Data augmentation using generative adversarial networks for images and biomarkers in medicine and neuroscience

ABSTRACT

The fields of medicine and neuroscience often face challenges in obtaining a su cient amount of diverse data for training machine learning models. Data augmentation can alleviate this issue by artificially synthesizing new data from existing data. Generative adversarial networks (GANs) provide a promising approach for data augmentation in the context of images and biomarkers. GANs can synthesize high-quality, diverse, and realistic data that can supplement real data in the training process. This study provides an overview of the use of GANs for data augmentation in medicine and neuroscience. The strengths and weaknesses of various GAN models, including deep convolutional GANs (DCGANs) and Wasserstein GANs (WGANs), are discussed. This study also explores the challenges and ways to address them when using GANs for data augmentation in the field of medicine and neuroscience. Future works on this topic are also discussed.