Estimating the Imaging in Medical Science Using Image Processing Techniques

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ABSTRACT: Automatic image search is proving prominent in the medical imaging domain because it includes commands such as division, extraction of vital elements of the agent, coordination, layout, monitoring, the examination of movement, estimation of defacement, and three-dimensional recreation. The character of the input images takes on a polar job within the scope of any image review task. The higher image quality produces simplified and less advanced procedures for image processing. Consequently, inexpensive processes such as clamping, geometric adjustment, edge enhancement, differentiation, or brightness review will be required for the image processing. Despite the difficulties, automatic techniques for processing and searching for images are applicable for processing and searching for images is applicable for a good range of uses. In this paper, there are techniques we have appraised to process and examine objects in the images. In the following sections, these techniques will be introduced in applications from drugs and biomechanics to development and material sciences.

Keywords: Image processing, Image segmentation, medical science, Neural view

1. INTRODUCTION
The procedure examination of things in pictures could be a tough issue because it is ordinarily includes programmed undertakings for division, that is, the identification of the articles spoke to extraction of agent from the articles, coordinative between pictures, inflexible and non-unbending arrangement of pictures, monotonous following and movement investigation of highlights in image successions, disfigurement estimation between two articles, even as the 3D from creation of the articles from these pictures. Even though, to complete all these assignments throughout a completely programmed, effective and hereby approach is commonly requesting. A touch of these undertakings usually show up connected. The nature of key footage assumes a crucial job at intervals, for the accomplishment of any procedure image segmentation task. As a result, their quality seems to be the simpler and fewer advanced. The assignments are usually and henceforth, to boost the nature of the information footage, acceptable techniques for procedure image method. For example, clamor evacuation, geometric adjustment, edges, and quality upgrade and brightening remedy or blending, are needed. Despite of nature troubles, machine techniques for image process and examination provides a wide scope of great applications for our public. Applications with relevancy two-dimensional, three-dimensional or may be four-dimensional data is effectively found in observation, pc generated reality, prescription, building, biomechanics, engineering science and material sciences.

2. RESEARCH METHODOLOGY
2.1 RESEARCH OBJECTIVES
• To discuss requirement or purpose of image processing.
• To explore the importance of digital image processing in medical reports/test.
• To discuss the various applications of image processing.
• List the advantages and disadvantages of image processing.

2.2 METHODOLOGY
The methodology used to recite a research project on Image Processing was secondary method of research methodology, under this method, a descriptive study/research is done over the topic and also the data is collected to various secondary sources like: online, pdfs, websites, articles, journals, e-books, etc. Once the data collection is done, the collected data is rephrased according to our understandings and then report is completed by typing all our learning’s into an easy language.

3. CLASSIFICATION OF IMAGE PROCESSING TECHNIQUES

Many current techniques are used for the segmentation of images. Two simple approaches of segmentation, regional or edge dependent approaches, may tackle these techniques. To perform the required segmentation, both techniques can be used in different images. Both these strategies can also be classified into three groups. The basic strategies are those procedures of picture division that depends upon the data of the structure of required bit of the picture, for example, the necessary locale which is to be portioned. The stochastic procedures are those strategies of the picture division that chips away at the discrete pixel estimations of the picture rather than the auxiliary data of area. These techniques can be broadly classified into following two categories. Figures 1 presents various types of Image segmentation methods.

A. Structural Segmentation Techniques
B. Hybrid Techniques

The half breed strategies are those methods of the picture division that utilizes the ideas of both above procedures for example, these utilizations discrete pixel and auxiliary data together. In further sections of this paper the different systems of division are talked about and looked at. Numerical depiction is evaded for straightforwardness. In this way all the methods are portrayed hypothetically. The famous systems utilized for picture division are threshold strategy, edge strategies, halfway differential condition based and fake neural system-based procedures and so forth. These all procedures are not quite the same as one another as for the strategy utilized by these for division. Table 1 compare the various segmentation techniques.
Table 1: Comparison of Various Segmentation Techniques [5]

