Srikanta Patnaik and Yeon-Mo Yang (Eds.)

Soft Computing Techniques in Vision Science

Studies in Computational Intelligence, Volume 395

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Soft Computing Techniques in Vision Science

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Foreword

I experience a great excitement in extending a welcome note on this special edited volume on "SOFT COMPUTNG TECHNIQUES IN VISION SCIENCE". It simply stands as an icon of excellence in this technology scenario. It gives me immense pleasure that the special volume is addressing an integration of two emerging disciplines and its dimensions. As Soft Computing is a thrust area of many scholars Vision Science is simply taking the advantage of its advancements. Apart from reducing complexity and enhancing effectiveness of the object under study, it has taken a diagnostic approach in the context of Vision Science. The research papers contained various application areas including Image Segmentation, Robot cognition, Immunity, Protein Structure Determination and other issues. As Bioinformatics is gaining a new age revolution, it is definitely praiseworthy. The explanations are lucid, attractive and in true sense stimulating. It will definitely penetrate to the targeted segment of the volume and ensure furtherance of the subject. I have cordial appreciation of this enduring compilation.

I greet all the authors for their dedication in this special edited volume. It is esteem than a priority in their career. Its continuity will make them realize the potential of self actualization. Fortune favors prepared mind, hence the kind of preparedness exhibited here is mind-boggling. I express this congratulatory message to Professor Srikanta Patnaik for bringing such a high caliber work which benefits to a large interest group. I respect to this confidence of transforming such brain child for the global civic society. I wish it a grand success in its journey. I have regards and valued remarks for Professor Yeon-Mo Yang being instrumental in bringing this opportunity for me. I wish a tranquil victory and success of this volume. It is a distinction on my part to be integrated with the strategic growth of this platform of knowledge. I anticipate with all consistent efforts that we will enable ourselves to cater to the needs of the advance labs and genius minds in the direction of Soft Computing and Vision Science.

I may pray the supreme force "nature" to support us in our thoughts and practices.

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Preface

The augmented field of Computational Science, specifically Soft Computing has run its course so diligently that the research community is befuddled by its multifarious applications. Rate of progress in this sphere of epistemology is gaining a cutting edge momentum which made it an epitomized component of Computer Science and Engineering. The subject as a matured scientific discipline harbored many intricate modules like imprecision, uncertainty, partial truth, tractability, robustness and low solution cost. Soft Computing ascribes itself some of the widely acclaimed domains like Neural Network, Fuzzy System, and Evolutionary computation, Harmony Search, Swarm Intelligence, Bayesian Network, Chaos Theory and Perceptron. After making a profound influence in these areas, Soft Computing as an instrument finds a healthy presence in the pristine landscape of "Vision Science". In earlier approaches the tool was acting as a catalyst in reducing the complexity of the system, where in the application in Vision Science it is a facilitating mechanism that not only reduces complexity but also predicts and extracts exact behavior of the object under study. Although the area is typically narrow but scope of research extends to Visual Perception and Visual system, Cognitive Psychology, Neuroscience, Psychophysics and Ophthalmology, linguistic relativity, color vision etc. Vision Scientists attribute these perspectives as sources of illumination for research.

Being very much skeptical about the future of Vision Science with the locomotion of Soft Computing, this Volume is presented before various research forums across the Globe. Considering the universal thrust areas, relevancy and genesis of the problem and due authenticity the research papers have been placed in this volume. A stringent and multi phase editing procedure has been followed to testify the reliability and validity of the research work. Considering the intellectual property issues and research benchmark indexes 18 chapters have got denominations for inclusion in the volume. Undoubtedly these chapters will carry a great deal of intellectual joy for our esteemed readers, to whom we are always grateful.

Prof. Srikanta Patnaik
Prof. Yeon-Mo Yang

Editorial

Every discipline moves with relativity as absoluteness is an inherent scarcity. Further growth is the need of the hour. We have to acquire the strongest sense of perseverance in creating and nurturing knowledge. The global culture has accustomed to this philosophy that uninterrupted technological value creation is the essence of any professional body promoting research. It provides necessary nutrition for the sustainability. This volume is manifested with a noble objective of bridging the gap between two growing field of study i.e. Soft Computing and Vision Science. Although these two disciplines are about three decades old in their appearance they have immense potential for the new generation 21st century researchers. Many gray areas are their which have been imbibed into it which has been addressed in this special volume of Journal. We feel honored to enjoy this editorial privilege in introducing such a noble work to whole world. Let's highlight various works that have been discussed in this volume.

