IDP – An Interactive Discourse Planner

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Abstract. We are building a system that plans text to describe and justify domain plans interactively. This paper focuses on the second task, plan justification. A speaker uses plan justification to have a listener adopt a recommended plan. The text plan that our system incrementally formulates and executes to justify its recommendation is represented uniformly in the same knowledge base with the domain plans that are under discussion. In this way, the text plan and the domain plans are both accessible for analyzing the listener’s feedback. The system can interpret vaguely articulated questions, generate concise replies and metacomments, and detect feedback that initiates digressions. As a testbed for our model, we are implementing a system that gives driving directions and route advice interactively.

1 Introduction

We are building a system called the Interactive Discourse Planner (IDP) that plans text to describe and justify domain plans interactively. This paper focuses on the second task, plan justification. A speaker uses plan justification to have a listener adopt a recommended plan. The text plan that IDP incrementally formulates and executes to justify its plan choice is represented uniformly in the same knowledge base with the domain plans that are under discussion. In this way, the text plan and the domain plans are both accessible for analyzing the listener’s feedback. IDP can interpret vaguely articulated feedback, generate concise replies and metacomments, and detect when the feedback initiates a digression. As a testbed for our model, we are implementing IDP to give driving directions and route advice interactively.

Planning text to discuss plans interactively relates two areas of research. The first area, plan recognition, focuses on analyzing natural language that is about plans to recognize a speaker’s intent and provide helpful responses. The second area, text planning, is concerned with using plans for selecting and structuring text that achieves communicative goals. From the perspective of plan recognition, the relevant context is one in which the user controls the conversation and the
system's role is passive. Hence, researchers in plan recognition have developed tools for tracking the discourse focus to recognize the user's domain plans [1, 4], and his discourse plans [5, 22].

Researchers have also considered interaction from the perspective that the system might be in control of the conversation. Instead of analyzing the discourse to discover the user's intentions, these systems plan to direct the discussion making their own intentions clear in a process called interactive generation. Situations that call for interactive generation arise when the system is acting as an expert advisor or tutor which must be able to explain and justify what it says. During interactive generation, the system must make assumptions about the user's knowledge and his willingness to accept what is said. However, the interaction may indicate that these assumptions are incorrect, and appropriate repairs must be planned. In this way, interactive generation leads to the production of efficient discussions that are tailored to the individual user's needs.

2 Plan Recognition in IDP

Van Kuppevelt argues that when a speaker produces an unsatisfactory answer to a question, the questioner asks subquestions [40]. The questioner may ask several subquestions to obtain the answer that she seeks. This process can continue recursively until the original, topic-constituting question is answered to the questioner's satisfaction. Therefore, topic-constituting questions restrict the development of a discourse. For van Kuppevelt, this restriction implies a program that must be followed for the discourse to come to a satisfactory end. The program is carried out by the question-answerer, and consists of providing an answer to the original topic-constituting question that is satisfactory.

IDP is a computational model for, and an implementation of the question answerer in the program that van Kuppevelt describes. IDP generates interactively for top-down plan discussions. Carberry notes that in top-down plan discussions, the user communicates her domain plan up front because she knows little about how to pursue it and wants the system to tell her [6]. The user may want additional information about one or more aspects of the domain plan. Therefore, the role of the user, as the questioner, is to cooperate in the system's discourse plan by asking questions that indicate how she would like the system to continue to plan the discourse to answer.

To make these indications, the user may use vaguely articulated questions like Why?. If it is necessary, she may refer to aspects of the domain plan that she would like fleshed out, for example Why not Sheridan Drive?. In this context, the system's task is to use the user's utterance to identify an aspect of the user's intended domain plan that is being questioned. The system must use the questioned information to identify an appropriate discourse plan to use.