

## Computational Intelligence and Brain Understanding

### Preface

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The distinguished collection of the three research articles, being published in this issue of *Fundamenta Informaticae*, comprise of the extended versions of selected papers presented in the 7th International Conference on Pattern Recognition and Machine Intelligence (PReMI'17); held from Dec 5-8, 2017 at the Indian Statistical Institute, Kolkata. The theme on which we have attempted to base this collection, and accordingly chosen papers from PReMI'17, is “Computational Intelligence and Brain Understanding”. For a long time neurological disorders were studied by the doctors through ‘deficit learning’ only. However, with the advent and applications of machine learning techniques, these as well as several cognitive functions are now becoming increasingly understandable to the research community through an amalgamation of medical science and computer science based approaches. The present collection is a humble attempt to further move forward in that direction.

The first of these three papers is titled as “Pattern and Rule Mining for Identifying Signatures of Epileptic Patients from Clinical EEG data” by Dasgupta et al. This work uses a host of machine learning and computational intelligence techniques to identify the signatures of epilepsy from EEG data of the brain, that were collected from a local hospital. The paper, interestingly, attempts to address several important questions like whether male and female brain, child and adult brain regions, and even brains for different demographic categories have varying patterns of over-/under-representation of connections in case of epilepsy!

The second article “Comparison of different data mining methods to determine disease progression in dissimilar groups of Parkinson’s patients” is similar to the first one in that the authors Przybyszewski et al. base a similar empirical study on another brain disease, viz. the Parkinson, taking the help of many machine learning and soft computing techniques. Additionally, some neuropsychological perspectives have also been studied – like the role of eye movements in predicting longitudinal symptom development.

The third paper deals more with the cognitive aspects of the brain. Its focus is to estimate music mood through machine intelligence and statistical learning. This paper, titled “Structured Gaussian Process Regression of Music Mood” by Chapaneri & Jayaswal, uses many interesting techniques like Gaussian mixture model, kernel PCA, twin Gaussian processes, and KL divergence measure, along with crowdsourced annotations, to model the music mood in terms of valence and arousal.

We are grateful to the esteemed reviewers who painstakingly contributed to the review process and helped improve the quality of the research contributions. We are privileged and delighted to acknowledge the continuous support received from the organizers of PReMI'17 for allowing us to select the research articles based on theme. We owe the Editor-in-Chief of *Fundamenta Informaticae* a special thanks for enabling us to proceed with the special issue with the selected articles, which is now going to be published as a distinguished collection in a regular issue. We hope you will enjoy reading the three thematic articles.

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