
Preface

Mobile health (mHealth) is a rapidly developing concept that is defined as “mobile computing, medical sensor, and communication technologies for healthcare.” It is an emerging field based on the development and proliferation of mobile devices that have various sensors and significant computing power. mHealth offers promising approaches for medical and public health service delivery in low-resource settings, which should help to improve access to medical services for underserved populations globally. There are now mHealth applications for medical diagnostics, biodetection, in vitro diagnostics, imaging, and physiological measurements, including applications as diverse as accelerometers for quantifying Parkinson’s disease tremor to devices for aiding neurosurgery.

Objectives of the Book: The primary aim of this book is to help present the emerging field of mHealth by providing examples of work in this field. The book includes research manuscripts on several types of mHealth technologies along with their application in clinical medicine and medical research. The authors were encouraged to discuss their technologies in the context of the medical or research utility, and to address accuracy and speed of use.

Scope of the Book: The book describes mHealth technologies in three main mHealth areas: in vitro and environmental testing, physiological and anatomical measurements, and imaging. As a technology-oriented book, the chapters include technical information about materials, methods, and protocols including discussion of pitfalls and lessons learned by the developer in using the methods. The chapters also provide examples of the utility of each technology and discussion of potential for clinical and research applications.

Target Audience: This book is designed to make mHealth more accessible and understandable to engineers, medical professionals, molecular biologists, chemical, and physical science researchers developing mHealth technologies. We hope it will also be useful as a teaching tool for bioengineers, biomedical engineers, medical professionals, and biologists.

Book Organization: This book is divided into three parts: technologies for in vitro and environmental testing, mHealth technologies for physiological and anatomical measurements, and mHealth technologies for imaging. These are the most common areas targeted by mHealth applications. In each part, the chapters are arranged based on the specific clinical utility.

The section focused on mHealth technologies for sample analysis includes technologies for microbial analysis (detection of HIV, *Mycobacterium tuberculosis*, and Dengue and malaria-transmitting mosquitoes), cancer-related technologies, hematology, exposure to environmental compounds, and protocols on general detection methods relevant to mHealth such as microfluidics and lab-on-a-chip technologies. This section includes a broad range of technologies such as cytometry, immunological assays, optical and electrochemical detection, gas chromatography, and a variety of lab-on-a-chip and lab-on-paper assays.

The section on mHealth physiological and anatomical measurements includes chapters on heart rate and sounds (stethoscopy), measuring body vital signs, monitoring essential

and pathological tremors and Parkinson's disease, EEG and sleep disorders, and a mobile device application for surgery support.

The section on mHealth imaging technologies includes chapters on cervical cancer and skin cancer analysis and the imaging technologies of microendoscopy and skin lesion imaging.

We would like to express our thanks and gratitude to the authors whose hard work and excellent contributions are helping make mHealth technologies more accessible to clinicians, engineers, and researchers. We appreciate the authors' time and especially their patience during a long and arduous review process.

Our hope is that mHealth will play an instrumental role in improving access to medical procedures including early detection, diagnostics, and treatment through the development of new portable and accessible devices, and that this will lead to improved health technologies.

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