Ontology for caring dementia patient

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Abstract In this paper, we have designed a knowledge-base for caring dementia patient. Proposed knowledge system contains an ontology that describes the knowledge on dementia patient, indoor environment, and various interaction situations between human and robot. By implementing the ontology with additional reasoning rules programmed in Prolog, we have shown the feasibility of the proposed knowledgebase under simple human-robot interaction scenarios. For example, robot can find an alternative way of drinking water such as using straw if the patient cannot drink water directly from a cup or help the patient find a straw based on the spatial relation between patient and the object. We are going to expand the knowledge on robot and human-robot interactions and test the validity of the proposed knowledge with the help from experts in dementia patient caring facilities in Korea.

Keywords Personality recognition, Human-robot interaction, Data acquisition

1 Introduction

Dementia is one of the devastating diseases that requires extensive care from family members and care providers. Recently, robot and knowledge systems have been widely developed for caring dementia patients[1-3]. For example, robots passively engage an interaction with the patient without any knowledge around the environment or sophisticated sensing technology is adopted to monitor the behavior of the patient. However, for robot to play an active role in caring dementia patient, more knowledge on various interaction situations between robot and patient is required. In this study, we propose knowledge system that describes the knowledge on dementia, indoor environment, and diverse interaction situations formed between robot and the patient.

2 Modeling knowledge on caring dementia patient

Proposed ontology contains distinct concepts for dementia disease, behavioral traits of the dementia patient, interaction events, robot's task and actions, and so on (Figure 1). Most of the concepts related with dementia derived from books about patient care and patient assessment documents that is typically used in care facility for person with dementia. For example, various concepts and relation knowledge on patient assessment can help the robot to select patient specific tasks and behavior of the robot itself.

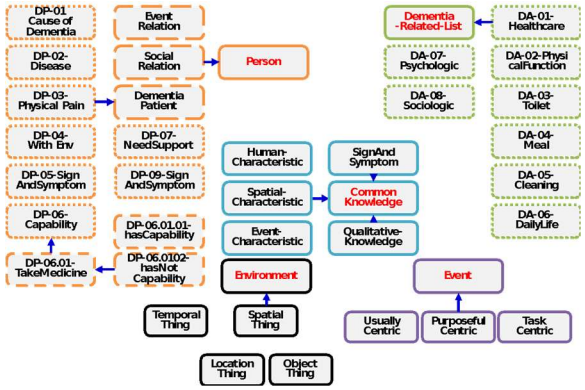

Fig. 1. Overall structure of the proposed ontology

3 Result and Conclusion

We have applied the developed ontology with several reasoning rules programed in Prolog under different interaction scenarios. For example, robot can find an alternative way of drinking water such as using straw if the patient cannot drink water directly from the cup or help the patient find a straw based on the spatial relation between patient and the object. In the future, we are going to expand the knowledge on robot and human-robot interactions and test the validity of the proposed knowledge with the help from experts in dementia patient caring facilities in Korea.

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