

Neuromorphic computing in AI: Mimicking the Human Brain

Sristi and Ankit Kumar

Sharda University, Greater Noida, UP, India

sristiptn@gmail.com and ankitrajrahul14@gmail.com

Abstract: *Neuromorphic computing is an innovative approach to artificial intelligence (AI) inspired by the biological principles of the human brain. Unlike traditional computing systems, which rely on von Neumann architectures, neuromorphic systems utilize spiking neural networks (SNNs) and event-driven processing to achieve greater efficiency and adaptability. These systems emulate neural activity, enabling real-time learning, low-power operation, and high parallelism.*

This paper explores the foundations of neuromorphic computing, focusing on its ability to address challenges such as the energy inefficiency and scalability limitations of conventional AI models. By leveraging hardware architectures like neuromorphic chips and advancements in neuroscience, this technology offers solutions for complex tasks in robotics, autonomous vehicles, and sensory data processing, where real-time responses are crucial.

Key developments in neuromorphic computing, such as hardware platforms (e.g., IBM TrueNorth, Intel Loihi) and algorithmic innovations, are discussed alongside their applications. The paper also examines challenges like hardware design complexity, standardization, and integration with existing AI models.

By bridging the gap between biological systems and computational technologies, neuromorphic computing holds immense promise to revolutionize AI. This study outlines its potential, ongoing research, and future directions to advance AI toward more energy-efficient, adaptive, and human-like intelligence..

Keywords: Neuromorphic computing

