BLIND IMAGE RESTORATION AND DATA AUGMENTATION

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Introduction

One of the biggest challenge from the times is Image restoration. Image restoration is the operation of taking a corrupt/noisy image and estimating the clean, original image. Corruption may come in many forms such as motion blur, noise and camera misfocus. The restoration process improves the image's appearance, and the main goal is to restore it to how it looked when it was first synthesized originally. Image restoration plays an important role in the real life- medical field different cancerous cells images can be restored and studied by the process, astronomical aspects obtained satellite image can be restored, face image restoration- detects the criminal activities etc. Here, we are using the Generative Adversarial Network(GAN) models to achieve the mention goals. GAN prior embedded network helps us to generate a fine-tuned and smooth image which can be further used to draw some insights.

PROBLEM STATEMENT

To achieve a high quality image without background noise, proper colorization and inpainted image is biggest challenge in today's computer vision industry. Because the training of a complete model in such case depends on each pixel of the image. Hence image restoration is the biggest task to achieve which further help to solve various real world and industrial problems such as in real world – various cctv image are degraded due to which criminal activities can't be record easily, similarly in medical field the cancerous cell can visualize easily and effectively by the model. It will certainly help in industries to train various economical projects like- clothes translation, text to image conversion and many more
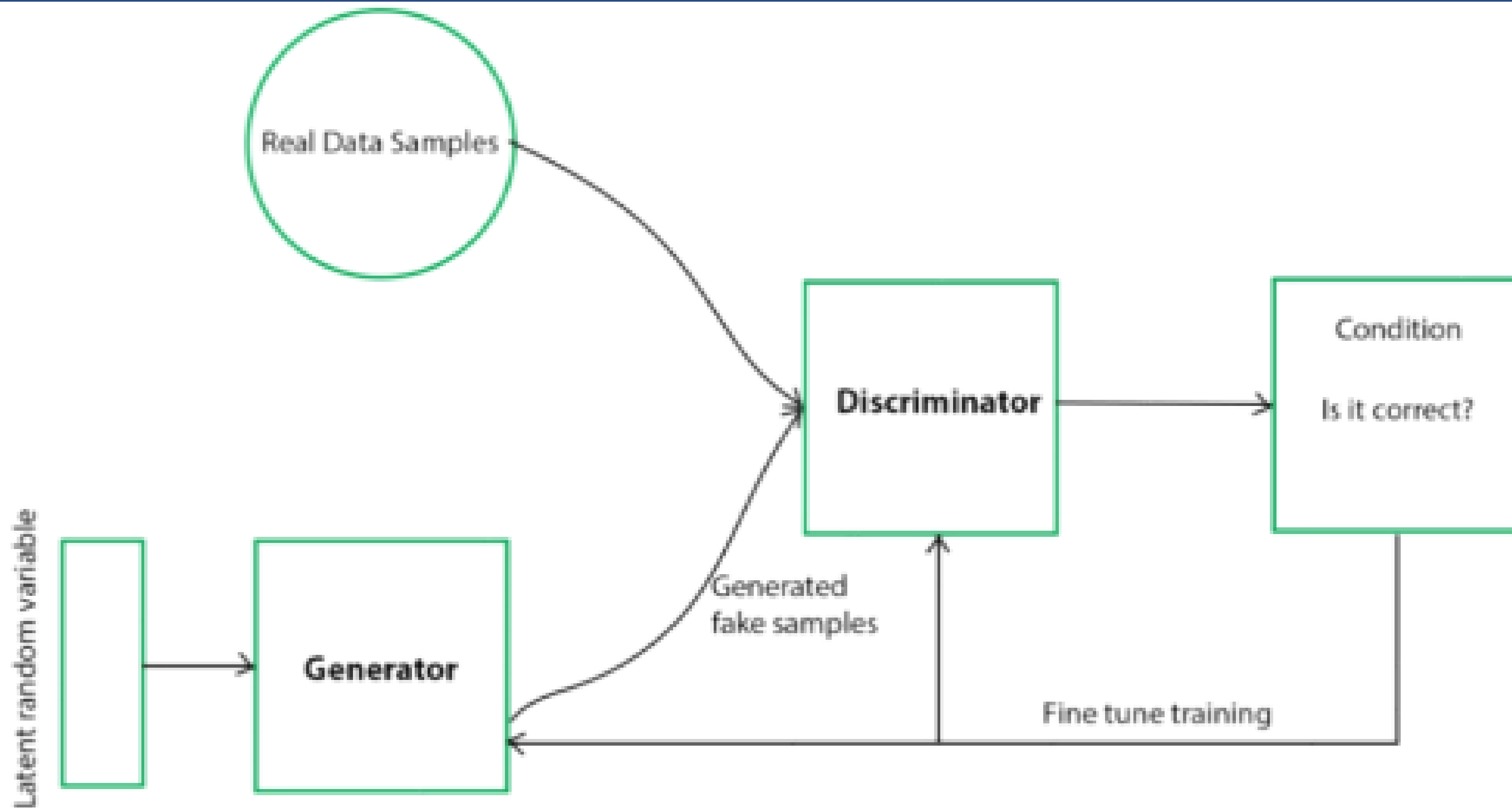
Objective

Objective is to build a website using Streamlit where the process of blind image restoration can be carried out and different poses for the same images can be generated that provides a better view to the user. A low quality real world image will be uploaded to user and in return it will provide a highly resolved image with different painting. The model is efficient enough to perform the image colorization, image inpainting and synthesize the image efficiently

Proposed Solution:

Our complete study and deployment is based upon the embedded GAN models. GAN models basically helps in the generation of images based on the concept of generator and discriminator. Generator basically generates the images on the basis of the random vector from the Gaussian distribution. And at the same time discriminator takes this fake generated image and real images from the training data as input and tests that generated fake images. If these generated images fool the discriminator predicting that its true, then only the image is allowed to pass through discriminator.

