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Nota di contenuto	Intro -- Preface -- Objective of the Book -- Contents -- Editors and Contributors -- Chapter 1: The Contribution of Artificial Intelligence to Drug Discovery: Current Progress and Prospects for the Future -- 1.1 Introduction -- 1.2 Historical Evolution of Drug Discovery -- 1.3 Fundamentals of Artificial Intelligence in Drug Discovery -- 1.4 Data-centric Approaches in Artificial Intelligence for the Field of Drug Discovery -- 1.5 Data-driven Approaches in AI for Drug Discovery -- 1.6 Hurdles and Prospects in Artificial Intelligence for the Field of Drug Discovery -- 1.6.1 Navigating Challenges and Embracing Prospects in AI-driven Drug Discovery -- 1.6.2 Pinpointing Bottlenecks in Traditional Drug Discovery -- 1.6.3 Untangling AI Implementation Challenges -- 1.6.4 Glimmers of Possibilities Unleashed by AI -- 1.6.5 A New Dawn in Drug Discovery -- 1.7 Case Study: AlphaFold´s Acceleration in Drug Discovery -- 1.7.1 Significance of AlphaFold -- 1.7.1.1 Mathematical Mastery Behind AlphaFold´s Prognostic Abilities -- 1.7.2 Elevating Drug Discovery: The AlphaFold Impact on CDK20 Inhibitor Discovery -- 1.7.3 AlphaFold´s Multi-dimensional Drug Discovery Impact -- 1.7.4 Navigating Challenges and Seizing Opportunities -- 1.7.5 The Eclipsing Horizon -- 1.8 AI in the Era of Pandemics: Case of COVID-19 -- 1.8.1 Overview of the COVID-19 Pandemic -- 1.8.2 AI´s Crucial Role in Drug Discovery and Vaccine

Development -- 1.8.3 Leveraging Mathematical Models for Drug Prediction -- 1.8.4 A Glimpse into the Future -- 1.9 Deep Learning in Antibiotic Discovery -- 1.10 AI Techniques in Antibiotic and Antiviral Development -- 1.11 Applications of AI in Drug Discovery -- 1.11.1 Target Identification and Validation -- 1.11.2 Compound Screening and Design -- 1.11.3 Clinical Trial Optimization -- 1.11.4 Concrete Examples of AI´s Impact -- 1.12 The Future of AI in Drug Discovery. 1.12.1 Emerging AI Techniques in Drug Discovery -- 1.12.2 The Potential of Personalized Medicine via AI -- 1.12.3 Predictive Mathematical Models Shaping Drug Discovery´s Future -- 1.13 Conclusion -- 1.13.1 Revolutionizing Microbial Drug Discovery with Artificial Intelligence -- 1.13.2 Anticipating Future Trends and Breakthroughs -- 1.13.3 Potential Breakthroughs Envisioned by AI -- References -- Chapter 2: Prediction of Plant Disease Using Artificial Intelligence -- 2.1 Introduction -- 2.2 Fundamentals of Plant Disease Diagnosis -- 2.2.1 Plant Disease Types -- 2.2.2 Symptoms and Signs -- 2.2.3 Conventional Diagnostic Techniques -- 2.2.4 Limitations of Traditional Methods -- 2.2.5 Need for AI-driven Innovative Methods -- 2.3 Role of Artificial Intelligence in Plant Disease Diagnosis -- 2.3.1 AI: Changing the Diagnosis of Plant Disease -- 2.3.2 Disease Diagnosis Based on Images -- 2.3.3 Sensor Data and Disease Forecasting -- 2.4 AI´s Advantages in Plant Disease Diagnosis -- 2.4.1 Early Disease Detection and Prevention -- 2.4.2 Accuracy and Scalability -- 2.4.3 Reduced Dependence on Chemicals -- 2.4.4 Improved Decision-making Capability -- 2.5 Barriers to Implementing AI Techniques in Plant Disease Diagnosis -- 2.5.1 Data Accuracy -- 2.5.2 Model Interpretability -- 2.5.3 Infrastructure and Accessibility -- 2.6 Current Trends in AI Involvement in Plant Disease Diagnostics -- 2.7 Data Collection and Pre-processing -- 2.8 The Significance of Data Quality -- 2.9 Data Sources -- 2.10 Techniques for Pre-processing Data -- 2.10.1 Data Augmentation -- 2.10.2 Standardization and Normalization -- 2.10.3 Feature Extraction -- 2.10.4 Balancing Classes -- 2.11 Data Collection and Pre-processing Challenges -- 2.11.1 Labeling Complexity -- 2.11.2 Imbalanced Data -- 2.11.3 Data Access and Privacy -- 2.11.4 Environmental Variability.
2.12 Building and Training AI Models -- 2.12.1 Comparative Analysis of Choosing Appropriate AI Algorithms for Plant Disease Diagnosis -- 2.12.2 Convolutional Neural Networks (CNN) -- 2.12.3 Random Forests -- 2.12.4 Factors Affecting Algorithm Selection -- 2.12.4.1 Data Accessibility -- 2.12.4.2 Interpretability -- 2.12.4.3 Computing Power -- 2.12.4.4 Real-time Requirements -- 2.13 Image-based Plant Disease Diagnosis -- 2.13.1 Data Pre-processing and Training AI Models -- 2.13.2 Systematic Algorithm for Image-based Disease Diagnosis -- 2.14 Model Evaluation -- 2.15 Sensor Data-based Disease Diagnosis -- 2.16 Future Directions and Innovations -- 2.16.1 Explicit AI for Interpretability -- 2.16.2 Fusion of Multi-modal Data -- 2.16.3 Limited Transfer Learning with Data -- 2.16.4 Active Learning Techniques -- 2.16.5 Distributed Learning for Decentralized Data -- 2.17 Integration of AI for Plant Disease Diagnosis Using Robotics, Drones, and Automated Farm Equipment -- 2.17.1 Robotics for Precision Plant Inspection -- 2.17.2 Aerial Surveillance Using Drones -- 2.17.3 Autonomous Farm Machinery for Personalized Care -- 2.17.4 Analyzing Real-time Data -- 2.17.5 Improved Disease Surveillance -- 2.18 AI Revolutionizing Sustainable Farming Methods and Precision Agriculture -- 2.19 Conclusion -- References -- Chapter 3: Computer Vision-based Remote Care of Microbiological Data Analysis -- 3.1 Introduction -- 3.2 The Role of Computer Vision -- 3.2.1 Automatization of Microorganism Identification -- 3.2.2 Classification