An Approach on Development of Image Super-Resolution Algorithms: Review

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Abstract **-** Spatial resolution of images are restricted by the size of CMOS sensors. Spatial resolution can be increased by increasing no of COMS sensors resuling in decrease in size of CMOS sensors which cause shot noise. In this thesis attempts have been made to enhance the spatial resolution of diff erent images. Two schemes are proposed for this purpose. The basic idea behind both the techniques is to utilize the high frequency subband images derived using lifting wavelet transform. In the first scheme the high frequency subband images are interpolated using surface fitting. In another scheme lifting wavelet transform and stationary wavelet transform are used along with surface fitting interpolation to increase the spatial resolution in the frequency domain.

Keywords **-** Image super-resolution, Spatial Resolution, Blind Image Quality Index

I. INTRODUCTION

Out of all five senses vision is most advanced, so it is not surprised that images play the single most important role in human perception. Human vision system is limited to visual band of electromagnetic (EM) spectrum, while imaging machines cover almost the entire EM spectrum, ranging from gamma to radio waves. They can operate on images generated by source that humans are not accustomed to associate with images. These include electron microscopy, computer generated images.

MDigital image processing works same as the human vision system. It involves the process of acquiring, analyzing and manipulating images using digital computers. There are various physical devices to capture digital images like camera, satellite, magnetic resonance imaging machine and microscope etc. The area of application of digital image processing is very vast. The simplest way to develop the extent of image processing is to categorize the images according to their source. There are various fields that use digital image processing.

1. Gamma-ray Imaging - Nuclear medicine and astronomical observation are areas use most of the gamma ray imaging. The principal of positron emission tomography is same as with X-ray tomography. Gamma rays detected and converted to image using principles of tomography.

2. X-ray imaging - X-rays are being used in medical and astronomy. The digital X-ray images are captured by digitizing the X-ray films. Angiography and computerized axial tomography (CAT) are other medical areas that use X-ray Imaging.

3. Ultraviolet Band Imaging - Ultraviolet Imaging is used in lithography, industrial inspection, microscopy, lasers, biological imaging and astronomical observation.

4. Visible and Infrared Bands Imaging - The application area for this imaging is very broad. It ranges from micro-inspection and material characterization to pharmaceutical. This spectrum images also applied in various security, identity detection, recognition and surveillance application and remote sensing.

5. Microwave Band Imaging - Microwave band imaging is used in RADAR. Radar uses antenna and computer processing to generate image.

6. Radio Imaging - The main application area of radio wave imaging is in medical and astronomy. In medical radio wave are used in magnetic resonance imaging (MRI).