| Segmentation Technique | Description | Advantages | Disadvantages |
|------------------------|-------------|------------|---------------|
| Thresholding Method    | Considering the histogram pinnacles of the picture to discover specific limit esteems. | No requirement for past data, most straightforward technique. | Exceptionally reliant on tops, spatial restraints are not thought of. |
| Edge Based Method      | In view of irregularity discovery. | Useful for pictures having better difference between objects. | Not reasonable for wrong discovery or an excessive number of edges. |
| Region Based Method    | Considering dividing the picture into homogenous areas. | Progressively safe to uproar, helpful when it is anything but difficult to characterize similarity criteria. | Costly strategy as far as time and memory. |
| Clustering Method      | In view of division into homogenous groups. | Fluffy utilizations incomplete participation in this manner, increasingly valuably for genuine issues. | Deciding participation work is not simple. |
| Watershed Method       | Considering topological translation. | Results are progressively steady, identified limits are constant. | Complex count of angles. |
| PDE Based Method       | In view of the working of differential conditions. | Quickest strategy, best for time basic applications. | Progressivel y computation al difficulty. |
| ANN Based Method       | Considering the recreation of the learning procedure for dynamic. | No compelling reason to compose complex projects. | More wastage of time in preparing. |
4. FORMATION OF IMAGE
The image is captured by a camera utilizing daylight because of the origin of validity. For image formation or production of the image a sensing element is employed [1]. These sensors are sensed by the live of sunshine mirrored and the article on which the light falls on the object. A persistent voltage signal is made once the data is being detected. The facts gathered is modified over into a complicated arrangement to form processed pictures. For this procedure, examining and quantization ways are applied. This may build a two-dimensional exhibit of numbers which can be a processed image.

4.1 REQUIREMENT OF IMAGE PROCESSING
Picture Processing fills the accompanying principle need:
• Perception of the concealed articles in the image.
• Upgrade of the image through sharpening and recovery.
• Look for important data from the images.
• Estimating various examples of articles in the image.
• Recognizing various items in the picture.

4.2 APPLICATIONS OF DIGITAL IMAGE PROCESSING
There are totally different utilizations of computerized image process which may likewise be a good theme for the proposal in image processing. Following are the basic uses of image processing [2]:
• Image process is employed to upgrade the image quality through procedures like image sharpening and reconstruction. The photographs are often adjusted to accomplish the best outcomes.
• Computerized image process discovers its application within the field for gamma-beam imaging, PET Scan, X-beam imaging, UV imaging.
• It is used for transmission and coding.
• It is used in shading within which processing of hued pictures are finished and then utilized by various shading areas.
• Image process discovers and its application in Artificial Intelligence.

5. COMPONENTS OF DIGITAL IMAGE PROCESSING
There are totally different in advanced image process for proposal and analysis. Here is that the summing up of most up-to-date proposal and analysis themes in advanced image processing:
• PICTURE ACHIEVEMENT
Image Acquisition is that the initial and vital advance of the computerized image process. Its mode is exceptionally an easy purely like being given a picture that is of currently in advanced structure and it includes preprocessing as an example for scaling and so on. It begins with the catching of a picture by sensing element, for example, a monochrome or shading TV camera and digitized. Within the event that the yield of the camera or sensing element is not in advanced structure then straightforward to computerized device (ADC) digitizes it. On the likelihood that the image will not properly obtain at that time, we will not have the choice to accomplish errands that we have to be compelled to. Redone instrumentality will be used for leading-edge image acquisition methods and techniques. 3D image acquisition is one such propelled technique image security strategy. Understudies will choose this system for his or her lord’s theory and analysis.
• IMAGE ENHANCEMENT
Image upgrade is one of the simplest and the most significant regions of advanced image processing. The center thought behind image improvement is to discover data that is darkened or to feature plain highlights as per the prerequisites of an image. For example, changing glory, difference and so forth [3]. Fundamentally, it includes control of an image to get the ideal than unique for explicit applications. Numerous calculations have been intended with the end goal of image improvement in image processing to change an image’s differentiation, splendor, and different other such things. Image Enhancement plans to change the human impression of the images. Image Enhancement strategies are of two kinds: Spatial area and Frequency space.
• **IMAGE RESTORATION**

Picture re-establishment involves rising the looks of a picture. As compared to image improvement that is subjective, image restoration is totally objective that makes the sense that restoration techniques are supported probabilistic or mathematical models of image degradation. Image restoration removes any type of a blur, noise from pictures to supply a clean and original image. The image data lost throughout blurring is reconditioned through a reversal method. This method is totally different from the image improvement methodology. Deconvolution technique is employed and is performed within the frequency domain. The most defects that degrade a picture are reconditioned here.

• **WAVELETS AND MULTI RESOLUTION PROCESSING**

Wavelets set about as a base for talking to pictures in shifting degrees of goals. Pictures subdivision thus implies analytic images into littler districts for information pressure and for pointed portrayal. Wave could be a scientific capability utilizing that the knowledge is withdrawn to a varied segment that every Associate in Nursing alternate to a repeat and each half is then focused on several through the goals coordinating scale [4]. Multi-goals process could be a pyramid strategy utilized in image processing. Utilization of multi-resolution ways are increasing. Facts from pictures will be unconstrained utilizing a multi-goals system.

