International Journal of Electronics and Communication Engineering (IJECE)
ISSN(P): 2278-9901; ISSN(E): 2278-991X
Vol. 14, Issue 1, Jan–Jun 2025; 37–44

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

CLOUD-ENHANCED GANS FOR SYNTHETIC DATA GENERATION IN PRIVACY-PRESERVING MACHINE LEARNING

Biswanath Saha

Jadavpur University, Kolkata, West Bengal, India

ABSTRACT

With the increasing demand for privacy in data-driven applications, the use of synthetic data generated by Generative Adversarial Networks (GANs) has emerged as a viable solution for privacy-preserving machine learning. This paper explores the integration of cloud computing with GANs to enhance the scalability and efficiency of synthetic data generation, enabling the creation of realistic datasets without compromising user privacy. We investigate various cloud-based deployment strategies for GANs, assessing their impact on computational performance, data security, and privacy preservation. By leveraging cloud resources, we propose a framework that allows for the seamless generation of synthetic data at scale, while ensuring that privacy concerns are addressed through differential privacy and other protective mechanisms. Experimental results demonstrate the potential of cloud-enhanced GANs to support privacy-preserving machine learning in diverse application domains, including healthcare and finance.

KEYWORDS: *Cloud Computing, Generative Adversarial Networks, Synthetic Data, Privacy-Preserving, Machine Learning, Differential Privacy, Scalability, Data Security*

Article History

Received: *10 Apr 2025* | ***Revised:*** *11 Apr 2025* | ***Accepted:*** *11 Apr 2025*