CS512 - Project - Proposal
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Image Generation Using Generative Adversarial Networks

Abstract:

This project proposes an improved GANs approach with an alternative U-Net based GAN architecture and pre-trained models to generate high-quality images with realism for various image generation tasks. We propose to implement this using the paper U-Net Based Discriminator for Generative Adversarial Networks.

Problem Statement:

Existing GANs approaches often struggle with generating high-quality and realistic images with varying structures and appearances, and can be computationally expensive to train from scratch. There is a need for an improved GANs approach that can generate high-quality and realistic images while being computationally efficient. The approach should be able to capture complex patterns and structures in the input data while maintaining coherence and consistency in the generated images.

Approach:

A new approach has been proposed to improve the quality of images generated by Generative Adversarial Networks (GANs). The approach uses an alternative U-Net based GAN model resulting in more realistic images with varying structures and appearances.

Our implementation of the proposed approach differs from the original paper as we plan to leverage pre-trained models to generate high-quality and realistic images and potentially using different evaluation metrics for our image generation tasks.

Evaluation metrics: FID(Frechet Inception Distance)- is a measure of similarity between 2 images.

Data:

COCO-animal Dataset(128x128)

COCO-Animals dataset from the reference paper

References:

[1]. E. Schönfeld, B. Schiele and A. Khoreva, "A U-Net Based Discriminator for Generative Adversarial Networks," 2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), Seattle, WA, USA, 2020, pp. 8204-8213, doi: 10.1109/CVPR42600.2020.00823.

[2]. Y. Wang, H. Laria, J. van de Weijer, L. Lopez-Fuentes and B. Raducanu, "TransferI2I: Transfer Learning for Image-to-Image Translation from Small Datasets," 2021 IEEE/CVF International Conference on Computer Vision (ICCV), Montreal, QC, Canada, 2021, pp. 13990-13999, doi: 10.1109/ICCV48922.2021.01375.

[3]. A. Al-qerem, Y. S. Alsalman and K. Mansour, "Image Generation Using Different Models Of Generative Adversarial Network," 2019 International Arab Conference on Information Technology (ACIT), Al Ain, United Arab Emirates, 2019, pp. 241-245, doi: 10.1109/ACIT47987.2019.8991120.

Team Members and Responsibilities

Data Collection, Literature Survey: Sai Manohar Vemuri
Data Preprocessing, Testing: Raghunath Babu
Building and training the model: Sai Manohar and Raghunath Babu (both will be exploring and implementing different models and conclude).