1. Record Nr. UNINA9911001456303321

Autore	Chaki Jyotismita
Titolo	The Art of Deep Learning Image Augmentation: The Seeds of Success / / by Jyotismita Chaki
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2025
ISBN	981-9650-81-X
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (IX, 142 p. 36 illus., 29 illus. in color.)
Collana	SpringerBriefs in Computational Intelligence, , 2625-3712
Disciplina	006.3
Soggetti	Computational intelligence Artificial intelligence Image processing Computational Intelligence Artificial Intelligence Image Processing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1: Introduction to Deep Learning based Image Augmentation -- Chapter 2: Generative Adversarial Networks (GANs) -- Chapter 3: Autoencoders -- Chapter 4: Applications of Deep Learning Based Image Augmentation -- Chapter 5: Evaluating and Optimizing Deep Learning Image Augmentation Strategies -- Chapter 6: The Future of Deep Learning Image Augmentation.
Sommario/riassunto	This book addresses the critical challenge of limited training data in deep learning for computer vision by exploring and evaluating various image augmentation techniques, with a particular emphasis on deep learning-based methods. Chapter 1 establishes the core problem of data scarcity, outlining its negative impacts on model performance, and introduces traditional image augmentation techniques like geometric transformations, color space manipulations, and other methods such as noise injection. It highlights the limitations of these traditional approaches, including limited variation, lack of control, and inability to introduce new information, before introducing the advantages of deep learning-based augmentation, such as superior control, task adaptability, enhanced realism, and automation. Chapter 2 delves into

GAN-based image augmentation, discussing how GANs generate realistic synthetic images for various applications like super-resolution and image-to-image translation, while also addressing the challenges associated with GAN training and potential future directions. Chapter 3 explores autoencoder-based image augmentation, covering techniques like VAEs, DAEs, and AAEs, and highlighting architectural considerations and challenges such as overfitting. Chapter 4 showcases the diverse applications of deep learning-based image augmentation and how it enhances various computer vision tasks by improving generalization, robustness, and accuracy. Chapter 5 discusses strategies for evaluating and optimizing deep learning image augmentation, including traditional metrics, image quality metrics, and hyperparameter tuning techniques. Finally, Chapter 6 explores cutting-edge advancements, covering AutoAugment, interpretable augmentation, attention-based augmentation, counterfactual augmentation, and human-in-the-loop augmentation, emphasizing the role of human expertise in creating high-quality augmented data.