



Digital Image Processing: Its History and Application

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Abstract: Digital Image Processing is that the use of a digital computer to process digital images through an algorithm. Digital Image processing could be a Software which is employed in image processing. For example: camera work, signals, photography, camera mechanism, pixels, etc. The target of this paper is to debate History of digital image processing and its applications.

Keywords: Digital Image processing, signals, mechanism, pixels.

I. INTRODUCTION

The purpose of early image processing was to boost the standard of the image and visual effects of the people. As per the Development of computers, mathematics and also the real-life demand Digital Image Processing also evolved rapidly. Now a Days Digital Image processing is employed Widely in real-life applications. Because of increasing Trends, needs, and applications of imaging it become tougher to process images for desired objectives. To beat this problem the concept of capturing, storing, finding, retrieving, analysing, and using images in standard of living under the computing environment came into existing. A number of the important applications of the image processing are image sharpening and restoration, remote sensing, feature extraction, face detection, forecasting, optical sharing, optical character recognition, biometrics, medical imaging, augmented imaging, license plate recognition, lane departure caution, transportation, parking, transmission and encoding machine vision, robotics, colour processing, signature recognition, iris recognition, face recognition, forensics, automobile detection, fault detection, pattern recognition, military application and others.

II. HISTORY

Digital Image processing were developed within the 1960s, at Bell Laboratories, the Jet Propulsion Laboratory, Massachusetts Institute Of Technology, University of Maryland, and some other research facilities for satellite imagery, medical imaging, wire-photo standards conversion, photography enhancement, videophone, character recognition. One in all the earliest applications of the digital image processing is seen within the newspaper industry in the 1920s. It had been about the photographs that were sent by submarine cable between London and New York. Now because the development of recent digital technologies got developed Digital Image Processing also get developed. Very commonly and basic used techniques in image processing are enhancement, restoration and compression of images. The very first successful application was America Jet lunar photos were sent by Space Detector Ranger 7 using this application in 1964. Techniques mainly utilized by them were like geometric correction, gradation transformation and noise resent lunar photos. It had been a giant success story to possess the successful computerized mapping of the moon's surface. The Success of this application was noticeably progressed so spacecraft sent nearly 100,000 photos that were processed with more complex image functionalities. It helped to get the topographic map, colour map and panoramic mosaic of the moon.

Because of the computing equipment of that era the value was fairly high at that time. But it had been changed in 1970s as dedicated hardware were available and digital image processing proliferated as cheaper computers. As general-purpose computers become faster it began to occur of the dedicated hardware of all. In 2000s there have been fast computers and signal processor and thereupon digital image processing become the foremost common type of image processing. It's mostly used because it has turned to a significant computing discipline which is playing a big role to resolve reality life problems in real time.

The primary camera was invented in 1975 but it didn't take the primary digital photo. The primary digital photo actually came 20 years earlier in 1957 when Russell Kirsch made a 176*176 pixels digital image by scanning a photograph of his



three months old son. The low resolution was because of the actual fact that the pc they used wasn't capable of storing more information.

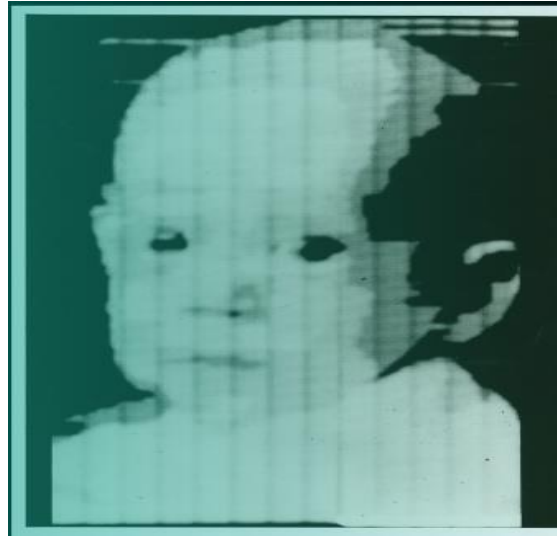


Fig. 1 The First Digital Photograph of Walden

Back in 1957, Kirsch created a 2-by-2-inch black and white digital image of his son Walden as an infant. The image was then scanned into a computer, marking it along the world's first images ever scanned. The above fig. 1 shows the photo of Walden. At the time, Kirsch used a tool created by his research team at the U.S. National Bureau of Standards to scan the image. Kirsch was the one to later use pixels with variable shapes rather than the squares, a technique that managed to ultimately rid images. He's the person to blame for creating the pixel that forms the digital images videos we see today, passed on the great beyond on August 11 at his target in Portland, Oregon at age of 91.

III. APPLICATIONS

Some of the applications of the digital image processing within the field of Science, Engineering and Technology are as follows: Image sharpening and restoration, remote sensing, feature extraction, face detection, optical character recognition, biometrics, medical imaging, optical sorting, video processing, microscope imaging, license plate recognition, lane departure caution, transportation, parking, robotics, signature recognition, forensics so on.

A. Medical Field

The need for digital image processing in medical field was changing density range of Black and White images, interfacing analog outputs of sensors such as endoscope to digitizers and into image processing systems, colour correction and manipulation of colour within a colour image, zooming of images, Removal of artifacts from the pictures, construction of 3D images to 2D images. Now a days Doctor's use digital cameras to determine the inside portion of the material body and even operations also are possible through cameras. As world get digitalized all new techniques associated with digital image processing during this sector also get developed.



Fig. 2 Medical Imaging



B. Remote sensing

Remote sensing is that the process of detecting and monitoring the physical characteristics of a part by measuring its reflected and emitted radiation at a distance typically from satellite or aircraft. Some basic technique common in remote sensing are image registration, image fusion, image segmentation and classification. Imaging systems, particularly those on-board satellites, provide a repetitive and consistent view of the planet that has been employed in many remote sensing applications like urban growth, deforestation and crop monitoring, weather prediction, land use mapping, land cover mapping and then on. For every application it is necessary to form methodology to extract information from particular image data.



Fig. 3 Remote Sensing

C. Robotics

Cameras are essential in robots like self-driving cars that are required to identify objects within the environment. Sensor within the camera return an array of pixels to which image processing algorithm are applied.



Fig. 4 Robotics

D. Face Detection

Face detection may well be a technology getting utilized in an exceedingly reasonably application that identifies human faces in digital images. Face detection also refers to the psychological process by which humans locate and attend to faces in an exceedingly very visual scene. Face detection algorithms specialize in the detection of frontal human faces. It's analogous to image detection during which the image of the person is matched bit by bit. Image matches with the image stores within the database.

