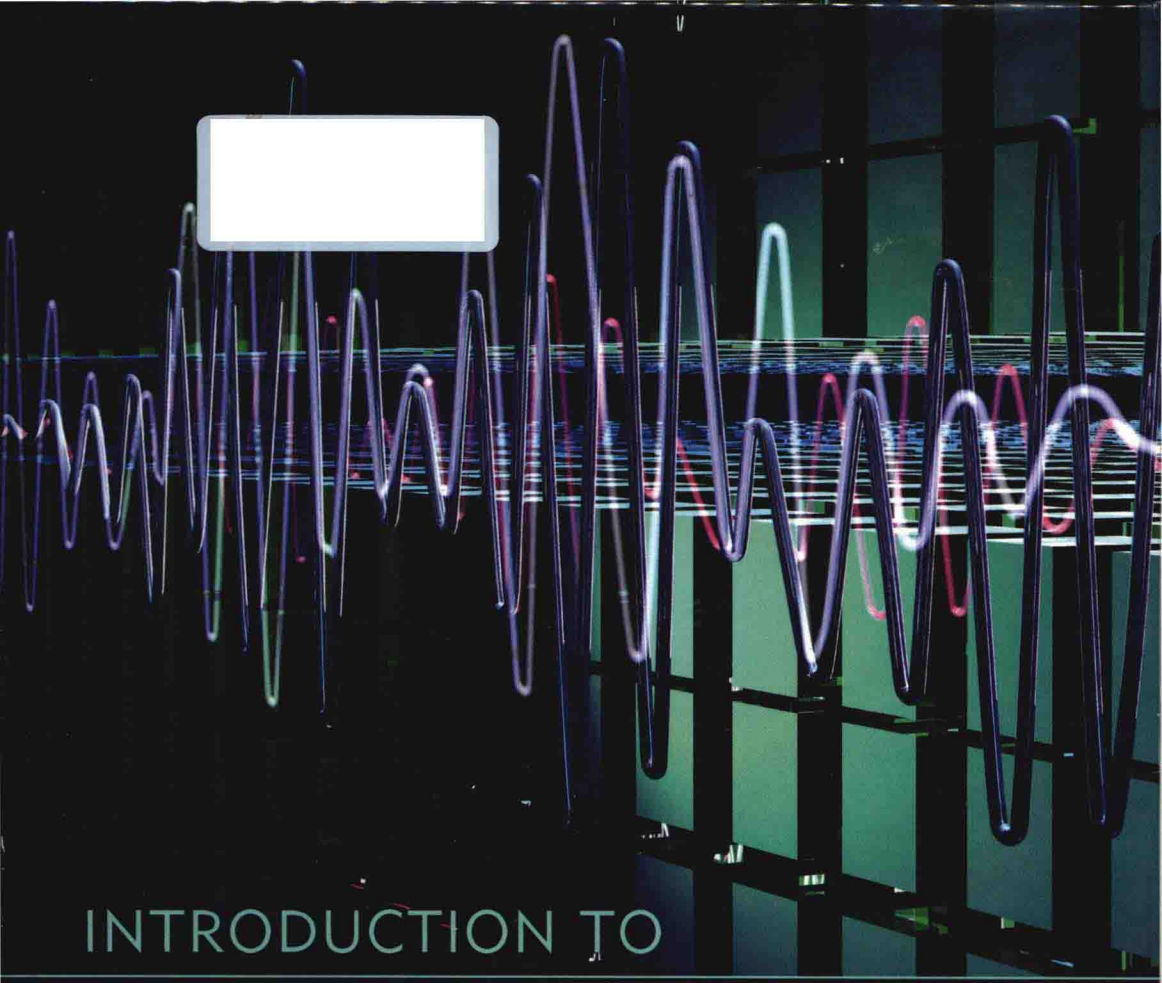

INTRODUCTION TO AUDIO ANALYSIS

A MATLAB APPROACH

THEODOROS GIANNAKOPOULOS | AGGELOS PIKRAKIS

MATLAB® examples

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Introduction to
AUDIO ANALYSIS:
A MATLAB Approach

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PREFACE

This book attempts to provide a gentle introduction to the field of audio analysis using the MATLAB programming environment as the vehicle of presentation. Audio analysis is a multidisciplinary field, which requires the reader to be familiar with concepts from diverse research disciplines, including digital signal processing and machine learning. As a result, it is a great challenge to write a book that can provide sufficient coverage of the important concepts in the field of audio analysis and, at the same time, be accessible to readers who do not necessarily possess the required scientific background.

Our main goal has been to provide a standalone introduction, involving a balanced presentation of theoretical descriptions and reproducible MATLAB examples. Our philosophy is that readers with diverse scientific backgrounds can gain an understanding of the field of audio analysis, if they are provided with basic theory, in conjunction with reproducible experiments that can help them deal with the theory from a more practical perspective. In addition, this type of approach allows the reader to acquire certain technical skills that are useful in the context of developing real-world audio analysis applications. To this end, we also provide an accompanying software library which can be downloaded from the companion site and includes the MATLAB functions and related data files that have been used throughout the text.

We believe that this book is suitable for students, researchers, and professionals alike, who need to develop practical skills, along with a basic understanding of the field. The book does not assume previous knowledge of digital signal processing and machine learning concepts, as it provides introductory material for the necessary topics for both disciplines. We expect that, after reading this book, the reader will feel comfortable with various key processing stages of the audio analysis chain, including audio content creation, representation, feature extraction, classification, segmentation, sequence alignment and temporal modeling. Furthermore, we believe that the study of the presented case studies will provide further insight into the development of real-world applications.

This book is the product of several years of teaching and research and reflects our teaching philosophy, which has been shaped via our interaction with our students and colleagues, and to whom we are both grateful. We

hope that the will prove useful to all readers who are making their first steps in the field of audio analysis. Although we have made an effort to eliminate errors during the writing stage, we encourage the reader to contact us with any comments and suggestions for improvement, in either the text or the accompanying software library.

Theodoros Giannakopoulos and Aggelos Pikrakis
Athens, 2013

For access to the software library and other supporting materials, please visit the companion website at: htpp://booksite.elsevier.com/9780080993881

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