CARDIOVASCULAR IMAGING AND IMAGE ANALYSIS

Edited by

AYMAN EL-BAZ | JASJIT S. SURI

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Dedication

With love and affection to my mother and father, whose loving spirit sustains me still

—Ayman El-Baz

To my late loving parents, immediate family, and children

—Jasjit S. Suri

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Preface

This book covers the novel strategy of the state-of-the-art approaches for automated non-invasive system for early cardiovascular disease diagnostics. Cardiovascular disease is the leading cause of death for people of most ethnicities in the United States, including African Americans, Hispanics, and whites. According to the American Heart Association, cardiovascular disease accounts annually for almost 801,000 deaths in the United States, which is about 1 of every 3 deaths. This means cardiovascular disease claims more lives each year than all forms of cancer. However, early detection of cardiovascular disease increases the chances of patients' survival.

Current non-invasive cardiovascular imaging includes ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), and computed tomography (CT). Today's CAD systems can analyze images from these different modalities for detecting cardiovascular disease and determining its aggressiveness. Generally, the CAD systems analyze the images in three steps: segmentation, description or feature extraction, and classification of the status.

The main aim of this book is to help advance scientific research within the broad field of early detection of cardiovascular disease. This book focuses on major trends and challenges in this area, and it presents work aimed at identifying new techniques and their use in biomedical image analysis.

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About the Editors

Ayman El-Baz is a professor, university scholar, and chair of the Bioengineering Department at the University of Louisville. Dr. El-Baz earned his bachelor's and master's degrees in electrical engineering in 1997 and 2001, respectively. He earned his doctoral degree in electrical engineering from the University of Louisville in 2006. In 2009, Dr. El-Baz was named a Coulter Fellow for his contributions to the field of biomedical translational research. Dr. El-Baz has 15 years of hands-on experience in the fields of bio-imaging modeling and noninvasive computer-assisted diagnosis systems. He has authored or coauthored more than 450 technical articles (105 journals, 15 books, 50 book chapters, 175 refereed-conference papers, 100 abstracts, and 15 U.S. patents).

Jasjit S. Suri is an innovator, scientist, visionary, industrialist, and internationally known world leader in biomedical engineering. Dr. Suri has spent more than 25 years in the field of biomedical engineering/devices and its management. He received his doctorate from University of Washington, Seattle, and his MBA from the Weatherhead School of Management, Case Western Reserve University, Cleveland. Dr. Suri was awarded the President's Gold Medal in 1980 and became a Fellow of the American Institute of Medical and Biological Engineering for his outstanding contributions in 2004.

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