• **COLOR IMAGE PROCESSING**

Shading image process has been finding manually by being of unimaginable trickery on account of the notable increment within the utilization of advanced pictures on the web. It incorporates shading displaying and process during a processed space so on. There are completely different shading models that are utilized to see a shading utilizing a three-dimensional organize framework [6]. These models are RGB Model, CMY Model, HSI Model, and YIQ Model. The shading image process is finished as folks will see an outsized variety of hues. There are 2 territories of shading image process full-shading processing and pseudo shading processing. In full-shading process, the image is ready fully hues whereas in pseudo shading process the grayscale pictures are modified over to hued images. It is associate degree intriguing theme with regards to image process. Figure 2 explain the image processing procedure.

![Figure 2: Color Image Processing Graph Compression](image)

Pressure includes the procedures that are used for alteration reposition vital to spare a picture or knowledge transmission to transmit it. Within the event that we tend to cite its net use, it is for the foremost half accustomed pack information [8]. Calculations procure useful knowledge from pictures through measurements to give up usual quality images. Image pressure could be a wandering suggestion theme in image process.

• **MORPHOLOGICAL PROCESSING**

Morphological process includes separating apparatuses of image components that are in addition used within the representation and depiction of form. There are positive non-direct tasks at once identifies with the highlights of the image. These tasks will likewise be applied to grayscale pictures. The image is tested taking things down a mark called the organizing part.

• **SEGMENTATION**
Division includes partitioning a picture into its constituent elements or articles. For the foremost half, self-sufficing image division is maybe the toughest enterprise in advanced image process. It is a rough division system that takes way toward a good arrangement of imaging problems that expect articles to be recognized solely. In basic terms, image division implies dividing a picture into varied fragments for improvement and ever-changing the portrayal of the image. Right now, is dealt out to every picture element such a minimum of two marks might have an identical name [9].

- **REPRESENTATION AND DESCRIPTION**
  The behavior of picture and its depiction depends upon the crop of a division stage and it incorporates crude information [11], establishing either all the focused Information within the rule or simply limit of the rule. Selecting a portrayal may be a piece of the solution for amendment crude info into an affordable structure that allows succeeding laptop process. As depiction manages extricating qualities that yield quantitative information of intrigue or essential to isolate one category from another.

- **RECOGNITION**
  Acceptance includes supply of a reputation, as an example, "vehicle" to AN item entirely hooked into its descriptors. it is a technique for observing a specific item in a picture or video. There are positive systems and models for object acknowledgment like profound learning models, sack of-words model and then on. This could be attainable utilizing MATLAB. This needs AI and profound learning methods

- **KNOWLEDGE BASE**
  In sequence is tied in with numbering districts of a picture to seek out the info of intrigue that eventually delimits the exploration to be directed in searching for that data. Information Base gets puzzling, for instance[14]. An interconnected summation of all-important potential imperfections in materials appraisal problems or a picture information convincing high-goals satellite pictures of a venue about change-recognition applications.

6. **IMAGE PROCESSING IN MEDICAL DOMAIN SEGMENTATION TASK**

In the procedure visualization gap, the recognizable proof of the things has spoken to pictures is normally referred to as division. For these enterprise process techniques that depend upon layout coordinating, factual demonstrating, deformable formats, deformable models, level set methods or somatic cell systems are each currently and once more utilized. Figure 3 shows the example for it. After the connection of the image, the approaches of the districts within the informative images which are very similar to the design of the image used, can have the most remarkable association estimates, that of the image. This system is exceptionally simple and straightforward, but it shows a couple of impediments to manage, for example, geometric faults or contrasts in lighting.

![Image template (left) used to distinguish human eyes in images (right) [10]](image)

6.1 **MATCHING, REGISTRATION AND STIMULATION**

It is Arranging the knowledge of 2 articles, or of 2 styles into 1 item, spoke to in pictures may be a subject of unimaginable significance and exceptional analysis in procedure vision particularly, owing to the tremendous variety of potential applications. Basically, the present ways to arrange and coordinate the things by utilizing information that is associate in Nursing invariant image like curvature or displacements in international coordinate areas. Figure 4 shows the brain mapping for an Image.
6.2 TRACKING

