

# Preface

*Thus the man who is responsive to artistic stimuli reacts to the reality of dreams as does the philosopher to the reality of existence; he observes closely, and he enjoys his observation: for it is out of these images that he interprets life, out of these processes that he trains himself for life*

Friedrich Nietzsche

This book started as a bunch of files with R code for reading, processing, and saving images. The code slowly evolved into sets of lessons, more or less organized by subjects following the subjects presented in class while lecturing on Digital Image Processing at both the undergraduate and graduate levels at the *Universidade Federal de Alagoas* and the *Universidade Federal de Pernambuco*, Brazil.

The authors were invited to give a short course at the *Congresso da Sociedade Brasileira de Computação*, held in Bento Gonçalves, Rio Grande do Sul State, in 2009. During that Congress they first realized the importance of having a book on Digital Image Processing which, instead of presenting only the mathematical aspects of the discipline or just point-and-click operations and results, delved deeply into the computational aspects of the discipline.

That was the starting point of a project whose product is this book.

The main objective of this book is to introduce the R statistical software to the image processing community in an intuitive and practical manner. Indeed, R brings interesting statistical and graphical tools which are important and necessary for image processing techniques. Besides, it has been proved in the literature that R is among the most reliable, accurate, and portable statistical softwares in the “market” (considering either free/open source or proprietary). In order to achieve that objective, the concepts and techniques are presented theoretically and as much as possible in practice, as the R codes are presented and explained along the text. The idea is that: having this book in hand and an active R session available, the

reader can profit from this exciting learning and programming trip all the way through this book.

Other communities can also take advantage of the material presented here as it can be seen as an introduction to image processing and to R for those who are new to the research field and software.

**Chapter 1:** “Definitions and Notation”, works as a prerequisite for the remaining five chapters which can be read more or less independently. The reader is encouraged to try his own implementation of all the code presented in this book and, in particular, to try to develop faster and optimized programs.

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Learning by Examples

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