



## Feature Extraction for Image Processing and Computer Vision- a Comparative Approach

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# Feature Extraction for Image Processing and Computer Vision- A comparative approach

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## Abstract

Digital Image processing is a technique to process image digitally. This means image is represented using pixels and all the algorithm are implemented using that value. A digital image consists of a finite variety of parts unremarkably named as image parts, pixels. Pixel value determines the type of image ie weather it is gray scale or RGB . Computer Vision is a part of deep learning in which processing is done on images. The application of image processing include robotics, object detection, weather forecasting etc. In this paper the main goal is to focus on different feature extraction techniques applied by computer vision and digital image processing. Image Features are important input for any image processing tasks. Features include Blobs, Corner , Edges etc. Keywords: SIFT, Image processing, Artificial Intelligence, Pixel.

## 1 Introduction

Computer Vision includes another branch of experience called Artificial Intelligence (AI) whose objective is to emulate human intelligence. the world of Image Analysis or Image Understanding is in between image process and pc vision. there's no general agreement among analysis community relating to the borderline between image process, image analysis and pc vision. generally a distinction is formed by process image process as a discipline during which each the input and output of the method area unit pictures. it's a method that involves primitive operation [1]. s like reduction of noise, distinction sweetening, and image sharpening etc. Image analysis could be a method that's characterised by the very fact that its inputs area unit typically pictures, however its outputs area unit attributes extracted from those pictures (e.g., edges, contours, and therefore the identity of individual objects). and at last, pc vision could also be

outlined as a method that involves “making sense” of Associate in Nursing ensemble of ingrefers to the sector of process digital pictures with the resistance of a data processor. A digital image consists of a finite variety of parts remarkably named as image parts, image parts, pels or pixels. Pixel is the term most generally accustomed denote the essential part of a digital image[3]. Like human imaging system, digital imaging devices will acquire digital pictures and store them for process. however in contrast to human WHO will capture pictures just for visible band of spectrum, imaging devices will capture pictures covering whole vary of spectrum. Thus, digital image process encompasses a large sort of application areas within the domains of life science, remote sensing, traffic observance, document analysis and retrieval etc[2]. On the opposite hand, pc Vision is another domain of analysis space, wherever the final word objective is to use system to emulate human vision by learning from the setting and having the ability to form inferences on specific things and take necessary actions on the premise of the inferences. This space includes another branch of experience called Artificial Intelligence(AI) whose objective is to emulate human intelligence the world of Image Analysis[6].

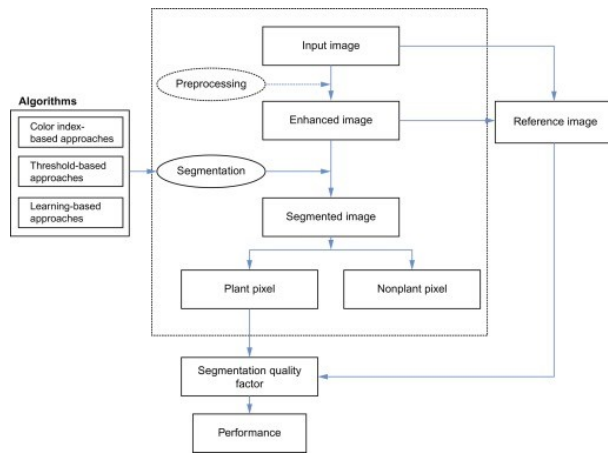


Figure 1: Steps Involved in Image Processing (source Resource-Sciencedirect.com)

## 2 PARALLEL ARCHITECTURES FOR IMAGE PROCESSING

Image Understanding is in between image process and pc vision. there’s no general agreement among analysis community relating to the borderline between image process, image analysis and pc vision. generally a distinction is formed by process image process as a discipline during which each the input and output of the method area unit pictures. it’s a method that involves primitive operations

