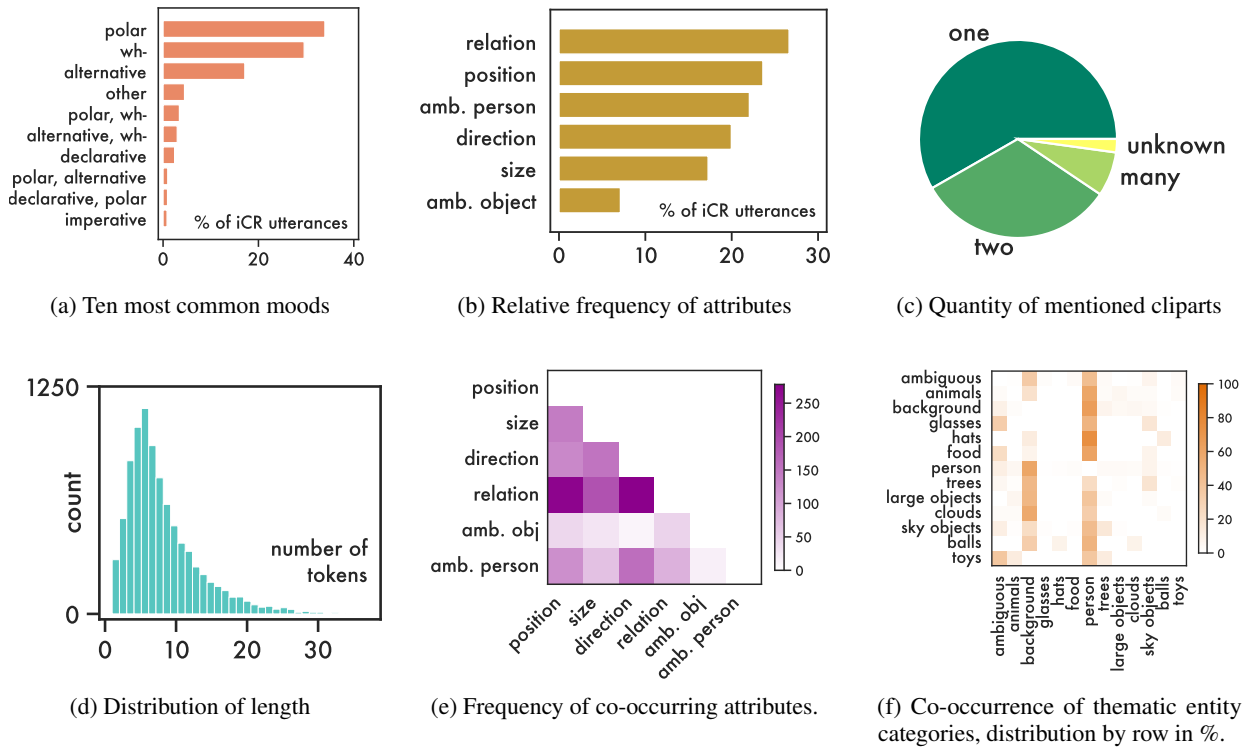


Figure 2: Overview of the distributions of annotated categories in CoDraw iCR utterances.

2004, *inter alia*). Still, it remains an open research area; in particular, we cannot delineate yet to what extent CR mechanisms can be learnt via data-driven methods (Benotti and Blackburn, 2021), and dealing with underspecifications is still hard for pre-trained language models (Li et al., 2022).

Benotti and Blackburn (2021) have recently raised awareness to the different world modalities upon which clarifications can be *grounded*, like vision, movement or physical objects. Still, few works exist that systematically map the content of CRs to elements related to the context where they occur (Gervits et al., 2021). Some examples are Benotti and Blackburn (2017), who use a methodology to classify CRs according to why they make implicated premises explicit (*e.g.* wrong plan, not explainable plan or ambiguous plan in instruction giving), in a corpus that is further analysed in Benotti and Blackburn (2021) with a recipe to detecting *grounded clarifications*. Gervits et al. (2021) propose a fine-grained annotation schema for CR types related to the environment (object location, feature, action, description, etc). The small size of these corpora, however, does not meet the needs of current data-driven methods.

Corpus Overview 8,765 utterances (7,710 types) were identified as iCRs in CoDraw. Figure 2

presents an overview of the annotation. The immediately preceding instruction giver utterance is the source utterance (*i.e.* the utterance where the communication problem manifests) for 80.26% of the iCRs and 78.49% of the iCR utterances get a response from the instruction giver in the immediately following turn. For 63.85% of them, both conditions are true. They are realised in many surface forms, ranging from short and generic (*sorry?*), to very specific (*owl is med?*), to long and verbose (*is the girl sitting or standing i need to know as there are multiple options and her expression as well*). Besides, the iCRs cover all available objects and are well distributed among actions.

Outlook Given the need for large scale corpora for data-driven methods, trading some of the ecological validity in the annotation process for machine-learnability was necessary. Still, even in its controlled environment with a limited number of actions and objects, the resulting iCR utterances are very diverse in surface form and very fertile in content. With the release of the annotation, the community gains a larger resource with sequential, spontaneous iCRs in turn-based dialogues. We aim to encourage more research on modelling CRs in instruction following interactions, and also to enable detailed evaluation of iCR generation.

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