Generate Fake Human faces using DCGANs for Data Augmentation

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Outline

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Proposed Solution

GAN Architecture Design:

Design a GAN architecture Consisting of a Generator and Discriminator network using Tensorflow/ Keras.

Generator:

The generator takes random noise as input and generates synthetic data samples. Its objective is to create data that is indistinguishable from real data to fool the discriminator. The generator is trained to produce samples that closely match the distribution of the training data.

Discriminator:

The discriminator acts as a binary classifier, distinguishing between real data samples (from the training set) and fake data samples produced by the generator. It's trained to correctly classify the origin of the input data as real or fake.

Problem Statement

The task is to develop a Deep Convolutional Generative Adversarial Network (DCGAN) to generate synthetic human faces for data augmentation in computer vision applications. The generated faces should be realistic and diverse, capturing variations in facial features, expressions, and demographics.

System Approach

System Requirements:

1. Hardware :

CPU: A modern multi-core CPU (e.g., Intel Core i7 or AMD Ryzen) is sufficient for training DCGANs, but faster CPUs can speed up training times.

Memory: At least 16GB of RAM is recommended for handling large datasets and model training. More RAM may be beneficial for larger datasets or more complex models.

System Approach -Cont.

Software Requirements:

Python: Python is a versatile programming language commonly used in machine learning and deep learning projects.

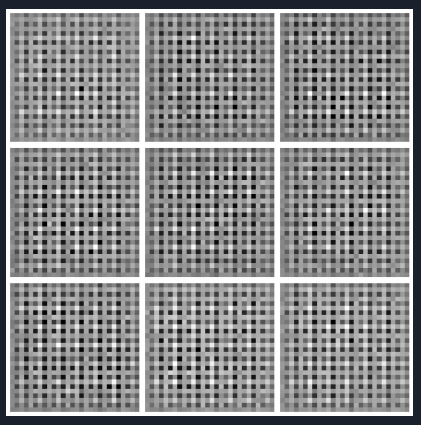
TensorFlow/Keras: TensorFlow is an open-source machine learning framework developed by Google, while Keras is a high-level neural networks API that runs on top of Tensorflow.

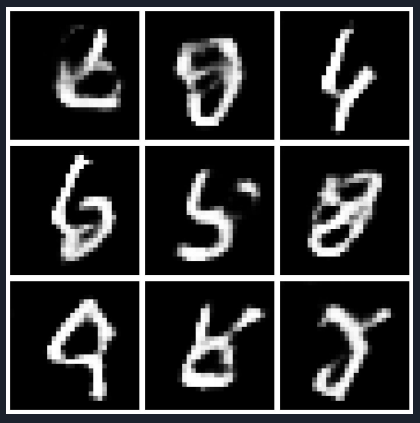
Google Colab: Google Colab (short for Google Colaboratory) is a free cloud-based platform that provides access to GPUs and TPUs, making it ideal for training deep learning models without requiring powerful hardware.

NumPy: NumPy is a fundamental package for numerical computing in Python.

Matplotlib: Matplotlib is a plotting library for Python that enables you to create a wide variety of plots, including histograms, scatter plots, line plots, and more.

Result





Conclusion

In conclusion, leveraging Deep Convolutional Generative Adversarial Networks (DCGANs) for generating fake human faces serves as a valuable strategy for data augmentation in machine learning and computer vision tasks. Overall, the use of DCGANs for generating fake human faces for data augmentation presents a promising approach to address data scarcity issues, enhance dataset diversity, and ultimately improve the effectiveness of machine learning systems in tasks such as facial recognition, emotion detection, and image classification.

References:

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