Chapter 1
Conceptual Understanding of Generative AI in the Modern World

Aryan Vasa
Ajeenkya D.Y. Patil University, India

Aditya Shrivastav
https://orcid.org/0009-0000-8461-8171
Ajeenkya D.Y. Patil University, India

Sunil Sankathala
https://orcid.org/0009-0004-7809-7647
Ajeenkya D.Y. Patil University, India

Kashvi Chaturvedi
https://orcid.org/0009-0005-3192-3400
Ajeenkya D.Y. Patil University, India

Susanta Das
https://orcid.org/0000-0002-9314-3988
Ajeenkya D.Y. Patil University, India

ABSTRACT

Generative AI, an innovative subset of Artificial Intelligence, is revolutionizing industries including business, healthcare, education, and the arts. This article examines the origins of GenAI, critical technologies and foundational concepts (such as GANs, VAEs, Diffusion Models, and Transformers), and well-known tools like

DOI: 10.4018/979-8-3373-5616-7.ch001

DALL·E and ChatGPT. It describes how GenAI produces realistic text, graphics, code and audio and how it's used to businesses, software, design, and learning. Along with examining issues like hallucinations, abuse, and inexplicability, the review also examines important societal issues including trust, bias, ethics, transparency and environmental effect. It also covers how GenAI fosters productivity, creativity, and human-AI cooperation. Through case studies and research analysis, it demonstrates how GenAI development is quickly transforming the fields like business, logistics, education, design, engineering, etc. In order to ensure that GenAI advances humankind without endangering it, it ends by urging a responsible, transparent, and moral approach to its use.

1. INTRODUCTION

Artificial Intelligence has been growing as a trending topic among researchers, analysts, industrialists and even the general public. Everyone is fascinated and interested to learn about it and use it as a technology to basically make the work easier. Artificial Intelligence has eventually become a popular choice as a smart investment for many people as well as industries. However, Artificial Intelligence is a broad field comprising different types and subsets and one of it's subsets has rapidly expanded in terms of use or applications in daily life recently. That subset of AI is Generative AI. It is becoming more and more popular because of its accessibility and capacity to generate realistic and imaginative outcomes. It has an impact on a variety of industries, including software development, marketing, education, medicine, and the arts and music. The field of generative artificial intelligence (GenAI) grew rapidly in late 2022, enabling a large audience to produce realistic images, music, and texts that resembled those of a human. This strategy has broad results for a number of domains, including content creation, which is itself a rising field. With the introduction of programs like ChatGPT, DALL·E, and Midjourney, the use of AI in content production has advanced significantly. These applications have made powerful Large Language Models (LLMs) accessible to the general public, enabling anyone without technical knowledge to produce writing, images, and even music that is human-like. The field of AI has a lot complex-language terms which everyone may not be familiar with and it may become difficult to understand, hence it would be better to understand the foundation of AI and Generative AI. According to Sakıın and Kusuma (2023), generative AI encompasses various models such as GANs, VAEs, diffusion models, and transformers, all of which are intended to produce realistic content by identifying patterns in data. Hence, understanding what generative AI actually means and how content creation operated prior to the widespread availability of these tools is crucial before delving into the specifics of