In the first chapter entitled "Genetic Algorithm Based Fuzzy Frequent Pattern Mining from Gene Expression Data" a brilliant work on application of various frequent pattern mining techniques on a fuzzified data has been explained by Debahuti Mishra et. al.. By comparing different frequent patterns obtained through various efficient algorithms authors concluded that Genetic Algorithm based fuzzy frequent patterns yields the best individual patterns. The second chapter entitled "Prediction of Protein Tertiary Structure Using Genetic Algorithm" authored by G. Sindhu and S. Sudha focuses on explaining Protein structure using GA. Authors could able to find lowest free energy conformation for a test protein using ECEPP force fields. Chapter 3 entitled "Hybrid Image mining Methods to Classify the Abnormality in Complete Field Image Mammograms Based on Normal Regions" by Aswini Kumar Mohanty et. al. proposed a hybrid classifier technique for extracting features that can be used to distinguish normal and abnormal regions of a mammogram.

Chapter-4 entitled "Handwritten Script Recognition using DCT, Gabor Filter and Wavelet Features at Line Level" authored by G.G.Rajput and H.B.Anita describes multiple feature extraction approach to identify the script type of the collection of handwritten documents. Chapter-5 entitled "Character Recognition using 2D view and Support Vector Machine" authored by Vijay Patil et al. proposed the character recognition using SVM classifier.

Chapter-6 entitled "Automatic localization of pupil using histogram thresholding and region based mask filter" by Narayan Sahoo et. al. proposed automatic localization of pupils by combining some multiscale feature extraction

techniques. Chapter-7 entitled "A Comparative Analysis on Edge Detection of Colloid Cyst: A Medical Imaging Approach" authored by Shreetam Behera et. al. discusses about colloidal Cyst detection, located in the third ventricle of the human brain using various image processing techniques such as detection, recognition and classification.

Chapter-8 entitled "Automatic Localization and Segmentation of Left Ventricle from Short Axis Cine Mr Images: An Image Driven Method" by G.Dharanibai and J.P.Raina is a fabulous attempt to localize the heart region through 4D cardiac cine MR images with no user input. Chapter-9 entitled "Performance Analysis of Neural Network and Anfis in Brain MR Image Classification" by Meena R et. al. highlights the importance of neural network in brain image segmentation. They have used Principal Component Analysis for feature extraction. Chapter-10 entitled "Hybrid algorithm using Fuzzy c-means and Local Binary patterns for Image Indexing and Retrieval" by Dilkeshwar Pandey and Rajive Kumar proposed an algorithm which performs effectively as compared to LBP and other techniques for image retrieval. Chapter-11 entitled "Artificial Neural Network (ANN) based object recognition using multiple feature seats" by Manami Barthakur et. al. proposed about forming a unique hybrid feature for object recognition using ANN trained with Back Propagation Learning.

Chapter-12 entitled "Protein Structure Prediction using Multiple Artificial Neural Network Classifiers" authored by Hemashree Bordoloi and Kandarpa Kumar Sarma develops an understanding on prediction of secondary protein structure employing Artificial Neural Network. Chapter-13 entitled "An Intelligent Agent Based Intrusion Detection System Using Fuzzy Rough Set Based Outlier Detection" by N.Jaisankar et. al. innumerate the efficiency of IDS through Fuzzy Rough Set SVM. Chapter-14 entitled "Application of Ant Colony Algorithm for classification and rule generation of Data" authored by P. Tiwari and *B. Verma* examines the performance of Ant-Minor algorithm in developing classification rule of data.

Chapter-15 entitled "Immunized Navigational Controller for Mobile Robot Navigation" authored by Dayal R Parhi and et. al. describes an architecture for mobile robot navigation problem based on idiotypic effects among the antibodies and antigens. Chapter-16 titled "Modified A* Algorithm for mobile robot path planning" by Anshika Pal et. al. emphasizes on comparative results obtained from A* and Modified A* algorithm in Mobile Robot Path Planning. Chapter-17 entitled "Artificial Immune System Based Path Planning of Mobile Robot" discusses on Artificial Immune Algorithm for mobile robots. Chapter-18 entitled "Facial Feature Extraction using 4D Stereo Camera System" authored by Soumya Kanti Dutta and et. al. experimented the fact that by using 4D stereo camera system a more accurate facial feature extraction can be done. This 4D stereo camera appears to be more efficient in the extraction procedure.

All the chapters are appealing to the subject as well as to its scope. We extend sincere gratitude to the research scholars for their indomitable spirit in bringing such commendable research work. We sincerely thank to the board of editors for their generous gifts of time, energy and intellect. We convey salute to the technical committee, organizing committee and publishing house for their unbroken

professional commitments in bringing this special volume. We hope this gracious piece of effort will earn a significant appreciation from the readers to whom we owe indebtedness. We must welcome constrictive feedbacks for future development.

Srikanta Patnaik
Yeon-Mo Yang

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