



CRITIQUE ON DIGITAL IMAGE PROCESSING

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Abstract :- To know about the explicit area of a subject, literature review plays a vital role for understanding and acquiring more insights. This paper is proposed with content-based image processing. The visual features of an image may include like Shape, Colour, texture and etc., to search through vast image database on end-user's request. This paper reviews different image processing techniques namely Digital imaging, Digital image processing, fusion synthesis, image editing and so on. Evaluating these techniques reveals the most promising methods for continued investigation.

Keywords:- [Image, Image Processing, Image Manipulation.]

1. INTRODUCTION

The process involved in conversion of an image into digital format and applying with some specific operations to enrich the image or extract the useful insights. Image processing is a type of signal processing whereas the input is an image like as a video frame, and the result can be an improved images or specific features extracted from it. Image processing systems generally treat images as two dimensional datasets and apply a range of techniques to manipulate them. Essentially, image processing gets involved in digital manipulation of images, sound modifications, or related changes carried out on a system. It aims to extract valuable information or to enhance the quality of image, and is a signal processing type where the input is an image and output can be an enhanced image or its related features. Currently the field of Image processing is encountering swift technological progress.

Image processing basically encompasses with the three basic steps: The acquisition tools for importing image; Analysing and manipulating the images; Output, a report based on image analysis.

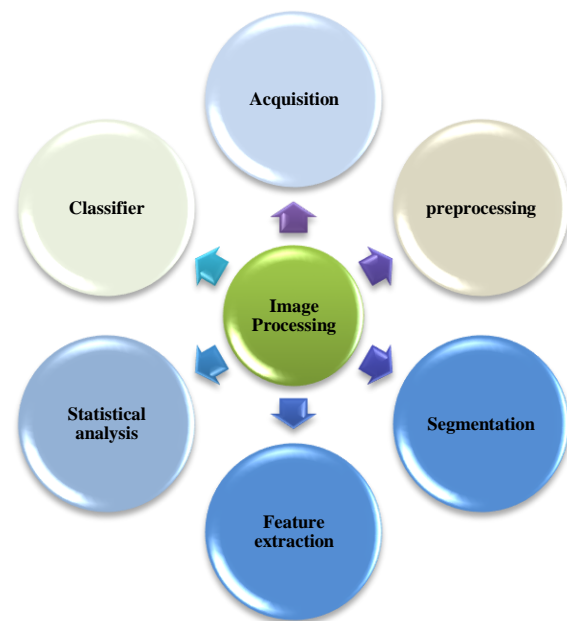


Figure 1: Image Processing

Image processing is the major method of accessing important tasks in an image, to get a further modified image or to remove some vital information from it. Image processing is a kind of signal processing where the data is an image and the result can be an image or features or feature related with that image. Nowadays, Image processing is one of the rapidest developing technologies, it makes remarkable exploration inside computer science. There are two types of techniques utilized for image processing, to be vivid simple and Digital image processing. Simple image processing can be accessed for the hard copies like printouts. Photographs, screenshots. Image supervisors utilize various basics of interpretations while using these visual protocols. Digital image Processing methods supports in control of digital image by utilizing computer system. When using the digital strategy, a wide range of data needs to cross through three phases like Pre-processing, Upgrading, and displaying information extraction. This literature will cover the scope to computer vision from image processing.

2. LITERATURE REVIEW

1. Y. Cheng and B. Li (2021) et.al outlined the technology of image segmentation and its applications in digital image processing. Image Processing technology in china has increased and implemented in many fields because of the development of science and technology. In Final Thoughts Image segmentation technology in digital image area has noteworthy applications beyond multiple fields like Bio Medical science, remote sensing engineering, Transportations, and inferno and detection. However, challenges persist in the Image segmentation technology of digital image, along with issues with broad range of frequency ranges, Low pressure data and Minimal processing speed. Hence it is important for researchers to move forward the implementation of this technology, address these issues, and identify effective solutions, in some areas, Digital image segmentation technology is most important for driving economic development of China.

Advantages

Image segmentation technology in digital image has top-notch applications in fields like Bio Medical science, remote sensing engineering, Transportations, and inferno and detection.

Dis-advantages

The image without noise reduction, the histogram does not explicit the normal height and the box of the dido value.

2. M. A. A. Mosleh, A. A. AL-Yamni and A. Gumaei (2019) et.al proposed An Automatic Nuclei Cells Counting Approach Using Effective Image Processing Methods. The approach relies on thersholding and morphological operations fixed to histological images where the color channels have been removed. Previous work in the spatial domain identified various controversies in segmentation due to the inherent intensity fluctuations in nuclei cells. The proposed method clarifies these controversies by isolating the color modes and then using suitable thresholds. This format differs from the existing approaches in its sequential procedures and efficiency, allowing us to easily resolve the challenges of segmentation. The latest methodology explained its effectiveness and efficiency in automatic detecting and counting nuclei cells. 37 images were conducted for analysis from public dataset which contains 100 histological images shown higher accuracy and effectiveness of the implemented approach. This method exhibits superior accuracy in detecting nuclei cells compared to previous match work.

