

Generative Artificial Intelligence (Generative AI) refers to AI systems capable of creating new content such as text, images, audio, and code.

This document covers foundational concepts, architectures, applications, and the impact of scaling in Large Language Models (LLMs).

#### SECTION 1: Foundational Concepts of Generative AI

Generative AI learns patterns from large datasets and generates original outputs using probabilistic models and deep neural networks.

#### SECTION 2: Generative AI Architectures

This section focuses on transformer architectures, including attention mechanisms, encoder-decoder models, and their advantages.

#### SECTION 3: Applications of Generative AI

Applications include chatbots, image generation, healthcare, education, and software development.

#### SECTION 4: Impact of Scaling in LLMs

Scaling model size, data, and compute improves performance, reasoning, and emergent abilities but raises cost and ethical concerns.