

ARTIFICIAL INTELLIGENCE IN HEALTHCARE SYSTEMS

Clinical Diagnostics, Infectious Disease Insights and Decision Support.



Dr. S. I. Saheed Askar

Artificial Intelligence in Healthcare Systems: Clinical Diagnostics, Infectious Disease Insights, and Decision Support



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Artificial Intelligence in Healthcare Systems: Clinical Diagnostics, Infectious Disease Insights, and Decision Support

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Preface

The rapid advancement of Artificial Intelligence (AI) has ushered in a new era in healthcare, transforming the way diseases are diagnosed, treated, and managed. This book, *Artificial Intelligence in Healthcare Systems*, has been developed with the objective of providing a comprehensive, academically rigorous, and practically relevant understanding of the role of AI in modern medicine.

Healthcare systems across the globe are experiencing a paradigm shift—from traditional, reactive approaches to proactive, data-driven, and personalized models of care. As highlighted in the early chapters, the evolution of AI in medicine has progressed from rule-based expert systems to advanced machine learning and deep learning frameworks capable of analyzing complex clinical data with remarkable precision.

This book explores key domains including machine learning, deep learning, natural language processing, clinical decision support systems, healthcare data management, and ethical considerations. It also emphasizes the integration of AI technologies with clinical practice, highlighting both opportunities and challenges such as data privacy, algorithmic bias, and interpretability.

The content is structured to cater to a diverse audience, including healthcare professionals, researchers, students, and policymakers. Each chapter is designed to build a foundational understanding while also addressing advanced concepts and emerging trends.

In an era where data is becoming as critical as clinical expertise, this book aims to bridge the gap between technological innovation and medical practice. It seeks to equip readers with the knowledge required to understand, evaluate, and effectively utilize AI in healthcare settings.

It is my hope that this book will serve as a valuable resource for those interested in exploring how artificial intelligence can enhance patient care, improve diagnostic accuracy, and contribute to the development of efficient and equitable healthcare systems.

Acknowledgement

The completion of Artificial Intelligence in Healthcare Systems has been made possible through the support, guidance, and encouragement of many individuals and institutions.

First and foremost, I express my sincere gratitude to all the researchers, clinicians, and scholars whose pioneering work in artificial intelligence and healthcare has inspired and informed this book. Their contributions have laid the foundation for the ideas and discussions presented in this work.

I am deeply thankful to my academic colleagues and professional peers for their valuable insights, constructive feedback, and continuous encouragement throughout the development of this manuscript. Their interdisciplinary perspectives have greatly enriched the quality and depth of this book.

I also extend my appreciation to the institutions and organizations that have supported research in healthcare innovation and digital transformation. Their commitment to advancing knowledge has been instrumental in shaping the evolving landscape of AI in medicine.

Special thanks are due to the healthcare professionals and data scientists who are working tirelessly to implement AI solutions in real-world clinical settings. Their dedication to improving patient care serves as a constant source of motivation.

I would like to acknowledge the support of the publishing team for their professionalism, patience, and guidance in bringing this work to completion.

Finally, I express my heartfelt gratitude to my family for their unwavering support, understanding, and encouragement throughout this journey. Their belief in my work has been a constant source of strength.

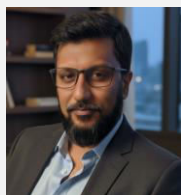
This book is a collective reflection of the efforts, knowledge, and inspiration drawn from many contributors to the field of healthcare and artificial intelligence.

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ABOUT THE AUTHOR



Dr. S. I. Saheed Askar is a distinguished medical professional, academician, and researcher with a specialized interest in the integration of artificial intelligence into healthcare systems. Hailing from Ramanathapuram District, Tamil Nadu, India, he completed his schooling at Schwartz Matriculation Higher Secondary School and Syed Ammal Higher Secondary School, Ramanathapuram. He pursued his M.B.B.S. (2004 Batch) at Yenepoya Medical College, Mangalore, under Rajiv Gandhi University of Health Sciences, Bangalore. Driven by a passion for medical science and public service, he joined the Tamil Nadu Government Medical Service in 2012. He later completed his M.D. in Microbiology (2018 Batch) from Tirunelveli Medical College, Tamil Nadu. Dr. Saheed Askar currently serves as an Assistant Professor in the Department of Microbiology at Government Medical College, Ramanathapuram. His academic and clinical expertise spans diagnostic microbiology, infectious diseases, and emerging technological innovations in medicine. He has done Fellowship in Infectious Diseases through medvarsity accredited by British Accreditation Council (BAC) and the school of population health, University of New South Wales (UNSW) – Medicine and Health, Sydney, Australia, Advanced Postgraduate Diploma (Fellowship) in Hospital Infection Prevention and Control Management by National Health Care Academy (NHCA), Singapore and Fellowship Certification Course in Infectious Diseases (FCID) in Cohort 5 in Indian Medical Association (IMA) College of General Practitioners (CGP). A forward-thinking researcher, he has authored eight impactful research publications focusing on Artificial Intelligence in Clinical Microbiology, published in reputed EMBASE, Scopus, and PubMed indexed journals. His work emphasizes the application of AI in rapid diagnostics, antimicrobial resistance prediction, clinical decision support systems, and precision infectious disease management. Further strengthening his interdisciplinary expertise, he has completed a Postgraduate Diploma in Artificial Intelligence & Machine Learning from the Indian Council for Technical Research and Development, along with a certification in Generative AI through upGrad in collaboration with Microsoft. Dr. Saheed Askar is currently pursuing his Ph.D. in Infectious Diseases, with a research focus on Artificial Intelligence in Infectious Disease Diagnostics, at Dunster University, Switzerland. His doctoral work aims to bridge the gap between advanced computational tools and real-world clinical applications, particularly in resource-limited healthcare settings. As the author of “Artificial Intelligence in Healthcare Systems”, Dr. Saheed Askar brings together his clinical acumen and technological insight to present a comprehensive perspective on the transformative role of AI in modern medicine. Through his contributions, Dr. Saheed Askar aspires to empower healthcare professionals, researchers, and policymakers to harness the potential of artificial intelligence in improving patient care, enhancing diagnostic accuracy, and shaping the future of global health systems.

ABOUT THE BOOK

Artificial Intelligence in Healthcare Systems provides a concise overview of how AI is transforming modern healthcare. It covers key applications such as diagnostics, treatment planning, clinical decision support, and healthcare management, along with core technologies like machine learning, deep learning, and natural language processing.

The book uniquely highlights the growing role of AI in diagnostic microbiology, including automated microscopy, culture analysis, genomic diagnostics, and antimicrobial resistance prediction, demonstrating how AI enhances diagnostic accuracy and laboratory efficiency.

It also explores the importance of healthcare data—such as electronic health records, medical imaging, and genomics—in building intelligent systems, along with applications in personalized medicine, drug discovery, telemedicine, and remote monitoring.

Authored by Dr. S. I. Saheed Askar, the book integrates clinical expertise with technological insight, making it a valuable resource for professionals, researchers, and policymakers interested in the future of healthcare.



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