Advantages

The innovative methodology illustrates considerable effectiveness and efficiency in the automatic detection and counting of nuclei cells. Superior accuracy in detecting nuclei cells compared to previous match work.

Dis-advantages

There is a necessity to develop more comprehensive surface feature strategies to get difference between cell structures and background, and to enhance shape refinement with boundary limits.

3. W. Xiong et al. introduced a study on a Fire Detection and Image Information Processing System utilizing image processing techniques. Accurate fire detection and early warnings are crucial for ensuring the safety of buildings. One of the major threat of accident to public security and social development is with the cause of Fire. The disaster with fire is five times greater than compared to natural disaster like Earthquakes, Floods, draughts and so on, therefore fire incidence is highest among all the various incidence. Hence effective monitoring fire in real time and to minimize fire oriented losses is a main focus in fire prevention and control. Digital image processing – Fire detection technology applies these techniques to detect and alert for fire. The introduced pre-processing alert method effectively reduces image processing time, improves fire detection accuracy, and lowers the rate of false alarms. It involves analysing the region's colour variations, edge shape similarity, overall movement, and shape changes of local edges within the 'suspicious' regions of the image sequence. These features are then sent to the classifier as feature vectors, which enhances the accuracy of detection.

Advantages

The suspicious region in the image sequence is directly extracted as a feature vector and sent to the classifier for recognition, enhancing the correctness of the identification process.

Dis-advantages

Monitoring technologies in previous were characterized by minimal coverage and a high false rate alerts.

4. C. Tang et al. (2020) introduced a Joint Regularization-Based Image Reconstruction technique by integrating Super-Resolution Sinogram for Computed Tomography Imaging. The 2*2 acquisition mode improves projection collection efficiency and reduces X-ray exposure time in computed tomography (CT) imaging concept. The super resolution SR technique is used to enhance the quality of projection in 2*2 acquisition mode, the signal to noise ratio of the reconstructed image may be affected by estimation bugs between SR sinograms and high resolution sinograms. Since the above method is followed because of the collected projection has low resolution and resulting in poor constructed image quality. By obtaining Super Resolution Sinograms the

matrix of system in 1*1 and 2*2 projection acquisition mode was utilized to construct fidelity terms. Block matching and TV regularization is the proposed reconstruction method, binds the system matrix into two projection acquisition modes enhancing the fidelity of reconstructed images. It solved the iterative alternating minimization method. Many experiments result on realistic anthropomorphic phantom data which the exposed method high performs its counterparts in terms of noise suppression and in-depth preservations in Computer Tomography image reconstruction from Super Resolution Sinogram.

Advantages

The SART method to a great extent minimises noises in the reconstruction images and BMTV method further develops the reconstruction quality

Dis-advantages

The SART TV collapses the image details in the phantom skull.

5. C. Varma and O. Sawant (2018) et al. proposed an alternative approach to detect breast cancer using digital image processing techniques. The end result images confirmed the expiry of their approach for tracing their anomalies in breast tissue and effectively differentiating breast cancer identification but also finds in extracting areas of interest from images of biomedical when the proper threshold limit is selected thereby having wide efficient in the field of biomedical. To achieve high quality visualization and detection, followed by efficient feature extraction leading to improved diagnosis, an advanced method with utilizing surface analysis combined with thresholding and segmentation is used. Additionally, their approach benefits from reduced processing time and increased processing speed. The future vision is to make unprocessed as processed image with procedure independent factors without time delays, on second addition they plan to examine and incorporate several environments-based features along with rapid –up techniques to improve the resultant segmentation. At the end, they intend to integrate performance assessments from practicing clinicians involved in breast cancer valuation to provide a milestone for evaluating the progress of their endeavour.

Advantages

Thresholding and segmentation are the further developed method to complete great visualization, detection,

The advantage of reduced processing time and processing speed.

Dis-advantages

Procedure autonomous factors.

6.A. Sharma and A. Sonker (2019) et.al proposed Benefaction of Digital Image Processing Techniques in Quality Assessment of Rose Flower. Structural health monitoring (SHM) and structural integrity evaluation (SIE) in view of radio frequency identification (RFID) in the ultrahigh frequency (UHF) band are the following criteria getting increasingly more consideration because of their wireless, passive, and minimal expense characteristics. Real-time cognizance of parts of item's status or ecological conditions.in addition Coordinating sensing capacity in RFID labels delivers the entire system fit for following. As of delay, individuals' status to utilize RFID-based "brilliant skin" for in situ monitoring of the health state of huge scope infrastructure is expanding, on account of the minimal expense and wide accessibility of RFID technology. A 3-D UHF RFID label antenna has been intended to detect the corrosion in metals. PCA has been utilized to remove sensing information by a scope frequency measurement of AID, which soothes the test in the antenna plan, while enhances the affectability and Vigor. The created RFID sensor system can effectively distinguish and portray the corrosion stages and remotely measure the corrosion's information through a reader and a tag in a stand-off distance. It gains the merits of beat whirlpool current for NDT&E and exhibits a financially savvy way of executing circulated supervising. This methodology can possibly span the holes of NDT&E and SHM for industry application. Nevertheless, there are a very few constraints. The first is that one committed antenna is explored for a bunch of devoted examples. The second is that the RFID framework should be read for conveyed monitoring. Future work will zero in on the most proficient method to address these constraints and further develop the RFID sensor system, which incorporates the strategy and development of more antennas for various deformities and tests. Distinctive measurement strategies from readers will be additionally researched too

