

Master Thesis for Software Agents for Rights Negotiation and Configuration in a Distributed Environment

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1 Background

The master thesis is related to the Health Democratization project funded by the Research Council of Norway. The project develops a health data infrastructure for sharing health data among various healthcare stakeholders. One of the project tasks is to define the requirements and design of a distributed infrastructure for a healthcare domain where negotiating agents can operate and negotiate decisions. The agents may represent both software, or applications, and human beings. Negotiations within the infrastructure will evaluate and select appropriate types of negotiation mechanisms that may include one-to-one, one-to-many, and many-to-many mechanisms. The mechanisms will allow the agents to interact between each other and to make decisions based on these interactions. The smart contracts are considered as building blocks for these interactions.

As an example of a user story, the project considers an emergency case that involves a person with life-threatening traumatic injuries suffered in an accident. To provide an immediate and appropriate prehospital treatment, the healthcare workers need various health data, such as the patient's medical history or treatment policies. These data must be provided in real-time and may include personal information, the list of current medications, chronic health conditions and allergies, and emergency contact details. The hospital preferences may also be relevant. The person may predefine which hospitals this patient prefers to avoid. Further, this person has previously signed smart contracts that regulate different emergency cases. When certain terms and conditions are met, the corresponding contract is enforced, and the data are collected and sent to the ambulance agent.

2 Short description

Based on the user stories, this master project will define different types of the software agents and implement these agents. Further, the project studies the existing smart contract technologies to select the appropriate candidate. The project also develops interfaces to these agents using Open API that will allow users: (1) to build and customise the agents to meet predefined client's needs and requirements and (2) to interact with the agents and to sign smart contracts. The project looks at which open interoperable API, authentication and other features are needed. The project could include both practical and theoretical aspects and could also include two students. The focus of the theoretical part could be in the direction of blockchain-based rights negotiation for health data, i.e. evaluating the relevance of using smart contracts.

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