

STEAM-H: Science, Technology, Engineering,
Agriculture, Mathematics & Health

STEAM-H: Science, Technology, Engineering, Agriculture, Mathematics & Health

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Martha Refugio Ortiz-Posadas
Editor

Pattern Recognition Techniques Applied to Biomedical Problems

 Springer

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Preface

Pattern recognition is the science that studies the processes of identification, characterization, classification, and reconstruction of sets of objects or phenomena, with the purpose of extracting information that allows establishing common properties among them. It has an applied and multidisciplinary character, and it is conformed to technical sciences, computer science, and mathematics, among others, in order to develop computational tools and methodologies related to these processes. The fundamental problems of pattern recognition refer to those related to the determination of factors that affect objects and their classification, and four types are considered: (1) selection of variables and objects, (2) supervised classification, (3) unsupervised classification, and (4) partially supervised classification.

On the other hand, there are different study areas of pattern recognition such as image processing, signal processing, computer vision, remote sensing, neural networks, genetic algorithms, artificial intelligence techniques, descriptive geometry, mathematical morphology, statistical recognition, structural syntactic recognition, and combinatorial logical recognition, to name a few. All these can be applied into biomedical problems.

This volume presents together leading Latin American researchers from five different countries, namely, Brazil, Chile, Costa Rica, México, and Uruguay, to present their own work with the perspective to advance their specific fields. It presents nine chapters regarding different pattern recognition technics applied to the solution of several biomedical problems featured as follows.

In Chap. 1, Aída Jiménez-González and Norma Castañeda-Villa present two experiences on the recovery of physiological information from noisy datasets, applying the method of independent component analysis (ICA).

In Chap. 2, Verónica Jacinto Jiménez et al. describe the identification process of genomic variants and genetic expression profiles for the diagnostic of diseases using high-throughput sequencing methodologies.

In Chap. 3, Leticia Vega-Alvarado et al. propose a system for the automatic detection of the parasite causing Chagas disease in stained blood smears images.

In Chap. 4, Alfonso Rosales-López and Rosimary Terezinha de Almeida propose the use of intervention analysis on time series, using the Box and Tiao approach, as a method for health technology assessment on public health interventions.

In Chap. 5, Millaray Curilem et al. evaluate the possibility of detecting the presence of nausea in chemotherapy patients by processing the electrogastrogram signal.

In Chap. 6, Letícia M. Raposo et al. describe the random forest algorithm, showing an application to predict HIV-1 drug resistance.

In Chap. 7, Luis Jiménez-Ángeles et al. describe an overview of the medical imaging modalities most frequently used for assessment of the cardiac contraction pattern.

In Chap. 8, Franco Simini et al. describe two automatic systems related with home care and personal devices.

In Chap. 9, Tlazohtzin Mora-García et al. propose an evaluation tool based on multi-criteria decision analysis (MCDA) for the replacement of older medical equipment installed at hospitals.

Mexico City, Mexico

Martha Refugio Ortiz-Posadas

Contents

The Classification of Independent Components for Biomedical Signal Denoising: Two Case Studies	1
Aída Jiménez-González and Norma Castañeda-Villa	
Pattern Recognition Applied to the Analysis of Genomic Data and Its Association to Diseases	35
Verónica Jiménez-Jacinto, Laura Gómez-Romero, and Carlos-Francisco Méndez-Cruz	
Images Analysis Method for the Detection of Chagas Parasite in Blood Image	63
Leticia Vega-Alvarado, Alberto Caballero-Ruiz, Leopoldo Ruiz-Huerta, Francisco Heredia-López, and Hugo Ruiz-Piña	
Monitoring and Evaluating Public Health Interventions	73
Alfonso Rosales-López and Rosimary Terezinha de Almeida	
Recognition of Nausea Patterns by Multichannel Electrogastrography	91
Millaray Curilem, Sebastián Ulloa, Mariano Flores, Claudio Zanelli, and Max Chacón	
Random Forest Algorithm for Prediction of HIV Drug Resistance	109
Letícia M. Raposo, Paulo Tadeu C. Rosa, and Flavio F. Nobre	
Analysis of Cardiac Contraction Patterns	129
Luis Jiménez-Ángeles, Verónica Medina-Bañuelos, Alejandro Santos-Díaz, and Raquel Valdés-Cristerna	
Pattern Recognition to Automate Chronic Patients Follow-Up and to Assist Outpatient Diagnostics	175
Franco Simini, Matías Galnares, Gabriela Silvera, Pablo Álvarez-Rocha, Richard Low, and Gabriela Ormaechea	

**Pattern Recognition for Supporting the Replacement of Medical
Equipment at Mexican Institute of Pediatrics** 197
Tlazohtzin R. Mora-García, Fernanda Piña-Quintero,
and Martha Refugio Ortiz-Posadas

Index 217

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