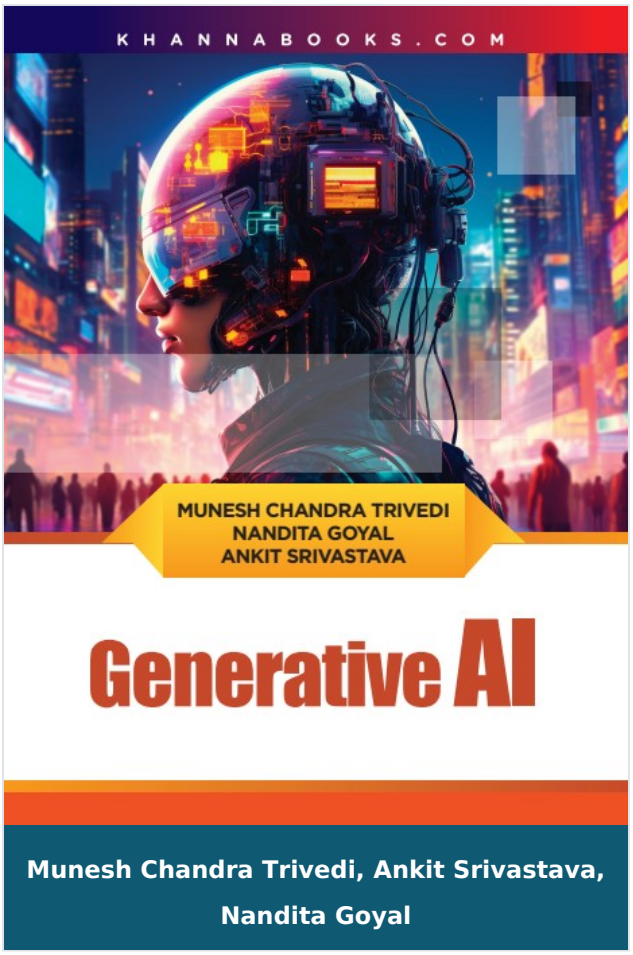

Generative AI

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Product Description

Generative AI: foundations, models, and Applications are a comprehensive guide that explores one of the most transformative areas of artificial intelligence—machines that create. This book offers an in-depth, yet accessible journey through the theoretical principles, algorithmic frameworks, and practical implementations that underpin generative models. Designed for students, researchers, and industry professionals alike, it bridges the gap between foundational understanding and real-world application.

The book begins with a concise introduction to machine learning and deep learning, establishing the mathematical and conceptual foundation required to understand generative models. It the systematically introduces key architectures such as variation autoencoders (VAEs), Generative adversarial Networks (GANs), autoregressive models, diffusion models, and large-scale transformer-based systems such as GPT and DALL-E.

Special attention is given to transformer architectures and multimodal generative models, which are reshaping fields such natural language processing, computer vision, digital art, and scientific discovery. Practical code examples and implementation guidance are provided using popular frameworks, empowering readers to build and experiment with their own models.

This book also examines the broader impact of generative AI--- from ethical considerations and safety challenges to the societal implications of machine- generated content. It encourages critical thinking about issues like deep fakes, misinformation, algorithmic bias, and intellectual property in the age of AI-Generated media.

Whether you are a student preparing for a career in AI, a software developer exploring new tools, or a researcher seeking a deeper understanding of generative technologies, this book serves as both a foundational text and a forward-looking reference. It combines clarity, depth, and practical relevance to help you master the art and science of

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Generative AI.

SALIENT FEATURES OF THE BOOK

- The language is simple and easily understandable.
- Includes hands-on approach for learning the subject.
- Explores a wide spectrum of generative architectures including variational autoencoders (VAEs), Generative adversarial Networks (GANs), Transformer-based models (e.g., GPT), Diffusion models, and multimodal systems.
- Provides mathematical details without losing the reader in complexity.
- Includes exercises and examples.
- Includes in-depth discussions on cutting-edge advancements such as attention mechanisms, transformer architectures, large language models (LLMs), prompt engineering, and fine-tuning techniques.
- Prepares readers not just to use today’s tools, but to adapt to tomorrow’s innovations---offering insights into emerging trends such as foundation models, generative agents, and open-ended creativity in AI.
- An application-centric view is highlighted to provide an understanding of the practical uses of each class of techniques.
- Greater focus is placed on modern deep learning ideas such as attention mechanisms, transformers, and pre-trained language models.

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