An Ontology- and Constraint-based Approach for Dynamic Personalized Planning in Renal Disease Management

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Abstract

Healthcare service providers, including those involved in renal disease management, are concerned about the planning of their patients’ treatments. With efforts to automate the planning process, shortcomings are apparent due to the following reasons: (1) current plan representations or ontologies are too fine grained, and (2) current planning systems are often static. To address these issues, we introduce a planning system called Dynamic Personalized Planner (DP Planner) which consists of: (1) a suitably light-weight and generic plan representation and (2) a constraint-based dynamic planning engine. The plan representation is based on existing plan ontologies, and developed in XML. With the available plans, the planning engine focuses on personalizing pre-existing (or generic) plans that can be dynamically changed as the condition of the patient changes over time. To illustrate our dynamic personalized planning approach, we present an example in renal disease management. In a comparative study, we observed that the resulting DP Planner possesses features that rival that of other planning systems, in particular that of Asgaard and O-Plan.

Keywords—patient care planning; treatment protocols; dynamic treatment planning; personal health services.