PhD projects Greater Manchester Connected Health Cities

PhD studentships available to start from April 2017/September 2017

Greater Manchester Connected Health Cities Programme

Project 3: Sharing data, knowledge and algorithms in a learning health system

Supervisors: Dr Niels Peek and Prof John Ainsworth

Background

The Connected Health Cities programme is a collaboration between healthcare providers, academia, and the private sector to generate new knowledge as an ongoing, natural by-product of the care experience, and feedback that knowledge to clinicians, patients, and other stakeholders in the health system to achieve cycles of continuous improvement. The core of each Connected Health City is a combinatorial analytics facility, called the Ark. In Greater Manchester, the Ark will build on the existing HeRC Trustworthy Research Environment (HeRC TRE) that is located on the University of Manchester campus and provides secure compute, storage and networking capacity required by GM CHC. Authorized users will use the Ark to access, aggregate, and analyse data from different NHS providers, and produce actionable knowledge that can be used to drive change in the healthcare system. In addition, data, knowledge, and algorithmic assets will be shared with the three other Connected Health Cities to facilitate replication of experiments and scaling up across North England.

PhD project outline

The PhD project will focus on the development of computational methods and tools to share data, knowledge, and algorithms, focusing on the following research questions:

1. How can we create a shared understanding of available data assets in the Ark?
2. What methods for data description and data quality metrics will capture the semantics that enable rapid learning from (big) heterogeneous data streams?
3. What approaches will describe fitness for use within the context of a specific purpose? For example, what are the semantics for characterizing data and identifying and describing bias?
4. How do we develop ways to communicate generated results, and surrounding uncertainties, to others who may wish to replicate (or build upon) the work done?
5. How can the Ark become smart enough to detect attempts to answer a question that is not answerable with the resources in the system?

To answer the above questions, the student will build on methods and theories from machine learning and semantic web technology to develop computer-interpretable meta-data catalogues; computer-interpretable descriptions of research questions; and computer-interpretable prediction rules and other analytical outputs. Where possible the work will build on existing initiatives such as the Observational Health Data Sciences and Informatics (OHDSI) program, an international collaboration that aims to bring out the value of observational health data through large-scale analytics and open-source solutions.

Student background required: We require a student with a minimum of an upper second class bachelor's degree in computer science, biomedical engineering, or a closely related discipline, with an interest in health informatics. Training will be available in learning health systems; data engineering; semantic web technology; epidemiology; machine learning and statistical modelling.

CLOSING DEADLINE: FEBRUARY 17th 2017