

Towards an Intelligent Agent Framework to Manage and Coordinate Collaborative Care*

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Our project investigates computational models of collaboration between entities involved in the coordination and management of complex, care provision systems. We use the agent paradigm to assist service providers in the coordination and decision processes that enable the management of patient care. One important aspect is to adapt dynamically to changing patient situations, service provider characteristics and changing quality requirements. This paper discusses how we have built a Multi-Agent System to (a) plan the delivery of healthcare services, (b) negotiate the responsibility of healthcare providers to provide services (reaching agreements), and (c) ensure that the selected team of providers and patients adhere to careplans (maintaining agreements).

Coordination of healthcare services is a powerful example of a complex domain requiring models of collaborating agents that make agreements and adhere to them. The scope of our project is on investigating settings where collaborators are unreliable and non-conformant, i.e., where agreements are made but are not always maintained. This issue not only arises in collaborative healthcare management, but also in many other service industries, including the telecommunications and electricity supply. In the healthcare domain, better knowledge of patients and their needs can lead to dramatic improvements in the quality, safety, and efficiency of care provision, particularly in relation to patients suffering from chronic disease. However, a realisation of these benefits requires an adequate technological infrastructure. This infrastructure must support effective monitoring, analysis, distribution and utilisation of this knowledge.

To date, there has been little analysis of such healthcare management systems from an information-theoretic viewpoint. Despite the similarities of care management in both healthcare and commercial domains, current research has not offered a unified model of consumer care or determined how the lessons and technologies used in the one domain are transferable to the other. We report on building software architectures, knowledge representations, and machine reasoning techniques that enable consumer care provision across various organisational structures and settings, and how such architectures are tailored to meet different requirements of each domain.

* This project is supported in part by ARC Linkage Grant LP0774944 and British Telecom Agreement CT1080050530. We wish to thank Dr Kay Jones, Professor Leon Piterman, Professor Peter Shattner and Mr Akuh Adaji for their advice and contribution to the project.