

1. Record Nr.	UNINA9911025992103321
Autore	Gayathri N
Titolo	Generative AI : Disruptive Technologies for Innovative Applications
Pubbl/distr/stampa	Newark : , : John Wiley & Sons, Incorporated, , 2025 ©2025
ISBN	1-394-30291-6 1-394-30293-2
Edizione	[1st ed.]
Descrizione fisica	1 online resource (291 pages)
Altri autori (Persone)	KumarS. Rakesh ChandranRamesh RajPethuru PelusiDanilo
Disciplina	006.3
Soggetti	Artificial intelligence
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Cover -- Series Page -- Title Page -- Copyright Page -- Contents -- Preface -- Chapter 1 Introduction to Generative AI -- 1.1 What is Generative AI -- 1.2 Difference Between AI, Machine Learning and Generative AI -- 1.3 History of Generative AI -- 1.4 Key Milestones and Continued Progress -- 1.4.1 Generative Adversarial Networks (GANs) -- 1.4.2 Variational Autoencoders (VAEs) -- 1.4.3 Autoregressive Models -- 1.4.4 Transformer Models -- 1.4.5 Recurrent Neural Networks and Long Short-Term Memory Networks -- 1.4.6 Energy-Based Models (EBMs) -- 1.4.7 Flow-Based Models -- 1.4.8 Diffusion Models -- 1.5 Exploring the Inner Workings of Generative AI: Understanding Large Language Models (LLMs) -- 1.6 LLMs vs. Generative AI -- 1.7 The Impact and Future of LLMs -- 1.8 Benefits of Generative AI -- 1.9 Risks of Generative AI -- 1.10 Evaluating Generative AI Models -- 1.11 Technical Challenges and Limitations of Gen AI -- 1.11.1 Continual Reliance on Data -- 1.11.2 Hallucinations -- 1.11.3 Lack of Creativity -- 1.11.4 Ethics and Privacy -- 1.12 Real Life Use Case of Gen AI -- 1.13 Conclusion -- References -- Chapter 2 Generative Adversarial Networks (GANs) -- 2.1 Introduction -- 2.2 Tale of Two Minds: Unveiling the GAN Mechanism -- 2.2.1 Origins -- 2.2.2

Foundational Concepts of Generative Adversarial Network -- 2.2.3 The Discriminator -- 2.2.3.1 Theoretical Understanding -- 2.2.3.2 Objectives and Functionality -- 2.2.3.3 Mathematical Formulation -- 2.2.4 The Generator -- 2.2.4.1 The Generator's Objective and Mathematical Formulation -- 2.2.4.2 Creative Dynamics of the Generator -- 2.2.5 Adversarial Training -- 2.2.5.1 Fundamental Principles of Adversarial Training -- 2.2.5.2 Training Dynamics in Adversarial Training -- 2.2.5.3 Adversarial Training Application -- 2.2.5.4 Difficulties and Restrictions -- 2.2.5.5 Future Paths and Prospects for Research.

2.3 From Brushstrokes to Breakthroughs: Diverse Canvas of GAN Applications -- 2.3.1 Dreaming Up New Worlds: Aesthetic Mastery -- 2.3.1.1 Mastery of Aesthetics Using GANs -- 2.3.1.2 Improving Realism -- 2.3.2 Data Augmentation -- 2.3.2.1 GAN-Based Enrichment of Data -- 2.3.2.2 Cross-Domain Applications -- 2.3.3 Unsupervised Learning -- 2.3.3.1 GANs in Unsupervised Learning -- 2.4 Challenges and Ethical Considerations -- 2.4.1 Mode Collapse -- 2.4.2 Instability During Training -- 2.4.3 Absence of Convergence -- 2.5 A Glimpse into the Future: Where GANs Will Lead Us -- 2.5.1 Customized Content Production -- 2.5.2 Targeted Image Reproduction -- 2.5.3 Improved Data Distortion -- 2.5.4 Conditional Generation -- 2.5.5 Overcoming Obstacles -- 2.6 Conclusion: The Revolutionary Impact of Generative Adversarial Networks (GANs) -- References -- Chapter 3 Reinforcement Learning in Generative AI -- 3.1 Introduction -- 3.2 Current State of the Art in Generative AI with Reinforcement Learning -- 3.3 Different Applications for Generative AI with Reinforcement Learning -- 3.4 Characteristics of Generative AI with Reinforcement Learning -- 3.5 Outstanding Problems in Generative AI with Reinforcement Learning -- 3.6 Limitations of Generative AI with Reinforcement Learning -- 3.7 Conclusion -- References -- Chapter 4 Pix2pix GAN for Image-to-Image Translation: A Comparative Study with Diverse Datasets -- 4.1 Introduction -- 4.1.1 Significance of Generative AI in the Three Use Cases -- 4.2 Related Works -- 4.3 Methodology -- 4.4 Results and Discussions -- 4.4.1 Dataset -- 4.4.2 Experimental Assessment -- 4.5 Conclusion -- References -- Chapter 5 Study of State-of-the-Art Performance Metrics in NLP: Specifically for Text Summarization in the Medical Domain Using the SumPubMed Dataset -- 5.1 Introduction -- 5.2 Literature Review -- 5.3 Research Methodology -- 5.4 Results.

