Digital Image Process

There are many technologies in the subject of digital image processing:

Image transformation: Because the image array is large, the processing in the spatial domain involves a large amount of computation. Therefore, we can use a variety of image transformation methods, such as Fourier transform, Walsh transform, discrete cosine transform and other indirect processing technology, converting the spatial domain processing into transform domain processing,which can reduce the amount of calculation, and can be more effective ( Fourier transform can be digital filtering in the frequency domain). At present, the wavelet transform of the emerging research has good localization in the time domain and frequency domain, and it has a wide and effective application in image processing.

Image Compression Coding: Image coding compression reduces the amount of data describing the image (ie, the number of bits) in order to easy to transfer, reduce processing time and the amount of memory used. Compression can be obtained without distortion, or under permissible distortion conditions. Coding is the most important method of compression technology, it is in the image processing technology is the development of the earliest and more mature technology.

Image Enhancement and Restoration: The purpose of image enhancement and restoration is to improve the quality of the image, such as removing noise, improving image clarity, and so on. Image enhancement does not take into account the reasons for image degradation, highlighting the part of interest in the image. Such as strengthening the high-frequency components of the image, the image can make the outline of the object clear, the details are obvious; such as strengthening the low-frequency components can reduce the impact of noise in the image. Image restoration requires a certain understanding of the reasons for image degradation, generally speaking, should be based on the degradation process to establish a "degradation model", and then use a filtering method to restore or rebuild the original image.

Image Segmentation: Image segmentation is one of the key technologies in digital image processing. Image segmentation is the extraction of meaningful parts of the image, the meaningful features are the edges of the image, the area, etc., which is the basis for further image recognition, analysis and understanding. Although a number of edge extraction and regional segmentation methods have been developed, there is no effective method for universal application to various images. Therefore, the research on image segmentation is one of the hotspots in image processing.

Image Identification: image identification (classification) belongs to the category of pattern recognition. The main content is that the image is segmented and extracted by some preprocessing (enhancement, restoration, compression). Image classification often adopts classical pattern recognition method, statistical pattern classification and syntactic (structure) pattern classification. In recent years, newly developed fuzzy pattern recognition and artificial neural network model classification have been paid more and more attention in image recognition.

In the following paragraph a number of recent developments in medical imaging are outlined, with the focus being on the application of image processing techniques. Medical images are at the core of medical science and an enormous source of information that need to be utilized. Image processing techniques with regards to biomedical images are generally either used for the retrieval of images (Content Based Image Retrieval) or for analysis and modification of images.

In the development of biomedical imaging systems, the idea of image retrieval goes hand in hand with the need for digital image processing. There are three primary application areas: firstly, image restoration, secondly, the processing of data for autonomous machines perception and finally the processing of images for improvement in human perception for example comparison or feature extraction. The field of image processing has seen much research and advance since 1964, when the pictures of the moon transmitted by Ranger 7 were processed by a computer to correct various types of image distortions (Gonzales and Woods, 1993). The application of the image processing techniques has seen its place in often unrelated problems, since they require the same underlying technology. In medicine, image processing techniques have been used for assisting in diagnosis and research. Various techniques for image improvement like image enhancement and image restoration are used. Image analysis techniques including morphological image processing, edge detection, image feature extraction, image segmentation, shape analysis find much use in the medical field. More specifically, much research is being done to change the 2-dimensional images to provide a 3-Dimensional image structure, automated detection of certain specific features – which largely depends on what kind of images are being processed, and automated comparison of images to show the differences among them. Visualization of three-dimensional medical images is usually the use of human visual characteristics, through the computer on the two-dimensional digital tomographic image sequence of three-dimensional body data processing, to transform it into an image with intuitive three-dimensional effect to show the three-dimensional morphology of human tissue. Image visualization techniques are usually divided into two methods: surface rendering and volume rendering.

picture archiving and communication system(PACS) is a new generation at home and abroad in recent years.Hing medical image information technology, is designed for medical image management and design.Including the image acquisition, processing, storage, display or print hardware and software systems, is the medical shadow , digital image technology, computer technology and network communications technology combined production.PACS needs to solve the problem of data transmission and image storage, how to use limited Storage space to store more images, medical image compression is one of the key technologies,

which image processing technology in a focus on the problem in recent years.