

Preface

Several automatic systems require cameras to analyze the scenes and perform the desired task. Images and videos are taken from the environment, and after that, some processing algorithms should be used to analyze the object contained in the frames. On the other hand, in the past two decades, the amount of users of cameras has been increased exponentially. Cameras are present in smartphones, computers, cars, gadgets, and many other apparatuses used every day. Based on such facts, it is necessary to generate robust algorithms that permit the analysis of all this information. These algorithms are used to extract the features that permit the identification of the objects contained in the image. To achieve this task, it is necessary to introduce computational tools from artificial intelligence. The tendency is to have automatic applications that can analyze the images obtained with the cameras. Such applications involve the use of image processing algorithms combined with soft computing and machine learning methods. This book presents a study of the use new methods in image and video processing. The selected chapters explore areas from the theory of image segmentation until the detection of complex objects in medical images. The implementation concepts from machine learning, soft computing, and optimization are analyzed to provide an overview of the application of this tools in image processing.

The aim of this book is to present a study of the use of new tendencies to solve image processing problems. We decide to edit this book based on the fact that researchers from different parts of the world are working in this field. However, such investigations are published in different journals, and it is hard to find a compendium of them. The reader could see that our goal is to show the link that exists between intelligent systems and image processing. Moreover, we include some interesting applications in areas like medicine or security that are very important nowadays.

The content is divided into four parts; Part I includes the methods involved with theory and applications of image segmentation. For example, the use of multiobjective approaches or different color spaces. Part II includes the applications of machine learning and soft computing algorithms for medical purposes, for example, glaucoma or coronary diseases. Meanwhile, in Part III approaches for

security and biometry are included . Some of them are related to finger print identification or the analysis of videos for activity recognition. Finally, Part IV contains 11 chapters about object recognition and analysis in the scenes.

Editing this book was a very rewarding experience, where many people were involved. We acknowledge to all the authors for their contributions. We express our gratitude to Prof. Janusz Kacprzyk, who warmly sustained this project. We also acknowledge to Dr. Thomas Ditzinger, who kindly agreed to its appearance.

Finally, it necessary to mention that this book is just a small piece in the puzzles of image processing and intelligence. We would like to encourage the reader to explore and expand the knowledge in order to create their implementations according to their necessities.

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