CHAPTER-1

INTRODUCTION
1.1 Introduction:

Over the past several years, a variety of methods of image compression schemes have been developed under both lossy and loss less schemes. A loss less scheme is essentially preferred in medical applications, where exact restoration of an image is important and compression efficiency is not much important. But lossy scheme is preferred in multimedia applications, where exact restoration of an image is not important and compression efficiency is of prime importance. For efficient storage and transmission, compression efficiency of the scheme should be higher, since some loss of information does not completely degrade the quality of an image. As there has been great deal of excitement in the field of image compression and reconstruction, it is decided to design software implementation of compression and reconstruction algorithms [1-3].

Here, our aim is to design a digital filter with application to image processing particularly under lossy compression scheme. It means that, it is either a software or hardware implementation of a digital system, which performs compression and reconstruction of an image. Such an implementation of compression scheme is chosen under lossy scheme, because, lossy schemes provide better compression efficiency than loss less scheme. Design of digital filter is performed using digital computer and a software tools. A digital computer can be programmed to perform compression and reconstruction of an image using digital filtering techniques. Digital processing on the image is
performed by software that is configured to perform the desired operations; this way software realization of the digital system/ﬁlter is achieved.

In the present study, initially, from the knowledge gained from various existing image compression and reconstruction algorithms, 'Novel' compression and reconstruction algorithms were developed based on JPEG-DCT [4]. After the development, using "MATLAB" software, simulation programs are developed, so that, the program can perform the functions; such as, compression, reconstruction and estimation of the compression parameters (MSE, PSNR, CR, and bpp) of standard images. Procedural details of development of the "Novel" and modified algorithms and its applications in compression and reconstruction of standard gray scale and color images are discussed in details in different chapters.

The thesis comprises of six chapters, the first chapter contains a brief introduction of image compression schemes and the perspective of the work.

The second chapter contains, review of, loss less compression schemes, lossy compression schemes, the measure of performance of an algorithm, color image compression schemes, background on "MATLAB" and exhaustive survey of the literature.

The third chapter deals with the development of 'Novel' algorithms for image compression and reconstruction of an image. Analysis of an algorithm has been illustrated with the use of standard Lena gray scale image and related results are discussed.
The fourth chapter comprises the development of modified algorithms, which has been discussed in two sections. That is, Section-A and Section-B. Section-A comprises the development of modified algorithms using fixed-length coding scheme. Analysis of the same is illustrated for different standard gray scale images. Section-B comprises the development of modified algorithms using instantaneous coding scheme. Analysis of the same is illustrated for different standard gray scale images.

The chapter five, comprises the application of the modified algorithms using instantaneous coding scheme for standard color images and analysis of the same is illustrated for different standard color images.

In the sixth chapter, we present a brief summary of the simulation results of image compression schemes and conclusions drawn with regard to the role of the developed compression algorithms in image compression and reconstruction of both grayscale and color images. At the end, scope for the future work is also given.

The thesis at the end contains list of references cited throughout.