

A SYSTEM FOR AUTOMATIC ACTIVITY DETECTION IN CLINICAL WORK USING SCENARIO-BASED STUDY

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Human errors in clinical work lead to dangerous effect on patient's health, sometime may cause death of patient and make unnecessary medical expenses to the hospital. Activity detection can assist to identify human behaviours to recognize human errors in healthcare system. It may lead to study the causes of error in order to formulate solutions to reduce their incidence. The aim of this research is to construct a new system model which allows a computer to automatically identify an anaesthetist's physical actions in the operating theatre in order to identify human physical errors. The current research performs a scenario-based study to propose a new system model for automatic detection of clinical work. The proposed system model consists of two major components: motion capture method a sensor system and an agent-based activity recognition system. The motion capture system is used to capture the movements of subjects. The agent-based system processes the data captured by the sensors and identifies the actions performed. A scenario-based study was performed to implement the prototype system as a proof of concept. A simulation study was undertaken to develop a rapid prototype system in order to detect anaesthetist activities to investigate if such an approach is feasible. A small-scale task was undertaken to perform the simulation study. The small-scale task is part of the preparation of drugs for the patient during the induction phase of the anaesthesia in the operating theatre. This task was chosen as it is relatively easy to simulate outside the context of the operating room, but it involves some delicate physical movements and can be categorized into correct and non-correct action sequences. A prototype analysis system was designed to different sequences of correct and incorrect activities related to the above task. The developed prototype system was tested for accuracy in the simulated operating theatre environment. The experimental results show 90.4% accuracy with 87.5% of precision to detect the given actions. It indicates that the proposed system model seems to work with high accuracy to detect the physical actions of the subject for the given aspect of the clinical work.

Keywords: Activity Detection, Clinical Work, Motion Capture Sensor, Rapid Prototype System, Software-Agent