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A REAL-TIME DATA CLASSIFICATION SYSTEM FOR ACCURATE ANALYSIS OF NEURO-BIOLOGICAL SIGNALS

Zhanfeng Ji[1,2], Takenao Sugi[1], Satoru Goto[1], Xingyu Wang[2] and Masatoshi Nakamura[3]

[1]Department of Advanced Systems Control Engineering
Saga University
1 Honjomachi, Saga 840-8502, Japan
jzf1228@gmail.com

[2]Department of Automation
East China University of Science and Technology
130 Road Meilong, Shanghai 200237, China

[3]Research Institute of Systems Control Institute for Advanced Research and Education
Saga University
Yoka-machi, Saga 840-0047, Japan

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Abstract. *Neuro-biological signals have much importance in clinical diagnosis. However, those signals are inevitably contaminated by various artifacts. The analysis without considering the artifacts would lead to mis-interpretation results. Therefore, an available signal selection technique is necessary to be developed for obtaining accurate and reliable results. In this paper, a model of real-time data classification system for accurate analysis of neuro-biological signals was proposed. The proposed model can be utilized for various research purposes. As an example, a physical system to analyze the relationship between characteristics of electroencephalogram (EEG) and electrocardiogram (EKG) was developed. The results indicated that the real-time system was effective for available signals selection. With the developed real-time system, the quality of signals can be monitored during the recording process.*

Keywords: Real-time data classification, Accurate analysis, Artifacts detection, EEG, EKG

1. **Introduction.** The neuro-biological signals containing electroencephalogram (EEG), electrocardiogram (EKG), electrooculogram (EOG) and electromyogram (EMG) have close relationship with human mental/physical functions. EEG is the reflection of brain activities. EKG reflects the muscle movement of heart and the variability of autonomic nervous system. EOG comes from the movement of eyeball. EMG records the muscle activities at a certain part of the body.

In clinical diagnosis, EEG and EKG are more important than EOG and EMG. EEG analysis is widely used in monitoring and diagnosis, such as infants monitoring and epilepsy diagnosis. EKG analysis is useful to predict cardiac diseases and to investigate the autonomic nervous system since heart rate variability (HRV) analysis has become a popular tool [1]. The relationship analysis between EEG and EKG are important to understand the mechanisms of human brain and heart in future. However, there are no correlative researches being reported.

Artifact contamination problem is inevitable during the real clinical recording process. EEG and EKG are easy to be contaminated by various artifacts, which may be caused by loosing electrode, eye movement, blink, muscle activity, sweating, deep breath, or