5.5 Conclusions -- 5.6 Future Score of Work -- References -- Chapter 6 The Impact of Generative AI in Gaming: Exploring Immersive Experiences -- 6.1 Introduction -- 6.2 Realistic Textures and Landscapes -- 6.3 Intelligent NPCs and Adaptive Behaviors -- 6.4 Expanding Beyond Traditional Gaming -- 6.5 Conclusion -- References -- Chapter 7 Ethical Dimensions and Societal Effects of Generative AI: The Portrayal of Ethical Issues of ChatGPT, DALL-E, and Other Systems -- Introduction -- Ethical Considerations in AI-Driven Recruitment: Video and Image Interviews -- UNESCO -- Conclusion -- Acknowledgments -- References -- Chapter 8 Generative Artificial Intelligence for Social Good and Sustainable Development -- 8.1 Introduction -- 8.1.1 Motivation of Generative Artificial Intelligence -- 8.1.2 The Contribution of the Chapter -- 8.1.3 The Organization of the Chapter -- 8.2 An Overview of Generative Artificial Intelligence and Its Applications -- 8.2.1 Text Generation -- 8.2.2 Image Generation -- 8.2.3 Audio and Music Generation -- 8.2.4 Data Augmentation -- 8.2.5 Video and Animation Generation -- 8.2.6 Drug Discovery -- 8.2.7 Content Recommendation -- 8.2.8 Language Translation -- 8.2.9 Humanoid Robots and Avatars -- 8.2.10 Design and Creativity -- 8.3 Generative AI for Social Good -- 8.3.1 Personalized Healthcare

Interventions -- 8.3.2 Equitable Education Access -- 8.3.3 Disaster Response and Humanitarian Aid -- 8.3.4 Accessible Information for Diverse Audiences -- 8.3.5 Mental Health Support and Therapy -- 8.3.6 Language Translation for Communication and Diplomacy -- 8.3.7 Environmental Conservation and Sustainability -- 8.3.8 Crisis Counseling and Suicide Prevention -- 8.3.9 Promoting Social Equity Through Policy Insights -- 8.3.10 Content Creation for Nonprofits and Humanitarian Organizations.

8.4 Generative Artificial Intelligence for Sustainable Development -- 8.4.1 Renewable Energy Optimization -- 8.4.2 Smart Resource Management -- 8.4.3 Climate Change Mitigation -- 8.4.4 Ecosystem Monitoring and Conservation -- 8.4.5 Circular Economy Promotion -- 8.4.6 Sustainable Agriculture and Food Security -- 8.4.7 Urban Planning and Smart Cities -- 8.4.8 Water Resource Management -- 8.4.9 Global Supply Chain Sustainability -- 8.4.10 Environmental Education and Advocacy -- 8.5 Ethical and Regulatory Considerations -- 8.5.1 Data Privacy and Security -- 8.5.2 Fairness and Bias -- 8.5.3 Explainability and Transparency -- 8.5.4 Accountability -- 8.5.5 Environmental Impact -- 8.5.6 Ethical Use Cases -- 8.5.7 Global Collaboration -- 8.5.8 Ethical Artificial Intelligent Education -- 8.5.9 Public Engagement, Input and Global Governance -- 8.6 Generative Artificial Intelligence Limitations -- 8.6.1 Data Dependence -- 8.6.2 Bias and Fairness -- 8.6.3 Ethical Concerns -- 8.6.4 Lack of Creativity and Common Sense -- 8.6.5 Resource Intensive -- 8.6.6 Interpretability and Transparency -- 8.6.7 Overfitting -- 8.7 Future Research Directions -- 8.8 Lessons Learned and the Conclusion -- 8.8.1 Lessons -- 8.8.2 Conclusion -- References -- Chapter 9

