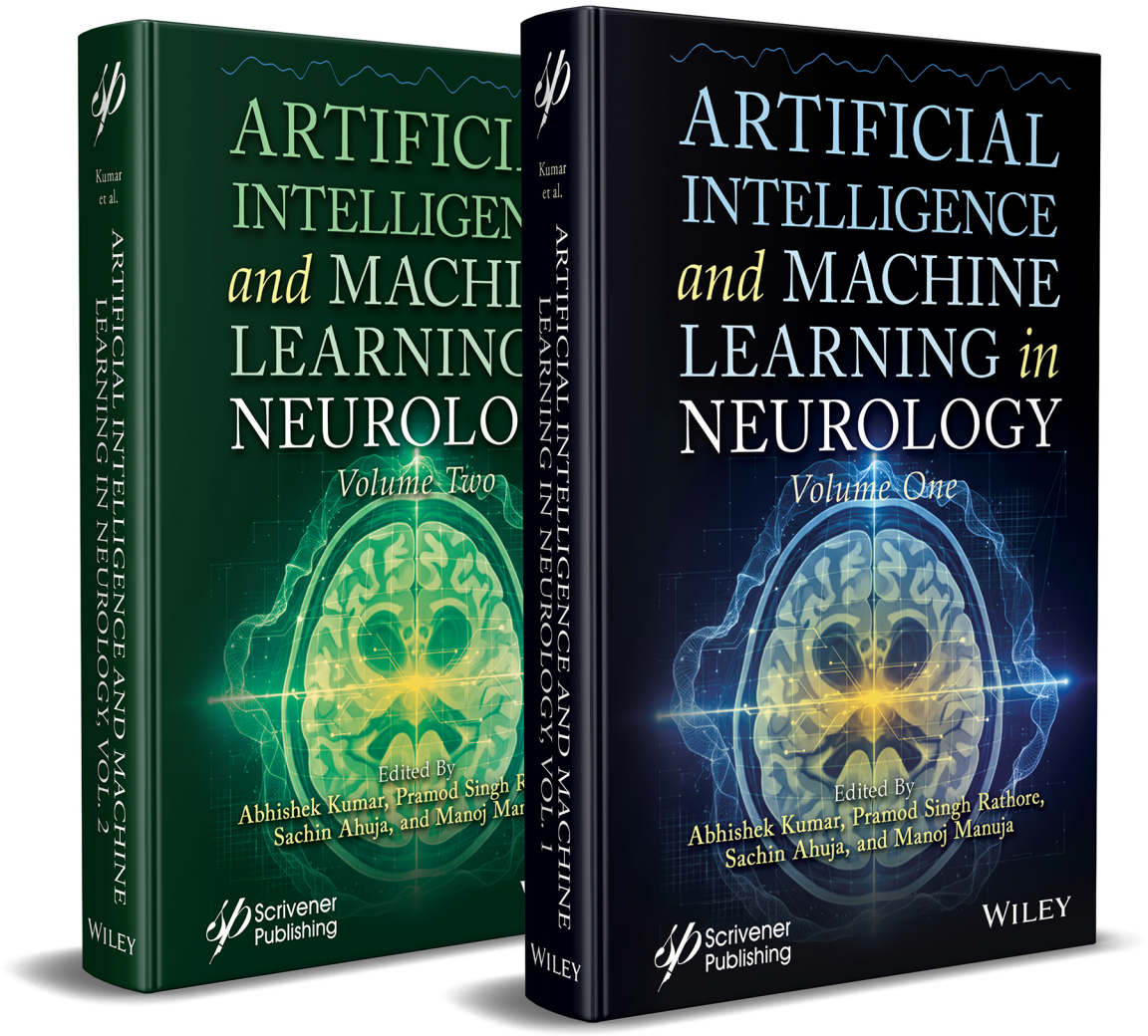
Kumar et al.
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN NEUROLOGY, VOL. 2
WILEY
ARTIFICIAL INTELLIGENCE and MACHINE LEARNING NEUROLOGY
Volume Two
Edited By
Abhishek Kumar, Pramod Singh Rathore,
Sachin Ahuja, and Manoj Manuja
Scrivener Publishing
Kumar et al.
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN NEUROLOGY, VOL. 1
WILEY
ARTIFICIAL INTELLIGENCE and MACHINE LEARNING in NEUROLOGY
Volume One
Edited By
Abhishek Kumar, Pramod Singh Rathore,
Sachin Ahuja, and Manoj Manuja
Scrivener Publishing
WILEY

Artificial Intelligence and Machine Learning in Neurology

Scrivener Publishing
100 Cummings Center, Suite 541J
Beverly, MA 01915-6106

Publishers at Scrivener
Martin Scrivener (martin@scrivenerpublishing.com)
Phillip Carmical (pcarmical@scrivenerpublishing.com)

Artificial Intelligence and Machine Learning in Neurology

Volume 1

Edited by

Abhishek Kumar

Pramod Singh Rathore

Sachin Ahuja

and

Manoj Manuja

WILEY

This edition first published 2026 by John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA and Scrivener Publishing LLC, 100 Cummings Center, Suite 541J, Beverly, MA 01915, USA

For more information about Scrivener publications please visit www.scrivenerpublishing.com.

