# Image Enhancement By Removing Noise

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**Abstract -** *To generate high-resolution image from a low-resolution input image single image super-resolution is used. Single image super-resolution is used to enhance the quality of an image. In this paper there is an image super-resolution algorithm is proposed which is based on GPS Gradient Profile Sharpness. Extract GPS from two gradient profile description models. PS contain two model one is triangle model and second is the mixed Gaussian model. Finally, the HR (High Resolution) image is generated which has better visual Quality, lower resolution error. The aim of single image super-resolution is to construct a high-resolution image from LR (low resolution) image input. Transformation gradient profiles to generate the target gradient field in High Resolution Image image.*

**Keywords: Gradient profile Sharpness, Histogram Equalization, Gaussian Mixture Model.**

## 1. INTRODUCTION:

The main aim is the generation of the high-resolution image from low-resolution image. Image super-resolution process is widely used in some application. This application may be the image display, remote sensing, and satellite imaging. Sometime take only one input image called as single image super-resolution. In some of the Cases, Multiple input image may be considered the goal of conversion from low-resolution image i.e. blurred image to better quality image. DE noising and DE blurring are the applications of image processing. When we construct the high-resolution image from the low-resolution image there is one challenge that is the quality of edge should be maintained. Super resolution is the technique of enhancement of image resolution. The pixel density of the image is high that is the meaning of high resolution. To recover a high-resolution image by using one or more low-resolution input images is the aim of super-resolution methods.

There has been much research works in this field in recent years, which can be mainly classified into three categories: interpolation-based approaches, learning-based approaches and reconstruction-based approaches As a result, how to generate an HR image with good visual perception and as similar as its ground truth has become the goal of image super-resolution.
The interpolation-based approaches are the basic image super-resolution methods, where currently the bilinear interpolation and bicubic interpolation are still very popular in practice. The learning-based approaches assume that the lost high-frequency details in Low Resolution images can be retrieved and hallucinated from a dictionary of image patch pairs.

The reconstruction-based approaches enforce a constraint that the smoothed and down-sampled version of the estimated HR image should be consistent with its LR image. Based on this idea, reconstruction models are proposed.

Interpolation-based approaches tend to blur high-frequency details if the upscaling ratio is large.
There are always some artifacts on their super-resolution results.

The computational complexity of learning-based super-resolution approaches is quite high.

## 2. METHODS :

When we are generating HR image it is very important to preserve the constraint of edge preservation in interpolation algorithm.so for that purpose use gradient profile sharpness

### 2.1: Contrast Enhancement:

Contrast enhancements improve the physical property of objects in associate the scene by enhancing the brightness distinction between objects and their backgrounds. distinction sweetening's are generally perfor med in a distinction stretch followed by the tonal enhancement, though these might each can be performed in one step. A distinction stretch improves the contracts differences uniformly across the dynamic vary of the image, whereas tonal enhancements enhance the saturation variations within image are the shadow (dark), middle tone (grays , or highlight (bright) regions at the expense of the brightness variations within the alternative regions.

### 2.2: Histogram Equalization

Histogram equalisation could be a technique in image process of distinction adjustment mistreatment the image's bar graph. bar graph equalisation typically will increase the worldwide distinction of the many pictures, particularly once the usable information of the image is represented by shut distinction values. Through

this adjustment, the intensities is higher distributed on the bar graph. this enables for areas of lower local distinction to realize a better contrast. bar graph equalisation accomplishes this by effectively spreading out the foremost frequent intensity values. This method is beneficial in pictures with backgrounds and foregrounds that a reach bright or each dark. This technique produces impractical effects in photographs; but, it's terribly helpful for
scientific pictures. There ar 2 ways in which to accept and implement bar graph equalisation, either as image modification or as palette modification. The operation is expressed as P(M(I)) wherever i'm the initial image, M is bar graph equalisation mapping operation and P could be a palette. If we tend to outline a brand new palette as P'=P(M) and leave image I unchanged then bar graph equalisation is enforced as palette modification. On the opposite hand, if palette P remains unchanged ANd an image is changed to me'=M(I) then the implementation is by image change. In most cases, palette modification is best as it preserves the original information. bar graph equalisation of color pictures conjointly a similar technique of grayscale image; Red, Green, Blue ar the values of a color image. Figure shows the conventional and bar graph equal Image