Desktop assessment of things obtaining image successions is Associate in Nursing exceptionally intelligence issue, because it may represent assignments for programmed discovery of articles, coordinative, following and disfigurement estimation. Propelled by its wide scope of big applications, wondering either two-dimensional or three-dimensional data, as in meditative imaging primarily based determination, human step investigation, observation frameworks, traffic examination, acknowledgment of articles, gift estimation and distortion examination, the computer examination of things moving has developed imposingly within the course of the foremost recent decades [15]. For this investigation, various arrangements may well be utilized to handle the problems of each application, except compels connected with procedure unpredictability even as with calculation speed are unremarkably accepted. To explore the protests that move in the groupings of images, an initial must distinguish for example fragment the objects of interest for each image for example, perform within local images or illustrative highlights of the articles to follow and subsequently monitor them from back to back images, while maintaining the correct connection of the data. Two basic sources of worry in examining the process of reproducing things moving from groupings of images are:

1) Revolutionize in the exterior of the articles obsessed by the alteration of the edge of the relief, by the lighting conditions, by the topology or by the non-foldable scratches.

2) Circumstances in which things mix or prevent.

6.3 THREE-DIMENSIONAL RECONSTRUCTION

Right now, gift the philosophies we have adapted the 3D state of things from 2D pictures. The incidental to approaches is commonly used

- for external forms: dynamic methods, that is, with the projection of a vitality on the surface of the articles or with a relative movement between the frame for fixing the image and also the articles; latent systems, that is, without projection of vitality or relative movement; and techniques to cut the house;

- For inward shapes: two-dimensional division, for example, the division of the types of the articles, and later the insertion of the division includes thus on get the surfaces of the things For the foremost half, the reformation of the state of three-dimensional objects from second pictures includes assignments of camera adjustment, info division, coordinating, triangulation and interruption. Moreover, the mill troubles are because of geometric twists, terrible or unpredictable brightening conditions, impediment event, image commotion, complicated shapesand so on. Figure 5 shows reconstruction process.

Lately, during the reconstruction of the external states of the articles, such as human physical structures, we have applied the techniques of cutting the area. These techniques cover the meter areas
of the articles and do not require a coordination procedure between the photographs used, which is generally exceptionally advanced with fast things. consequently, regularly, the three-dimensional models are processed by a grouping of images, obtained using a rotating platform gadget. For this, the jumping volumes of things are characterized and therefore cut by a bodily process, the voxels sure that they are not photographs and no images [17].

7. AUTOMATIC VISUAL INSPECTION SYSTEM
- To increase the efficiency and quality of the goods in manufacturing and allied industries, automated visual inspection systems are essential. We present here briefly few systems for visual inspection.
- Automatic inspection of light filament: the inspection of the bulb manufacturing process is an important application of automat visual inspection. Sometimes after a short period of time the bulbs’ filament gets fused due to incorrect filament structure, for example, non-uniformity of the cables in the lamp. The detection of these irregularities by manual inspection is not effective.
- A binary filament image slice is created from which the filament’s silhouette is produced in an automated vision-based inspection system. In this silhouette, uniformities in the filament geometry pitch within the bulb are identified. The General Electric Company has designed and built such a system.
- Component disappointment recognizable proof: Automated visual examination can likewise be utilized in electronic or electromechanical frameworks to identify deficient parts. The flawed parts are produced normally progressively warm quality from the dissemination of warm vitality in the gathering, photographs can be creating infrared (IR). By assessment of these IR pictures, the inadequate parts in the mount can be recognized.
- Automatic surface investigation frameworks: surface imperfection recognizable proof is a necessity in many metal industry businesses. Any deviation on the moved metal surface can for instance, be seen in the hot or cold moving factories in a steel plant. You can do this utilizing picture preparing strategies, for example, edge location, acknowledgement of shape, fractal examination and so on.
- The return of a broad image database query image is an important processing function. The introduction of large multimedia collections and digital libraries has led to a significant necessity to create search instruments to index and collect information. Today there are a variety of search engines for reading the text in machine form, but not many fast instruments for searching for images of extreme strength and color. Current search and indexing methods are inactive and costly. Therefore, the development of algorithms to recover the image using the embedded content is urgently required.
- The digital image features such as shape, text, color, topology etc. can be used for search and retrieval from large image databases as index keys of pictorial information. Recovery of photographs based on these image qualities is popularly referred to as the image recovery based on content.