Wiley Global Headquarters
111 River Street, Hoboken, NJ 07030, USA

For details of our global editorial offices, customer services, and more information about Wiley products visit us at www.wiley.com.

The manufacturer's authorized representative according to the EU General Product Safety Regulation is Wiley-VCH GmbH, Boschstr. 12, 69469 Weinheim, Germany, e-mail: Product_Safety@wiley.com.

Library of Congress Cataloging-in-Publication Data

ISBN 9781394428892

Cover image: Generated with AI using Adobe Firefly
Cover design by Russell Richardson

Set in size of 11pt and Minion Pro by Manila Typesetting Company, Makati, Philippines

Printed in the USA

10 9 8 7 6 5 4 3 2 1

Contents

Brief Contents of Volume 2

Preface

The rapid advancement of artificial intelligence (AI) in healthcare has transformed the landscape of medical practice, research, and diagnostics. As healthcare systems worldwide strive to enhance precision, accessibility, and efficiency, the integration of AI and machine learning technologies has become a cornerstone of modern medical innovation. From personalized treatment strategies to predictive analytics and secure data management, the potential of AI-driven healthcare solutions is unprecedented. This book presents a comprehensive exploration of cutting-edge AI applications in healthcare, addressing ethical frameworks, secure data exchange, predictive analytics, and chronic disease management.

The book begins by examining the critical ethical and legal considerations in deploying AI within healthcare environments, emphasizing the importance of responsible data usage and patient privacy. With increasing reliance on AI to make critical medical decisions, it is essential to address bias mitigation, fairness, and data governance, while ensuring compliance with regulatory standards. By exploring diverse perspectives from genetic, epidemiological, and clinical viewpoints, this book lays the foundation for understanding the complexities of ethical AI deployment.

A significant focus of the book is the implementation of secure and interoperable healthcare data systems. In an era where patient data security is paramount, blockchain-enabled ecosystems and cybersecurity frameworks are crucial to safeguarding medical information. Several chapters delve into the role of blockchain technology in maintaining data integrity and enabling secure health data exchange. These discussions highlight how decentralized technologies are shaping the future of secure healthcare management.

The transformative power of AI in chronic disease management is also a central theme. Chapters dedicated to diabetes management, heart disease monitoring, and personalized care showcase how AI-driven predictive models can improve patient outcomes. The book also explores wearable healthcare technologies and telehealth solutions, which have gained immense relevance in remote patient monitoring and chronic disease intervention.

Moreover, the book addresses the growing role of machine learning algorithms and natural language processing (NLP) in early diagnosis and chronic disease management. By integrating innovative computational techniques with healthcare applications, the chapters provide valuable insights into predictive analytics and data-driven decision-making.

The book concludes with forward-looking chapters on the future of AI in healthcare, highlighting the potential for augmented reality in telemedicine and the development of intelligent neuro health systems. The inclusion of cognitive computing and neurobiology underscores the profound impact of AI on brain health and rehabilitation.

We extend our gratitude to the contributors whose expertise and dedication have shaped this volume. Their commitment to advancing AI-driven healthcare solutions reflects a collective effort to bridge the gap between cutting-edge technology and medical practice. We also acknowledge the continued efforts of researchers and practitioners worldwide who are pushing the boundaries of innovation in this dynamic field.

This book is organized into 36 chapters. Chapter 1 discusses the epidemiology. Artificial intelligence (AI) could change how diseases are tracked, outbreaks are found, and public health measures are taken. AI-powered models can look at large datasets to find patterns and trends in how diseases are spreading. This helps shape public health policies and programs. Using AI in epidemiology, on the other hand, brings up ethics issues about data protection, informed agreement, and the chance that algorithms will make biased decisions. Transparency, responsibility, and fairness should be at the top of ethical guidelines for AI in epidemiology.

In Chapter 2, the first part of the chapter talks about basic moral concepts that should lead the creation and use of AI technologies in healthcare. These include beneficence, nonmaleficence, liberty, and justice. The article then talks about specific problems that come up when AI is used in urology and gastroenterology. These problems include worries about data privacy and security, the fairness and bias of AI algorithms, and how to use AI in clinical practice.