Revolutionizing Implementation: Cutting-Edge Tools and Resources in Generative AI -- 9.1 Introduction -- 9.2 Foundational Theories and Models -- 9.3 State-of-the-Art Tools in Generative AI -- 9.4 Generative AI Tools Strategies -- 9.5 Literature Review Methodology -- 9.6 Challenges and Solutions -- 9.7 Future Directions -- 9.8 Conclusion -- References -- Chapter 10 Applying Fuzzy Data Science in Generative AI for Healthcare -- 10.1 Introduction -- 10.1.1 Overview of Fuzzy Data Science and Generative AI -- 10.1.2 Relevance of These Technologies in Healthcare -- 10.1.3 Objectives and Structure of the Chapter.

10.2 Fundamentals of Fuzzy Data Science -- 10.2.1 Definition and Principles of Fuzzy Logic and Fuzzy Sets -- 10.2.2 Importance of Handling Uncertainty and Imprecision in Healthcare Data -- 10.2.3 Integration of Fuzzy Logic Along with AI Technologies -- 10.3 Generative AI in Healthcare -- 10.3.1 Explanation of Generative Models and Their Applications in Healthcare -- 10.3.2 Benefits of Generative AI for Medical Imaging, Diagnostics, and Treatment Planning -- 10.4 Synergizing Fuzzy Data Science with Generative AI -- 10.4.1 Conceptual Framework for Integrating Fuzzy Logic with Generative AI -- 10.4.2 Techniques and Methodologies for Combining These Technologies -- 10.4.2.1 Fuzzy Generative Adversarial Networks (Fuzzy GANs) -- 10.4.2.2 Fuzzy Variational Autoencoders (Fuzzy VAEs) -- 10.4.2.3 Fuzzy Clustering with Generative Models -- 10.4.3 Sources of Complexity in Healthcare Data and Uses of the Hybrid Approach -- 10.4.3.1 Handling Uncertainty and Imprecision -- 10.5 Case Study 1: Enhancing Diagnostic Accuracy -- 10.6 Case Study 2: Personalized Treatment Planning -- 10.7 Challenges and Limitations -- 10.7.1 Technical Challenges in Integrating Fuzzy Logic and Generative AI -- 10.7.2 Data Quality and Interpretability Issues -- 10.7.3 Ethical and Privacy Considerations in Healthcare Applications -- 10.8 Future Directions -- 10.8.1 Emerging Trends and Innovations in Fuzzy Data

Science and Generative AI -- 10.8.2 Potential Future Applications in Healthcare -- 10.8.3 Recommendations for Researchers and Practitioners -- 10.9 Conclusion -- 10.9.1 Summary of Key Findings from the Case Studies -- 10.9.2 Overall Impact of Fuzzy Data Science and Generative AI on Healthcare -- 10.9.3 Final Thoughts on the Future of These Technologies in Medical Science -- References. Chapter 11 Generative AI in Hospital Industry Transforming Medical Imaging for Patient Diagnosis and Health Data Management.

Sommario/riassunto

This book is essential for anyone eager to understand the groundbreaking advancements in generative AI and its transformative effects across industries, making it a valuable resource for both professional growth and creative inspiration. *Generative AI: Disruptive Technologies for Innovative Applications* delves into the exciting and rapidly evolving world of generative artificial intelligence and its profound impact on various industries and domains. This comprehensive volume brings together leading experts and researchers to explore the cutting-edge advancements, applications, and implications of generative AI technologies. This volume provides an in-depth exploration of generative AI, which encompasses a range of techniques such as generative adversarial networks, recurrent neural networks, and transformer models like GPT-3. It examines how these technologies enable machines to generate content, including text, images, and audio, that closely mimics human creativity and intelligence. Readers will gain valuable insights into the fundamentals of generative AI, innovative applications, ethical and social considerations, interdisciplinary insights, and future directions of this invaluable emerging technology. *Generative AI: Disruptive Technologies for Innovative Applications* is an indispensable resource for researchers, practitioners, and anyone interested in the transformative potential of generative AI in revolutionizing industries, unleashing creativity, and pushing the boundaries of what's possible in artificial intelligence. Audience AI researchers, industry professionals, data scientists, machine learning experts, students, policymakers, and entrepreneurs interested in the innovative field of generative AI.