like reduction of noise, distinction sweetening, and image sharpening etc[7]. Image analysis could be a method that's characterised by the very fact that its inputs are unit typically pictures, however its outputs are unit attributes extracted from those pictures (e.g., edges, contours, and therefore the identity of individual objects). and at last, pc vision could also be outlined as a method that involves "making sense" of Associate in Nursing ensemble of recognized objects, as in image analysis and activity the psychological feature functions call related to vision .Based on the preceding discussions, it's seen that a logical place of overlap between image process and image analysis is that the space of recognition of individual regions or objects inside a picture[9]. Thus, during a broader sense, digital image process encompasses processes whose inputs and outputs are unit pictures and also the processes that extract attributes from pictures, up to and together with the popularity of individual objects. To clarify the thought any, allow us to take into account the matter of machine-driven recognition of text inside a general scene image[10]. The processes of feat a picture containing the text, pre-processing that image, segmenting the individual characters, describing the characters within the sort of feature values appropriate for pc process and recognizing those individual characters will somewhat be thought- about inside the scope of digital image process. creating sense of the content of the image could also be viewed as being within the domain of image analysis and even pc vision, reckoning on the extent of complexity of the matter reminiscent of the extent of expected answer implicit by the statement "making sense". Applications of Digital Image process[4][5] . There are unit various applications of digital image process starting from early 20th century until currently. one in every of the oldest applications of digital pictures, as according in literatures, was causing photos by submarine cable between London and the big apple. In 1920, introduction of the Bartlane cable image gear improved the time needed to move an image across the ocean specialised printing instrumentation coded the photographs for cable transmission so the photographs were reconstructed at the receiving finish[11]. Visual quality of those early digital photos was improved towards the tip of 1921 by introducing a way supported photographic copy. the first Bartlane systems were capable of secret writing pictures in 8 distinct gray levels, that was increased to fifteen gray levels in 1929[8]. Though the examples simply cited involve digital pictures, the evolution of digital image process is intimately tied to the event of the data processor. owing to its inherent nature, digital pictures need most cupboard space and their process needs most process power that progress within the field of digital image process had been extremely obsessed on the event of digital computers[14]. tho' the thought of a pc was planned long back, what's known as a contemporary data processor came solely in Forties with the introduction of 2 key ideas by John von Neumann: (1) a memory to carry a keep program and knowledge, and (2) conditional branching. These two concepts are unit the muse of a central process unit (CPU), that is that the heart of computers nowadays. beginning with the John von Neumann design, there have been a series of key advances from the invention of the semiconductor by Bell Laboratories in 1948 to this use of radical massive scale integration (ULSI) in Nineteen Eighties

that semiconductor diode to computers powerful enough to be used for digital image process. initially the primary computers powerful enough to hold out meaningful image process tasks appeared within the early Sixties and therefore the first potential digital image process victimisation those computers for rising pictures from an area probe began at the reaction propulsion Laboratory [7][8]. Golden State in 1964 once the photographs of the moon, transmitted by Ranger seven, were processed by a pc to correct varied varieties of image distortions. The invention of computed tomography (CT) within the early Seventies is one in every of the foremost necessary events within the application of image process in life science. Another rising space of application is image registration, that is that the method of orienting 2 or additional pictures (the reference and perceived images) of a similar scene taken at completely different time, from completely different viewpoints, and/or by completely different sensors [5]. This has monumental applications in life science field. From the Sixties till this days, the sector of image process has fully grown quickly additionally to applications in medication and within the house programs, digital image process techniques area unit currently utilized in a broad vary of applications. Study of the aerial and satellite imagery is another space of the applying of image process [14]. In physics and allied fields, image process techniques area unit accustomed enhance ensuing pictures of the experiments in areas like high-energy plasma's and microscopy [12]. Archaeological use of image process includes restoration of blurred pictures that were the sole obtainable records of rare artefacts lost or broken once being photographed. alternative productive applications of image process techniques may be found within the field of bioinformatics, astronomy, chemistry, medical specialty, enforcement, defence, industrial applications etc. The same examples illustrate the cases wherever the results of process area unit supposed for human interpretation [11].

### 3 Applications of Digital Image Processing

Another major space of application of digital image process techniques is in determination issue.s managing machine perception which can have very little similitude to visual options that humans use in deciphering the content of a picture [4]. Biometric recognition is a vital and wide application space wherever digital image process plays a vital role. Automatic face recognition fingerprint recognition, palm recognition, tissue layer recognition have been the well researched areas during this domain. Content based mostly image retrieval is another domain of analysis during which pictures area unit categoryfied and indexed according their content specified the specified class of pictures may be retrieved as and once required in future [13]. Sign language and angle analysis are the area unitas wherever import of arm/body movement and countenance area unit analyzed and high level linguistics are inferred. alternative typical area unitas of machine perception that utilize image process techniques are optical character recognition (OCR), robotics, military signal process, meteorology and environmental assessment. Human motion tracking. With additional advance-

ment in image process techniques, evolution in electronic devices and development of extremely economical sensors and imaging devices, automatic police work has become a growing demand from completely different body authorities over the world. Human motion tracking is one in every of the requirements during this domain. several survey reports have been printed on pc vision based mostly human motion trailing. Real time trailing of human motion has been according in[2] .A 3D-model based mostly human motion trailing has been printed in Associate in Nursing analysis and synthesis of human movement is according in[15]. police work in computer game is additionally according in numerous literatures trailing human motion during a scene and tally variety of interactive individuals has been according in alternative connected applications like gesture recognition, prediction of motion trajectories and artificial intelligence are necessary analysis areas of digital image process[3].Pedestrian behaviour analysis Another application space associated with human motion trailing is pedestrian behaviour analysis and collision rejection. A report on Pedestrian Collision rejection Systems .

## 4 Conclusion

This paper gives information about different image processing and computer vision algorithm.Nowadays feature extraction is very important and crucial tasks for implementation of any algorithm that is based in images.Day by Day number of feature extraction algorithm are developing. this paper the main goal is to focus on different feature extraction techniques applied by computer vision and digital image processing.Image Features are important input for any image processing tasks. Features include Blobs,Corner Some are modification of traditional digital image processing algorithm.Computer vision has a wide future and it mostly works on images.Computer vision uses SIFT ,GLOH,SURF,PCA SIFT for extracting feature space at different scale Space .

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