### 2.3: Gradient Profile Sharpness:

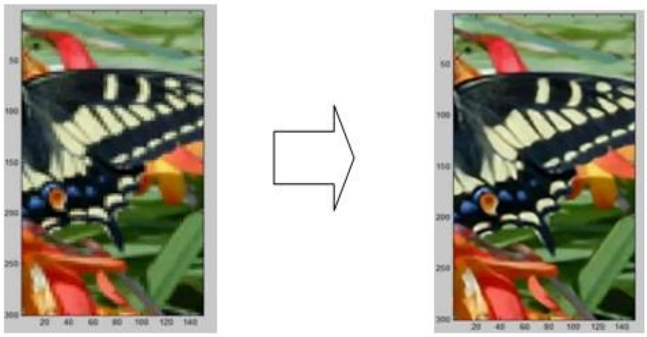
Gradient profile is employed for edge smoothness. The work that is completed antecedently on single image super- resolution is divided into 3 classes initial is interpolation primarily {based}} second is learning based and third is reconstruction based. Interpolation is quick and simple however blurs high-frequency details. Edge sharpness is that the necessary issue of image quality. Gradient field is employed for reducing the results of noise whereas the stingare increased. after we square measure generating 60 minutes image it's important to preserve the constraint of edge preservation in interpolation algorithmic program.so for that purpose use gradient profile sharpness. Triangle model and mathematician Mixed Model contain 2 feature initial is there height h and second is spatial scattering d supported 2 gradient profile description model metric of gradient profile sharpness is outlined. There that is that the magnitude relation of height to spatial scattering.height to spatial scattering.

$$n=h/d$$

h=height represent the edge constraint which is the magnitude of gradient profile

d=spatial scattering represent an edge of spatial spread.

The edge contrast and edge spatial scattering this two point are GPS take into consideration .the example of edge contrast is a human perception of edge sharpness. Edge sharpness is well defined in GPS. Gradient profile is the advantage that describes spatial layouts of edge gradient .triangle model and mixed Gaussian model are used to specify gradient profile. By modeling edge gradient profiles solve the image super-resolution problem.



(a) (b)

Figure1.edge sharpness using GPS

The original image is (a) and (b) is the edge sharpness image obtained from GPS. Sharp edge and smooth edge can be separate easily in the image (b).

### 2.4: Gradient Profile Transformation (GPT):

Using the gradient profile sharpness previous they'll approximate time unit gradient field by remodelling LR gradient field this is often done on the premise of gradient profile transformation. during this Section 2 models for GPT is planned 1st is Gradient Profile Transformation for triangle model and second is Gradient Profile Transformation for Gaussian mixture model. 3 main options square measure wont to preserve the energy and form of original Gradient Profile throughout Gradient Profile Transformation:

1) The sum of profiles gradient magnitude remains unchanged.
2) Gradient Profile Transformation keeps its peak position remains unchanged to avoid edge shifting.
3) The shape of Gradient Profile Transformation remains same or unchanged with its original Gradient Profile.

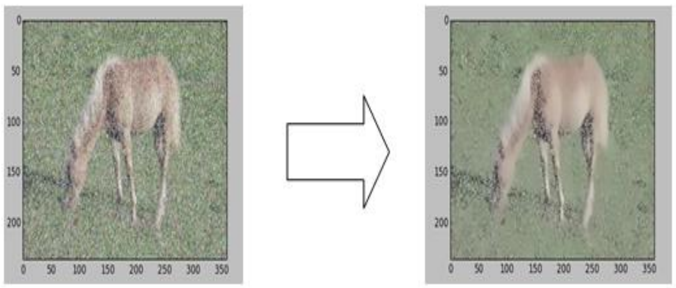
a) Gradient Profile Transformation for triangle model:

The GPT between two triangle models is simplified or easy because its shape is fixed.

Gradient profile transformation for Gaussian mixture model: The GPT between Gaussian mixture model is complicated because it's shape is not fixed.

## 3. RESULT:

A material information of thirty pictures with defect free and defected fabric pictures square measure collected. A camera having a high resolution is employed for capturing the material pictures. The captured image is keep in "jpeg" format. The non inheritable material pictures squaremeasure in numerous sizes, thence the pictures square measure resized and normalized exploitation interpolation rule. linear interpola tion rule accustomed normalize the captured image.



a) Original Image b) Result Image

## 4. CONCLUSION:

Gradient profile sharpness is developed using single image super-resolution. Then GPS transformation relationship is studied based on GPS transformation two model are proposed that models keep profile magnitude and profile shape during the transformation. Finally, high-resolution image is reconstructed.

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