



inDemand: Demand driven co-creation for public entities

CHALLENGE 1: Intelligent Screening – Using smart application in patient screening for MRI-scans

Pitch

A smart application for recognizing the risk information of MRI patients.

Motivation and description

The need for magnetic imaging is constantly on the rise. 20 542 MRI studies were conducted in Oulu University Hospital in 2017 and the amount has been increasing at an even annual growth rate of 10 percent. Around 17 000 studies were conducted in 2014. The same trend is also occurring elsewhere in Finland and internationally. The risk information of every incoming patient must be reviewed manually from medical records by practical nurses from the imaging unit. The review includes checking if the patient has foreign bodies that are incompatible with magnets, e.g. implants or stents. Foreign bodies are classified in the MRI-Conditional guide, which describes if and with which device it is possible to image the patient. A high-quality, comprehensive survey of risk information improves patient safety.

Currently, the screening of risk information consumes a significant amount of human resources, so that MRI studies can be conducted safely. For example, the medical records in patient record systems are being screened by staff members. Risk assessment includes checking the information systems of several hospitals for possible medical or other foreign bodies and the makes and models of medical foreign bodies. Sometimes records are searched for from the medical records of other hospitals. The patients themselves can also report possible foreign bodies.

The process involves the manual reviewing of patient records and reading narrative texts. X-ray reports are also read in cases where the patient has had a previous MRI study.

Main objective

If the risk screening is conducted by a Smart Application, less human resources are required. Possible implants will show up in the record system and the Smart Application will analyse the make and model of the patient's implant against an international MRI-Conditional list. The information provided by the application will help recognize if an MRI study can be conducted on the patient, and what is the appropriate magnetic imaging device to use.

Requirements for the proposals

The application will gather the risk information from the relevant patient record systems. When the information is screened, the application will produce a trigger in the imaging data system being used. This will provide patient-specific information about implants. The nurse conducting the study or the person booking the appointment will be alerted of the relevant information by the trigger. The trigger will guide the booking process weeks or even months before the scheduled date of the study, so that the study-specific needs can be anticipated at the hospital. Additionally, it may be necessary to scan the imaging archive (PACS) for information. The screened information contains narrative texts. Machine vision and Robotic Process Automation technologies can be utilised in the solution proposal.

Business opportunity

The development need concerns all activities of the hospital. Imaging provides support service to all specialised fields in the hospital. Magnet contra-indications should be checked from patients before booking an MRI appointment in all speciality fields, where patients are referred to MRI studies. An Smart Application would check the MRI-contras before booking an MRI for the

patient. This way the patient would be directed to the correct magnetic device at the time of the booking (1,5T/3T or some other modality). This would reduce unnecessary work from the process of directing the patient to the right place.

The development need also has national significance. MRI contra-indications must be checked from all patients coming in for studies in all hospitals that conduct MRI studies (university hospitals, central hospitals, private companies). MRI-contras are checked manually everywhere and it consumes the working time of medical staff.

The solution being developed has scaling potential, which gives it international significance. It is considered that this kind of Smart Application usage in checking MRI-contras would be very welcome in hospitals conducting MRI studies around the world. Over 18 000 MRI studies were conducted in the Oulu University Hospital in 2016.

Both public and private hospitals are target groups. In addition to the public sector, MRI studies are often conducted in the private sector either by private customers or as outsourced public services.