8. NEURAL ASPECTS OF THE VISUAL SENSE
Our visual system’s optic nerve joins the eyes and interconnects with the rear of the eye rods and cones. There are dendrites (inserts) in the neurons and a long axon with an end. Synapses relay the neurons. The signal transmission is linked to the diffusion of chemicals through the interface and the arc of neurons obtained by these chemicals, which are stimulated or inhibited and distributed across the interface. The optic nerves start out on one side of the retina with bundles of axons from the ganglion cells. On the other hand, bipolar cells bind rods and cones and even horizontal nerve cells forms lateral connections. There are lateral horizontal neural cells. To form a receiving field of opposite answers at center and periphery, the signals from the next receptors in the retina are clustered by the horizontal cells, so that no net stimulus is produced by a uniform field illumination. In the case of non-uniform lighting, the Lightning disparity in the middle and in the periphery stimulates. Many receiving fields have color and light are separated from stimuli. The lateral geniculate species and the visual cortex are further clustered for spatial edge detection and eye control of receptive field responses [12]. This analysis is poor before a high-level understanding with
undefined mechanisms. However, it demonstrates the significant role of sensual distinction at the root of contrast phenomena. Figure 7 shows the human brain view of flashed images frequently viewed videos.

![Figure 6: Human Mind Perception of Images and Videos [16]](image)

When the retina is uniformly illuminated in luminosity and color, there is very little movement of the nerve. There are between 6 and 7 million cones in a normal human eye and between 110 and 130 million rods. The fibers in the optic nerve receive the optical signal from rods and cones. The optic nerve passes through an optic chiasma with all signaling sent to the right half of the brain from the right side of the two retinas and all signaling to the left half of the brain. Half a brain takes image every day. It means that the visual system is not affected by eye failure. The optic nerves end up halfway through the brain on the lateral geniculate and the impulses are transmitted from here to the visual cortex.

### 9. ADVANTAGES OF IMAGE PROCESSING
- The processing of images is quicker and more financially knowledge. One needs less time for processing, just as less film and other shooting hardware.
- It is increasingly environmental to process images. No processing or fixing synthetic compounds are expected to take and procedure computerized images. Notwithstanding, printing inks are basic when printing advanced images.
- When shooting a computerized image, one can immediately check whether the image is acceptable or not.
- Copying a computerized image is simple, and the nature of the image remains great except if it is packed. For example, sparing an image as jpg group packs the image. By resaving the image as jpg design, the compacted image will be recompressed, and the nature of the image will deteriorate with each sparing.
- Fixing and correcting of images has gotten simpler. In new Photoshop 7, it is conceivable to smooth face wrinkles with another Healing Brush Tool in two or three seconds.
- The costly proliferation (contrasted and raster the image with a repro camera) is quicker and less expensive.
- By changing the image configuration and goals, the image can be utilized in various media.

### 10. DISADVANTAGES OF IMAGE PROCESSING
- Misuse of copyright is currently simpler than previous. For example, images can be duplicated from the Internet just by tapping the mouse two or multiple times.
The approximation of the image will deteriorate. This has not really happened all over the place. Images held in image banks despite everything have sensibly great costs, despite the way that downloading images through the net is quick and simple. The beneficial of advanced photography has expanded the quantity of images and photography by and large.

Old callings, (for example, producer up, repro cameraman) evaporate and new ones do not really show up. For example, in mid-1990s, the paper began utilizing modernized make-up, and the customary producers up were left jobless.

Work has gotten progressively specialized, which may not be a disservice for everybody.

A computerized record of a specific size cannot be enlarged with a decent quality any longer. For example, a great praise cannot be made of an image document of five-hundred kb. In any case, it is anything but difficult to make an image smaller [7].

11. CONCLUSION & FUTURE WORK

This scientific research work has fleetly displayed the ways and methods with to examine objects addressed in the pictures. We have defined varied techniques and applications relation to assignments of division, coordinating, enlistment, copy, following and three-dimensional creation of things. Even though the intense work that has simply been done, abundant work must be done everything, to create increasingly abundant and adaptable techniques for numerous applications in medical domain. To achieve the efficiency the commitment of specialists in alternative logical fields and potential end customers is fundamental and generally welcome. Computer algorithms are used to perform image processing in digital images. Digital image processing has many benefits over analog image processing as a sub-category or field of digital signal processing. The processing of input data allows for a much wider variety of algorithms and avoids difficulties including noise build-up and signal distortion during processing. Digital image processing can be modeled as Multidimensional Systems as images are represented in 2 and perhaps more dimensions. Having stressed and implementation on hardware devices and the transmission of image data in a safe manner, we briefly discussed the work on image treatment domain in this article. This paper will allow further research in this area to be implemented. The difficulty of time in the whole method of threshold and minimal image data to be stored in the FPGA board have nothing to do with the need to tackle, we have worked on fundamental filtering mechanisms and the digital image water marking and some other problems related to image protection. The preparing of pictures has a wide verity of utilizations which permits the specialist to pick one of his regions of intrigue. Numerous discoveries of study are distributed however different zones of research stay immaculate.

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