

**ARTIFICIAL
INTELLIGENCE:
MULTIDISCIPLINARY
STANCE AND
APPLICATIONS**

ARTIFICIAL INTELLIGENCE: MULTIDISCIPLINARY STANCE AND APPLICATIONS

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Foreword

The book “Artificial Intelligence: Multidisciplinary Stance and Applications” is a collective scholarly effort that brings together valuable insights from academicians, researchers and practitioners belonging to diverse disciplines. The volume reflects the rapidly expanding role of Artificial Intelligence (AI) in transforming not only scientific and technological domains but also the humanities, commerce, management, governance, and social sciences.

Artificial Intelligence has emerged as one of the most revolutionary developments of the twenty-first century. Its influence extends far beyond automation and computational efficiency, shaping the way societies function, businesses operate, scientific discoveries are made, and human creativity evolves. The chapters included in this volume explore a broad spectrum of themes that demonstrate the multidimensional applications of AI. As AI continues to disrupt traditional business models and redefine operational strategies across sectors, this book brings together diverse perspectives that critically examine its potential, implications, and future trajectory. AI is expected to bring attractive and profitable opportunities to various industries of India. But its effective use and its contribution should be implemented into action in a well-planned approach. This book will provide the collective insights of prominent industry leaders, researchers, academicians on how businesses can prepare for the future through innovation, sustainability, and global transformation. Furthermore, this volume bridges cutting-edge research with practical applications to offer actionable strategies for navigating an increasingly complex global marketplace. By fostering interdisciplinary perspectives and sharing rigorous empirical research, this volume proposes forward-thinking solutions designed to guide businesses toward a resilient, responsible, and globally integrated future.

AI-enabled tools are significantly transforming the process of knowledge creation by supporting literature review, predictive analysis, intelligent data processing, and research efficiency. This edited book aims to provide readers with a comprehensive understanding of the opportunities, challenges, ethical concerns, and future prospects associated with artificial intelligence. By integrating theoretical perspectives with practical applications, the volume serves as a valuable resource for scholars, students, policymakers, industry professionals, and researchers interested in understanding the interdisciplinary dimensions of AI.

I sincerely appreciate the efforts of all contributors who have shared their valuable research and intellectual insights in this volume. Their scholarly

contributions have enriched the quality and diversity of this book. I commend the editors Dr. Aanchal Arora, HOD, Department of Chemistry, Khalsa College for Women, Civil Lines Ludhiana, Dr. Khushdip Kaur, Associate Professor, PG Department of Commerce, Khalsa College for Women, Civil Lines Ludhiana and Dr. Isha Dudeja, Assistant Professor, Department of Chemistry, Khalsa College for Women, Civil Lines, Ludhiana and contributors of the book for their rigorous and thoughtful engagement with this important subject. I am confident that this book will encourage deeper inquiry, interdisciplinary collaboration, and critical thinking regarding the transformative role of artificial intelligence in academic research, policy discussions, and practical advancements in the fields of science, humanities, commerce, and management.

Prof. Parmjit Kaur

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Chapter 1

ARTIFICIAL INTELLIGENCE IN BIOTECHNOLOGY: TRANSFORMING SCIENCE IN THE DATA ERA

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Abstract

Artificial intelligence (AI) has significantly reformed human life and scientific research, making the world more digital. In biology, the “AI Revolution” has shifted the field from observational to a predictive and programmable engineering science. By merging AI with biology, researchers are able to handle the “complexity crisis” in biological data that easily surpass human analysis. Deep learning, machine learning and data science, are widely used to understand, model and work with biological systems. Biotechnology plays a huge role in the development of products and technologies that enhance our lives by utilizing the biological systems, organisms and biomolecules. The large and complex data generated is processed with the support of AI swiftly and cost effectively. Biotechnology has wider applications in pharmaceuticals, agriculture, industrial enzymes, diagnostics and environmental solutions. One of the most important developments by the use of AI in biotechnology is the ability to predict protein structures, accelerates manufacturing of antibodies and enzymes and improves drug design. AI has also helped to quickly produce mRNA vaccines by analyzing viral genome sequences and optimizing mRNA codons. AI-powered biosensors are improving food safety, environmental monitoring and medical diagnostics. Other areas where AI is making a difference include agricultural