Unsupervised learning of image data using generative adversarial network

ABSTRACT

Over the past few years, with the introduction of deep learning techniques such as convolution neural network (CNN), supervised learning with CNN had achieved a huge success in the computer vision area such as classifying digital images. However, supervised learning has a major drawback, in which it requires a large dataset for them to perform more effectively. As the data used in training grew bigger, the cost of labeling data for training becomes more expensive and impractical. In order to resolve this issue, unsupervised learning is encouraged to be used as it can draw inferences from datasets consisting of unlabeled input data. Generative adversarial network (GAN) is one of the unsupervised learning technique that has the ability to create natural-looking images, converting text description into images, recover resolution of images and last but not least, its power of representation learning from unlabeled data. Thus, this study attempts to evaluate the effectiveness of GAN algorithm in performing the supervised task and unsupervised task such as classification and clustering. Based on the results obtained, the GAN algorithm can learn the internal representation of data without labels and can act as good features extractor. Future works include applying GAN framework in other domains such as video, natural language processing and text to image synthesis.