

APPLICATIONS OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN HEALTH SCIENCES

Editors

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Öğr. Gör. Dr. Erkan ÖZBAY

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Macit KALÇIK - Lütfü BEKAR

E-ISBN: 978-625-382-330-6

DOI: 10.54637/vizetek.9786253823306

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Bu kitap, elektronik (e-kitap) formatlarında yayımlanmaktadır.

Kitap içeriğinin tüm sorumluluğu yazar(lar)ına aittir.

Yayın Tasarımcısı / Koordinatörü: Büşra KULAKSIZ

Dizgi & Mizanpaj: Zeynep ERTUĞRUL

Kapak Tasarımı: Ahmet TUNÇDEMİR

Yayım: Ankara | Haziran, 2026

Materyal Türü: Elektronik Kitap (Çevrim içi / Web tabanlı)

Elektronik Yayın Formatı: PDF

Elektronik Yayın Tipi: Adobe Ebook Reader



Seyranbağları Mah. İncesu Cad. 10/2 Çankaya/ANKARA

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Yayıncı Sertifika No: 41575

PREFACE

Artificial intelligence and machine learning are gaining a more visible place in health sciences. This development offers new possibilities in measurement, imaging, sound analysis, drug dose management, clinical decision support, and molecular-level computation. However, every model used in health does not directly mean clinical trust. The value of an artificial intelligence output should be evaluated through the quality of the data used, the accuracy of the measurement method, the validity of the model, and its relationship with clinical interpretation.

The aim of preparing this book is to examine artificial intelligence and machine learning applications in health sciences with a strong scientific basis, away from exaggerated promises. Artificial intelligence is examined here not as an independent clinical authority, but as a field of methods that processes measurable data and supports expert evaluation. This distinction is especially important. Because artificial intelligence in health gains meaning only with correct data, clear methods, and controllable results.

The chapters in this book show how different data types in health sciences are processed and how meaningful results can be produced from these data. Anthropometric measurements, acoustic signals, clinical and genetic variables, pharmacological data, and molecular-level computational models form the scientific basis of the book. The common point of these fields is that the use of artificial intelligence cannot be considered independent of measurement. The success of the model first depends on the reliability of the measurement. For this reason, the relationship between method, data, source of error, and clinical interpretation is especially emphasized in the book.

The development of artificial intelligence applications in health sciences provides important opportunities for researchers and clinicians. However, the limits of these systems should be clearly known. A classification result, a prediction value, or a decision support output gains scientific value only with suitable validation, clear reporting, and expert evaluation. The approach adopted in this book is also based on this principle. Artificial intelligence is a powerful tool, but in the field of health, it is not sufficient without reliability, clarity, and responsibility.

The studies included in this work were prepared with the contributions of expert physicians, academics, and researchers in their fields. The chapters

consider the measurement principles and method limits required by their own scientific fields. In this way, the book aims to examine artificial intelligence and machine learning applications in health sciences within clinical and scientific reality, without separating them from technical detail.

We hope that this book will be a useful source for researchers working in medicine, health sciences, biomedical engineering, physiology, pharmacology, clinical decision support systems, and computational biology. The reliable progress of artificial intelligence applications in health will be possible only with scientific care, measurable data, and responsible use principles. This book was prepared to contribute to this understanding.

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