

What Do Homecare Provider Stories Tell Us about Dynamicity?

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Introduction:

The growth of the ageing population in industrialized countries is expected to become a serious problem in the near future. A promising solution to this problem is to improve healthcare systems and to support independent living for elderly by way of homecare service provisioning [1]. An important challenge to realize homecare service provisioning is to find effective ways to handle the dynamicity demands of the homecare domain. These demands imply that the provided services must be adapted based on a) frequently occurring contextual changes like a care-receiver's location and occupation, or b) slowly developing changes in a care-receiver's requirements like his/her extent of impairment [2]. To address these changes, the provisioning system should be capable of adapting the homecare services while they are being executed. At the same time, the execution of homecare services should be constrained by a service plan which is created by care-givers possibly through a separate system. The purpose of the service plan is to specify at a high level of abstraction how to address the needs of the care-receiver (in compliance with applicable medical protocols).

The service plan (especially its completeness and accuracy) plays an important role in the success of the provisioning system to deal with the dynamicity. In our definition, a service plan refers to one or more service building blocks (SBBs) and it describes the configuration and orchestration of instances of these SBBs as well as decision rules with respect to run-time behaviour. The SBBs, like a medicine dispenser or reminder, are the smallest manageable services which cannot be broken down further into smaller services from the care-givers point of view. Configuration parameters allow the care-givers to specify different aspects of the SBBs such as service operations and user interface modalities. Orchestration schemes determine how SBBs are composed. Decision rules determine the possible adaptation at runtime, based on evaluation of the rules with runtime data (e.g., context values). For example, decision rules can be used to choose between alternative operations of one SBB or between alternative data and control flows among the SBBs, based on specific runtime circumstance. We believe that enhancing the service plan with decision rules can address the dynamicity in the homecare domain, especially with respect to existing rule-based and careflow medical protocols [3].

Expectation: What input is needed from industry?

To investigate the feasibility of our approach, we need to obtain several homecare scenarios and their possible variations from homecare providers, either for

different care-receivers or for a specific care-receiver with different runtime circumstances. We would like to interview a maximum of three representatives from different participating organizations who provide homecare services. The interviews will last 30 minutes. The interviewees should have at least 3 years experience with homecare services (Remote Patient Monitoring and Treatment) and can be either IT specialists or nurses. During the interview, we present several predefined service plans which have been developed based on some example scenarios and ask the interviewee to match them with the real scenarios which they have faced in practice. Our aim is to find out: (1) what types of SBBs and configuration rules can be useful for homecare services; (2) what types of ICT-based orchestration schemes and composition rules have been employed in practice; (3) what types of changes have been experienced and how often are homecare providers faced with such changes in their homecare service provisioning; (4) what types of medical protocols are imposed by legislation or regulation and how these affect the ICT-based homecare services; and (5) to what extent a separately devised service plan can help without compromising the safety and privacy in the homecare domain.

Work Plan:

Based on the interviews, we will use qualitative data analysis techniques (coding) to extract the common patterns of orchestration schemes, SBBs' configuration parameters and applicable decision rules in order to address dynamicity in homecare, i.e. to enhance adaptivity in homecare service provisioning. Then, we will refine our approach to support the scenarios collected from the interviews. In addition, the SBBs, their configurations and orchestration schemes as well as related decision rules will be deployed in our provisioning system to demonstrate its capability for runtime service provisioning. We also plan to enhance the evolvability of the homecare services based on monitoring performed by the provisioning system to improve off-line modification. This work is part of the IOP GenCom U-Care project which is sponsored by the Dutch Ministry of Economic Affairs under contract IGC0816.

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