Image Super-Resolution using CNN

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PROBLEM STATEMENT

- The goal of this project is to develop a super-resolution approach for enhancing the resolution of input images, without relying on pre-existing datasets. Instead.
- we will create a neural network that takes the input image as an input and varies the parameter values to produce an output image with higher resolution.
- We will be using pre-process input images by applying image enhancement algorithms and use PyTorch to train the CNN model, which will optimize the super-resolution process by varying the parameter values.
- The significance of this project lies in The proposed approach is expected to provide an efficient and effective solution for super-resolving low-resolution images into high-resolution images using deep learning techniques.

ABSTRACT

- Image enhancement is the procedure of improving the quality and information content of original data before processing. Common practices include contrast enhancement, spatial filtering, density
- Image enhancement algorithms are commonly applied to remotely sensed data to improve the appearance of an image and a new enhanced image is produced.
- The enhanced image is generally easier to interpret than the original image.

SOCIETAL BENEFIT

- Medical Imaging: it is used in x-rays, CT scans, and MRI image. Leading to improved diagnosis and treatment.
- Surveillance: The High-resolution images can be used in Surveillance systems to capture details or objects more accurately. Mainly used in security and prevent criminal activities.
- Remote Sensing: It is used in the remote sensing application to monitor environment changes, detect natural disasters, and track the movement of natural resources.
- Entertainment: Used in the entertainment industry to enhanced the quality of mages and videos, resulting in a better viewing experience for audience.
- Eduction: High-resolution images can be used in educational materials, such as textbooks and online courses, to provide students with more detailed andaccute information.
- The model's performance will be evaluated using quantitative and qualitative metrics such as PSNR, SSIM, and visual inspection.

OBJECTIVE

- Display an image which has supposedly higher resolution than the input image.
- To not use dataset to reduce overhead and increase use cases with no changes to code.
- Instead create a network of the input image with varying parameter values and select the higher resolution image as the output.

TECHNICAL DEPTH

- Image super resolution enhances image quality by increasing resolution and detail.
- CNNs are effective for image super resolution and can be implemented using Scikit-Learn and PyTorch.
- A dataset of low-resolution and high-resolution image pairs is required for training the model.
- Model architecture, loss function, hyperparameters, and evaluation metrics are crucial for training the CNN model.

MODULE DESCRIPTION

- Image Input
- Scikit Image for image processing
- PyTorch for working with CNN model

THANK YOU