In Chapter 3, AI has the potential to improve patient outcomes, enhance diagnoses, and streamline healthcare, but biased systems can lead to unfair treatment of specific groups. Bias can stem from skewed training data, flawed algorithm design, and systemic inequalities in healthcare. To address these issues, a multifaceted approach is needed. This includes using diverse, representative training data, transparent algorithm design, and regular audits to detect and correct biases. Incorporating fairness checks during development can help identify flaws early.

Also of Interest

Check out these other related titles from Scrivener Publishing

Artificial Intelligence in Healthcare for the Elderly, Edited by Sandeep Sharma, Preeti Nagrath, Bhawna Singla, and Joel J.P.C. Rodrigues, ISBN: 9781394275366. *Artificial Intelligence in Healthcare for the Elderly* provides valuable insights into how artificial intelligence can transform healthcare through personalized monitoring, ethical considerations, and real-world applications.

Design and Forecasting Models for Disease Management, Edited by Pijush Dutta, Sudip Mandal, Korhan Cengiz, Arindam Sadhu, and Gour Gopal Jana, ISBN: 9781394234042. The book provides an essential overview of AI techniques in disease management and how these computational methods can lead to further innovations in healthcare.

Smart Hospitals: 5G, 6G, and Moving Beyond Connectivity, Edited by Arun Kumar, Manoj Gupta, Sanjeev Sharma, Er. Himanshu Sharma, and Khursheed Aurangzeb, ISBN: 9781394275441. Discover the potential of 5G, 6G, and smart hospitals beyond connectivity in Smart Hospitals: 5G, 6G, and Moving Beyond Connectivity and learn how these advancements are revolutionizing healthcare and the digital world.

Sustainable Nanomaterials for Treatment and Diagnosis of Infectious Diseases, Edited by Rajasekhar Chokkareddy, Suvardhan Kanchi and Gan G. Redhi, ISBN: 9781394200016. The book focuses on the design and novel synthetic routes of sustainable nanomaterials in diagnosing and treating infectious diseases offering potential benefits in terms of efficiency, biocompatibility, and environmental impact.

Federated Intelligent System for Healthcare: A Practical Guide, Edited by S. Rakesh Kumar, N. Gayathri and Seifedine Kadry, ISBN: 9781394271351. This practical guide gives valuable insights for integrating advanced technologies in healthcare, empowering researchers to effectively navigate and implement federated systems to enhance patient care.

Internet of Medicine for Smart Healthcare, Edited by Abhishek Kumar, Narayan Vyas, Pramod Singh Rathore, Abhineet Anand, and Pooja Dixit, ISBN: 9781394272235. This book provides in-depth explanations and discussions of the latest applications of AI, machine learning, and the Internet of Medicine, offering readers the cutting edge on this rapidly growing technology that has the potential to transform healthcare and improve patient outcomes.

Viral Vectors for Vaccine Delivery, Edited by Vivek Chavda and Vasso Apostolopoulos, ISBN: 9781394271535. The book is essential for anyone interested in vaccine development, as it highlights the unique advantages of viral vector vaccines in triggering robust, long-lasting immunity and provides an in-depth exploration of the technology and advancements shaping the future of healthcare.

Artificial Intelligence and Cybersecurity in Healthcare, Edited by Rashmi Agrawal, Pramod Singh Rathore, Ganesh Gopal Devarajan, and Rajiva Ranjan Divivedi, ISBN: 9781394229796. *Artificial Intelligence and Cybersecurity in Healthcare* offers a vital exploration of the intersection of artificial intelligence and cybersecurity within healthcare Cyber Physical Systems, equipping readers with knowledge on how to navigate the transformative yet complex technological landscape shaping modern patient care and data protection.

Explainable Artificial Intelligence in the Healthcare Industry, Edited by Abhishek Kumar, T. Ananth Kumar, Prasenjit Das, Chetan Sharma, and Ashutosh Kumar Dubey, ISBN: 9781394249268. Discover the essential insights and practical applications of explainable AI in healthcare that will empower professionals and enhance patient trust with Explainable AI in Healthcare, a must-have resource for anyone looking to navigate the future of medical practices with confidence.

Role of Flavonoids in Chronic Metabolic Diseases: From Bench to Clinic, Edited by Neeraj Mishra, Sumel Ashique, B.H. Jaswanth Gowda, Arshad Farid, Ashish Garg, ISBN: 9781394238040. This comprehensive volume covers the entire field of flavonoids by explaining their complex functions in reducing chronic metabolic illnesses, from the early stages of laboratory research to the development of therapeutic uses.