Combinatorial Dialogue Games in Strategic Argumentation

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Abstract

This paper introduces combinatorial dialogue, a formal approach to strategising within argumentative dialogue games where the moves played within a dialogue game are interpreted as moves within an edge-addition and/or edge-removal combinatorial game. This enables an agent to reason about which move to make, regardless of the particular dialogue game that is being played. Thus the process of defining strategies related to dialogue outcome classes, selecting tactics for realising those strategies, and the definition and interpretation of heuristics for good, ideal, or merely societally responsible play are all abstracted away from the, potentially complex, underlying dialogue game.

As dialogue games[3, 2] become more complex it becomes increasingly important that agents have a means to determine how to play a game well and maximise the chances of meeting their own individual goals. This is important because many argumentative dialogue games have been defined which model a variety of types of dialogue, as well as a range of desirable and un-desireable features of those dialogues. Additionally different games may be selected and played based upon the context of interaction[1], for example, playing a persuasion dialogue game when agents desire to bring about a change in their opponent's beliefs, or playing a negotiation game when attempting to reach agreement over some resource. An agent must be able to play a range of potentially complex dialogue games as well as possible.

The standard approach has been to identify strategies for playing individual games, an effort intensive task that is insufficient when agents can dynamically select games, or even define new ones, at runtime. In combinatorial dialogue the moves of dialogue games are mapped into an abstract, combinatorial game space in which strategies, tactics, and heuristics are defined, and moves are selected based upon the state of the combinatorial game. The advantage of this approach is threefold; firstly, agents gain a basic facility for selecting a dialogue strategy regardless of the constituent rules of the associated dialogue game, secondly, researchers gain a simple framework for defining and working with argumentative strategies in a consistent fashion, abstracted from individual dialogue games, and thirdly, we establish new links between the research fields of agent communication and combinatorial game theory, an established field whose core concern is the study of strategy gameplay.

This means that agents have the ability to play dialogue games better and researchers have a clear framework within which to define new strategies for even better play.

References

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[3] S. Wells and C. Reed. A domain specific language for describing diverse systems of dialogue. *Journal of Applied Logic*, 10(4):309–329, 2012.