

BAYESIAN NETWORKS MODEL FOR DIALOGUE ACT RECOGNITION BASED ON INTRA-UTTERANCE FEATURES AND INTER-UTTERANCES CONTEXT

Anwar Ali*, Ramlan Mahmod, Fatimah Ahmad and Md. Nasir Sulaiman

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Abstract

Previous dialogue act recognition models assume inter-utterances independency, in which each utterance is independent of the preceding utterance given the preceding utterance dialogue act. Accordingly, in these models, the recognition of the dialogue act of an utterance depends on the linguistic features extracted from the utterance itself and the dialogue act of the preceding utterance. This paper presents a Bayesian Networks model for dialogue act recognition in a dialogue system. In addition to the linguistic features of the user utterance and the previous utterance dialogue act, the presented model employs inter-utterances context which results from relaxing inter-utterance independency assumption. To design the model two sets of linguistic features have been identified, intra-utterance features extracted from the user utterance and context features extracted from the previous utterance. Bayesian networks machine learning has been used to induce the networks from a task oriented dialogue corpus. A series of experimental cases have been conducted to evaluate the Bayesian Networks model. In each case, different features have been used. The results show that the inter-utterance context is an effective factor in the recognition of dialogue act and the model which is based on intra-utterance features and inter-utterances context has the highest recognition accuracy.

Keywords: Dialogue act recognition, dialogue system, bayesian networks, machine learning

Introduction

A dialogue system is a computer system which communicates with human users via natural language to achieve a certain goal such as making travel arrangements, answering questions about weather or sports, routing telephone calls, acting as a general telephone assistant, or performing even more sophisticated tasks. Figure 1 shows the typical architecture of a dialogue system which integrates many

components such as speech recognition, natural language understanding, dialogue manager, natural language generation and text-to-speech synthesis (Jurafsky and Martin, 2003). The role of the natural language understanding component is to convert the user's utterance into semantic representation to figure out his intention so that the dialogue system can generate an appropriate response. In the information-state approach to

Faculty of Computer Science and Information Technology, University Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia. E-mail: anwar_althari@hotmail.com {ramlan, fatimah, nasir}@fsktm.upm.edu.my

** Corresponding author*