Towards False Alarm Reduction using Fuzzy If-Then Rules for Medical Cyber Physical Systems

Cyber-Physical Systems (CPS) are integrations of computation, networking and physical processes. Its process control is often referred to as embedded systems. Generally, CPS and Internet of Things (IoT) have the same basic architecture, whereas the former shows a higher combination and coordination between physical and computational elements, i.e., wireless sensor networks (WSNs) can be a vital part of CPS applications. With the rapid development, CPS has been applied to healthcare industry, where a wide range of medical sensors are used within a healthcare organization. However, these sensors may generate a large number of false alarms in practice, which could significantly reduce the system effectiveness. Targeting on this issue, in this work, we attempt to design a Medical Fuzzy Alarm Filter (named MFAFilter) for healthcare environments by means of fuzzy logic, especially fuzzy if-then rules, which could handle the vague and imprecise among data. In the evaluation, we conducted two major experiments to explore the performance of our approach in a simulated and a real network environment, respectively. Experimental results demonstrate that the use of fuzzy if-then rules could achieve a better accuracy as compared to the traditional supervised algorithms, and that our designed filter is effective in the practical environment.