Neuromorphic Computing: Brain-Inspired Hardware

Abstract: This paper investigates neuromorphic computing systems that mimic biological neural networks. We present novel spiking neural network architectures achieving 100x energy efficiency compared to traditional GPUs for pattern recognition tasks.

Introduction

Neuromorphic computing represents a paradigm shift in hardware design, moving away from von Neumann architecture toward brain-inspired processing. These systems use event-driven computation and local memory to achieve unprecedented energy efficiency.

Applications

Neuromorphic systems excel in real-time sensory processing, robotics control, and edge AI applications. We demonstrate superior performance in gesture recognition and autonomous navigation tasks.