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Pradeep Kumar Mallick
Valentina Emilia Balas
Akash Kumar Bhoi · Ahmed F. Zobaa
*Editors*

# Cognitive Informatics and Soft Computing

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## Table of contents (74 papers)


**Role of Filter Sizes in Effective Image Classification Using Convolutional Neural Network**

Vaibhav Sharma, E. Elamaran
Pages 625–637

**Sentiment Analysis on Product Reviews Using Machine Learning Techniques**

Rajkumar S. Jagdale, Vishal S. Shirsat, Sachin N. Deshmukh

Pages 639–647

**Vector-Controlled Induction Motor Drives Using Intelligent RST Robust Controller**

Bhola Jha, M. K. Panda, V. M. Mishra, S. N. V. Ganesh
Pages 649–667

**Optimization of Electricity Bill on Study of Energy Audit by Using Grid Integration of Renewable Energy Sources**

Shubham Soni, Inderpreet Kaur, Deepak Kumar
Pages 669–676

**Computer-Aided Diagnosis of Epilepsy Based on the Time-Frequency Texture Descriptors of EEG Signals Using Wavelet Packet Decomposition and Artificial Neural Network**

N. J. Sairamya, S. Thomas George, M. S. P. Subathra, Nallapaneni Manoj Kumar
Pages 677–688

**User Identification Methods in Cognitive Radio Networks**

A. K. Budati, S. Kiran Babu, Ch. Suneetha, B. B. Reddy, P. V. Rao
Pages 689–699

**Design and Performance Analysis of Optical Signal Processing Module in Open Air and Underwater Environment**

C. R. Uma Kumari, Dhanalakshmi Samiappan
Pages 701–710

**Analysis of Jitter and Shimmer for Parkinson's Disease Diagnosis Using Telehealth**

Harisudha Kuresan, Sam Masunda, Dhanalakshmi Samiappan
Pages 711–721

**Real-Time Biomedical Recursive Images Detection Algorithm for Indian Telemedicine Environment**

Syed Thouheed Ahmed, M. Sandhya
Pages 723–731

**From Nonlinear Digital Filters to Shearlet Transform: A Comparative Evaluation of Denoising Filters Applied on Ultrasound Images**

S. Latha, Dhanalakshmi Samiappan
Pages 733–741

**Application of Multi-domain Fusion Methods for Detecting Epilepsy from Electroencephalogram Using Classification Methods**

L. Susmitha, S. Thomas George, M. S. P. Subathra, Nallapaneni Manoj Kumar
Pages 743–754

**In Silico Studies of Charge Transfer Complexes of 6-(Trifluoromethyl)furo[2,3-b]pyridine-2-carbohydrazides with Iodine as σ-Acceptor**

Shirish Kumar Kodadi, Parthasarathy Tigulla
Pages 755–770

**A Cognitive Approach for Design of Smart Toilet in Healthcare Units**

Mohan Debarchan Mohanty, Mihir Narayan Mohanty
Pages 771–780

**Autonomic Nervous System for Sympathetic and Parasympathetic for Cardiac Event Coherence**

Noel G. Tavares, R. S. Gad, A. M. Hernandez, Uday Kakodkar, G. M. Naik
Pages 781–794

**Steady-State Visual Evoked Potential-Based Real-Time BCI for Smart Appliance Control**

Noel G. Tavares, R. S. Gad
Pages 795–805

# Autonomic Nervous System for Sympathetic and Parasympathetic for Cardiac Event Coherence

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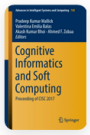

Cognitive Informatics and Soft Computing

Noel G. Tavares, R. S. Gad, A. M. Hernandez, Uday Kakodkar & G. M. Naik

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## Abstract

Human body physiology is regulated through the central neural control (CNS) which takes signal from the respiratory system and ambiance which signifies atmospheric pressure, temperature and various gases in the environment. The central nervous system then controls the metabolic control of various organs through the afferent nerves and the efferent nerves reflecting the various reflex of the organs back to the CNS, which regulates the cardiovascular system (CVS) for the stroke volume (SV) of the blood and heart rate (HR). The SV and HR collectively synthesize the cardiac output of the heart balancing the body for the coherence or non-coherence states. We have defined and simulated here in this paper the Neural Mass Model (NMM), which is one of the component which feeds the CNS and controls the cardiovascular system for the human blood pressure (ABP) and heart rate. We have defined and simulated arterial blood pressure model, i.e., Windkessel model; describing the arterial blood pressure for the particular input volume of the blood and ECG model for the computing heart rate and heart rate variability (HRV). The integration of CNS, Windkessel and EEG model has thrown light on some aspects of sympathetic and parasympathetics of ANS for further improvisation and experimentations.

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**Noel G. Tavares, R. S. Gad, A. M. Hernandez, Uday Kakodkar and G. M. Naik**

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