



inDemand: Demand driven co-creation for public entities

CHALLENGE 2: Respiratory Rate Monitor – Machine vision in respiratory rate monitoring

Pitch

A respiratory rate monitor for unmonitored patients.

Motivation and description

When monitoring the development of a patient's condition, one of the most important vital functions to pay attention to is breathing. Breathing can be assessed by counting the respiratory rate. An increase in breathing is indicated by a higher respiratory rate and other visually measurable changes (e.g. use of accessory muscles, speech ability). Even small changes in the respiratory rate of a patient give healthcare professionals quick indications of the development of a patient's state.

Simple and quickly applicable methods for measuring and assessing respiratory rate would significantly improve patient monitoring and patient safety. An improvement in monitoring opportunities of an unmonitored patient with a new measuring instrument would help healthcare professionals in their daily work and would improve the quality of care in specialty and primary healthcare. Professionals are aware of the usefulness of continuous respiratory rate measuring in the monitoring and assessment of a patient's condition. However, despite this awareness, respiratory rate is often left unmeasured, because there is no simple instrument or device for measurement.

Main objective

A quick and reliable method of measurement and monitoring of an unmonitored patient's respiratory rate would be particularly useful in a busy hospital emergency room environment. With this new solution, it would be possible to detect and take care of situations such as a sudden crash in a patient's condition or an incrementally decreasing condition of a patient in follow-up. A real-time monitoring of respiratory rate would enable the detection of patients with a risk of deterioration in the waiting area and the urgency of care assessment in the so-called triage area. An instrument, which enables the measurement of the respiratory rate of unmonitored patients would ease and quicken the treatment and urgency of care assessments of patients and increase the safety of patients in queue. A respiratory rate measuring instrument for unmonitored patients would also have numerous other applications in emergency room environments and emergency care.

Requirements for the proposals

A measuring method based on camera technology (heat and motion observation).

An application for professional use (browser and mobile).

Business opportunity

The development need is extensive in scope and the innovation could be utilised widely in the hospitals throughout the country. It concerns particularly the emergency room and the emergency care responsibility areas of Oulu University Hospital.

Hospital emergency rooms elsewhere in Finland are facing similar challenges regarding the observation of unmonitored patients and patient safety. A solution could raise international interest, because the issues of emergency care and hospital emergency rooms seem to be universal in nature, thus offering a scaling opportunity for the new solution.

In 2016 emergency rooms in university hospitals treated over 500 000 primary care patients. Emergency rooms would benefit greatly from a measuring instrument innovation as described above, which would allow the effortless and cost-effective

simultaneous monitoring of several unmonitored patients. Waiting times for treatment and urgency of care assessment become necessarily lengthened when emergency rooms become congested, which increases the risk of deterioration of a patient's state before receiving care.