Inpatient Nursing Task Support

Nursing is characterized as a cycle management of patient conditions within the PDCA (Plan Do Check Action) conceptual framework. Due to *(i)* shortage of nurses and *(ii)* improving complexity of cares, nursing is regarded as one of the most challenging professions in Japan. Therefore, an effective nursing induction system for high-quality care is practically mandatory. The low level of staffing leads to higher level of patient mortality, which is partially due to the applied action rules of nurses. In order to improve this condition, we proposed a new analysis method to quantitatively elucidate the action rules of nurses on providing nursing care and a support system for nursing students to facilitate training in nursing activity order (Fig. 1).

To derive an efficient nursing activity order, we propose an effective scheduling method for nursing care scheduling problems based on the simulated annealing algorithm[1]. In the support system, sensor data are used to recognize nurse activities and determine the order of these activities. We attached four accelerometers (Fig. 2) to a nurse, calculated features and applied an SVM (support vector machine) classification algorithm. Through the experiments in simulated nursing conditions with 13 nursing activities, we evaluated the accuracy (Fig. 3) and had proven the effectiveness of the activity recognition for nursing care.

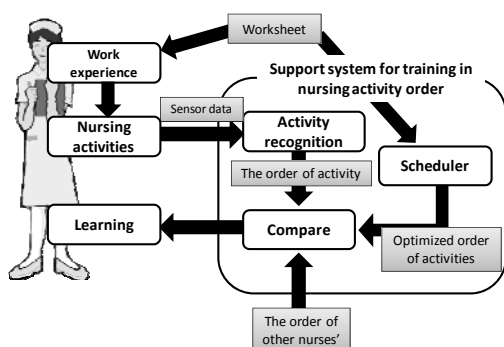*Keywords*: Nursing care, action rule, scheduling, pattern recognition

References

1) Mingang Cheng, Hiromi Itoh Ozaku, Noriaki Kuwahara, Kiyoshi Kogure and Jun Ota, Dynamic Scheduling in Inpatient Nursing, Int. J. Automation Technology, 3, 2, 174/184, 2009.
2) Yoshihiro Takebe, Kanai-Pak Masako, Noriaki Kuwahara, Jun Ota, "Nursing Task Recognition Using Accelerometers" 22th SICE Symposium on Decentralized Autonomous Systems, 69/74, 2010 (in Japanese).

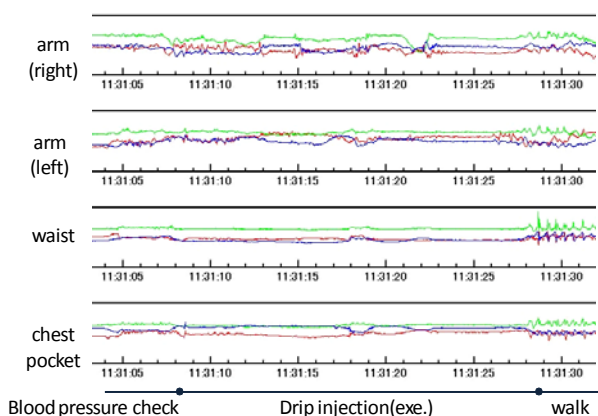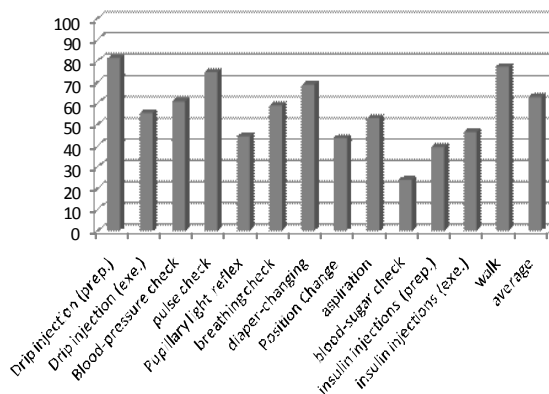Fig.1 The support system for training in nursing activity order

Fig.2 Accelerometer data

Fig.3 Accuracy of activity recognition