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Editorial

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It is our pleasure to present this first issue of the EAI Journal of Bioengineering and Bioinformatics which contains a collection of 5 papers. A new journal promotes complementary disciplines that hold great promise for the advancement of research and development in complex medical and biological systems, biochemical engineering, bioelectrical engineering, biological systems engineering, biomechanical engineering, biomechanics, biomedical engineering, biomimetics, bionics, bioprinting, bioprocess engineering, biorobotics, biotechnology, cell engineering, clinical engineering, environmental health engineering, genetic engineering, human-factors engineering, implants, medical imaging, neural engineering, pharmaceutical engineering, synthetic biology, systems biology, tissue engineering, as well as machine learning methods for bioinformatics, modelling methods, supervised classification, clustering and probabilistic graphical models for knowledge discovery, deterministic and stochastic heuristics for optimization and applications in genomics, proteomics, systems biology, evolution and text mining.

This issue provides a common platform for the cross fertilization of ideas and shaping knowledge and scientific achievements by bridging these two very important and complementary disciplines into an interactive and attractive integration. Issue includes 5 papers varying from EEG signal processing, machine learning, fuzzy logic, biomechanics and bioimaging, biomedical decision support system, and personalized diagnose.

Paper from Timplalexis et al [1] described a sleep stage classification study for healthy and patient subjects. The proposed approach utilizes a mixture time-domain and frequency domain features extracted from 2 EEG and the EOG signals.

Kato et al [2] proposed the parallel implementation of FSBC (pFSBC) using Python with multi-threading to improve the processing time of the original FSBC implemented in R. They developed a clustering method for high-throughput sequencing with Systematic evolution of ligands by exponential Enrichment SELEX pools (HT-SELEX) which is crucial for selecting different types of aptamer candidates. The parallel processing of FSBC is effective to reduce the processing time. pFSBC will help to avoid the time-consuming clustering task, and it will provide accurate clustering results for the HT-SELEX data.

Giannakaki et al [3] described a method for absence seizures detection based on EEG signals decomposition via the Matching Pursuit (MP) algorithm. It was tested in a clinical dataset of 8 pediatric patients (4 females, 4 males) suffering from active absence epilepsy, containing 123 absence seizures in total. The seizure detection system achieved a time window based discrimination accuracy of 97.3% accomplishing a good state of the art performance.

Konstantinidis and Brown [4] extended the model in order to incorporate non-Gaussian state noise with A Monte Carlo Markov Chain (MCMC) filtering procedure on a self-organizing state-space model. The suitability of the proposed method for online use, in combination with its ability to smoothly track frequency changes in human EEG signals under the most common anesthetics, suggests that it can be used for real-time brain state tracking.

Christinaki et al [5] investigated a parametric transfer-learning method based on the Fisher divergence, where information from other patients is injected as a prior probability into a Hamiltonian Monte Carlo framework. Method was tested on the NEVERMIND dataset of self-reported well-being scores. Results demonstrate good benefits where long-term forecasts are required given only short-term data.

References

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