Flowchart:

Real Data Samples

Discriminator

Condition

Is it correct?

Latent random variable

Generator

Generated fake samples

Fine tune training

Algorithm Proposed

- Data Collection.
- Trained a GAN network on high quality images of dataset
- Then the GPEN model is embedded with this trained GAN model to further perform the fine-tuning of images.
- To generate the different angles of images .Further, a Stylegan -3 model is embedded with the network.
- At last the model will be deployed on website by the help of Streamlit.
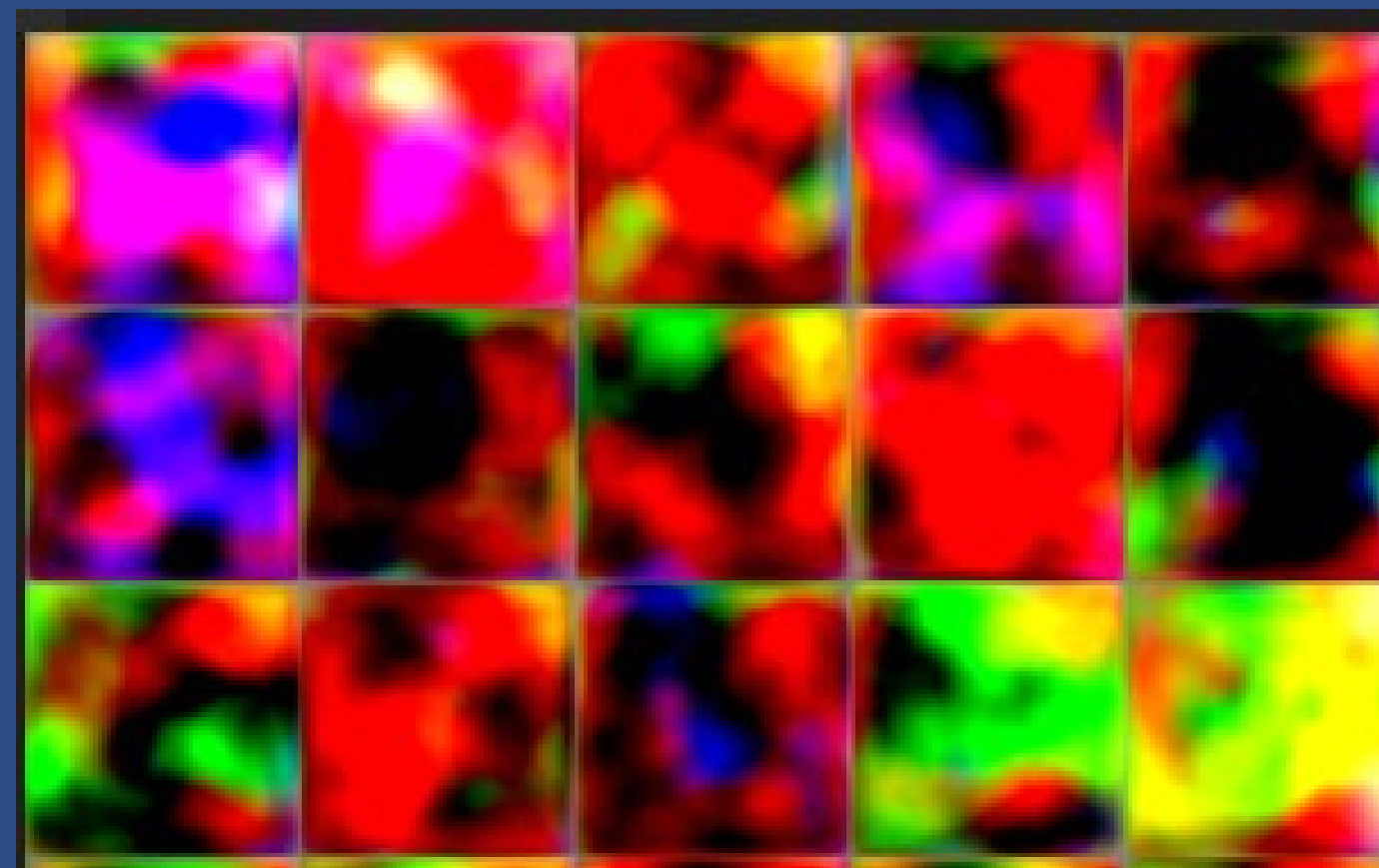
Result

Image restoration

Image restoration 2

Image colorization

Image inpainting

Intermediate result of stylegan-3

Output of stylegan-3

Conclusion:

Currently, the industry is wound up with with high-resolution human face datasets, which can be used to train models for various purposes such as virtual fitting, clothing translation, etc. There are limits to the datasets available. Can be used to create different poses of the image. The data generated is realistic and this generated dataset can be used in many ways as local brands cannot afford advertising superstars. In this case, Stylegan can be used to generate composite images using style mixing. And the actor can't even charge her for the act. Many other industrial applications also contribute

Future Scope:

- Now a day's industries are crazy about high resolution human face datasets which can be utilized by them to train their models for different purposes like virtual try-on, clothes translation and many more but limit is a dataset here GPEN along with STYLEGAN 3 can be used to generate the different poses of a image.

- The generated data is realistic and this produced dataset can be used in many ways like as local brands are unable to afford the superstars for advertisement in such case Stylegan can be used to generate the synthesized image with style mixing. And actors can't even do any case on them for the deed. Many other industrial applications also sustain for the same

Do you have
any questions?