Advantages

The created RFID sensor system can effectively identify and portray the corrosion stages.

Dis-advantages

Restrictions and further develop the RFID sensor system, the design and development of more antennas for variety imperfections and tests.

7. G. Lu, X. Zhang, W. Ouyang, D. Xu, L. Chen and Z. GAO(2019) et.al. proposed the Deep Non-Local Kalman Network for Video Compression Artifact Reduction. The deal draws from two main factors. On first, the benefits of previously restored frames are from the recovery process of the current frame. Past learning suggest that previously restored frames can give much and more correct temporal data when compared to the

original decoded frame. So, leveraging short temporal data from previous restored frames can build a robust video artifact removal system with very high performance. Generally, the rely on previous restored frames directs to dynamic recursive solution for video artifact removal. Video compression artifact reduction as kalman filtering process treated by the framework for incorporating several deep neural networks to predict states and estimates. This recursive character of Kalman filtering and the representation learning capability of neural are the both leveraged in our system. In Addition, non-local earlier information is integrated to achieve high quality reconstruction. This approach has victoriously stretched to address various low level computer vision works like denoising. The research based on experiments results have exposed the High priority of our deep Kalman filtering network over state – of – art procedures.

Advantages

The procedure has been victoriously stretched to address of low-level computer vision tasks such as denoising.

Dis-advantages

Non -local earlier data is not effectively utilized for reconstruction.

8. S. Suwannakhun and P. Daungmala (2018) proposed a method for estimating pig weight using digital image processing with deep learning. One of the most crucial metrics in pig farming is Weight, which allows for quick analysis of routine weight and status of nutrition at the appropriate times. This activates efficient feed management, crucial for meeting market standards. Classical weight estimation protocol needs pigs to be moved to weighing machine and worker intensive, frequently requiring di quantity of people spending up to 300 seconds per pig. In this proposed neural network – based method is introduced for pig identification and weight estimation. Pigs’ images are captured in clear manner, especially with motion nature and with varied head postures, delivers an important challenge affected by camera and lighting conditions. The proposed approach involves in multiple steps: On first, A detection method of segments, on second, throughdilation and erosion concept noise reduction of the image is processed. On third, Image elements are extracted using feature extraction process, like Colour, texture, Major axis length, minor axis length, centroid, area and Eccentricity. On end, for pig weight estimation, the features are used in conjunction with large database. The end of the experiment, the result produced shown as a weight estimation approximate value of 83 % with rate of detection approximately 87%.

Advantages

Auto method has been implemented for pig identification and recognition.

Use of Multiple feature extraction for pig element.

Dis-advantages

Significant challenges are like capturing the clear image of pigs.

9. V. D. Dvanesh, P. S. Lakshmi, K. Reddy, and A. S. Vasavi (2018) et al. proposed a method for Blood Cell Count using Digital Image Processing (DIP) Digital image processing is one of the fastest growing technological field used in the era, especially in the field of medicine it plays a vital role. Digital image processing technique works with the algorithms of computer to process digi images. Blood cells counting process is a significant challenge, impacting diognoses of conditions such as polycythaemia and anemia. The proposed address this challenge using DIP techniques to reduce errors and workload stress. The procedure focus on Red Blood count (RBC) sand White Blood Count (WBC), with the achieving an overall accuracy 91% results. The proposed method detects automatically for blood counting concept.

Advantages

The proposed digital image processing method improves blood cell analysis. And it is more efficient than existing methods.

Disadvantages

Blood smeared images remains one of the changing aspect for further improvement.

10. C. Shao, Y. Chen, F. Xu and S. Wang (2019) et.al proposed A Kind of Pavement Crack Detection Method Based on Digital Image Processing. The ill effect of quantization noise that contributes in band phase noise is experienced by Time-to-Digital Converter. therefore, in the past evaluations many favours have been made to beautify the aim of Time –to – Digital Converter with the direct preposition to Vernier. In these Time to Digital Converter, since delay chains are primarily used as core quantifiers complex and precise timing control is often necessary to improve resolution. Moreover, achieving high dynamic range (DR) is difficult due to inherent jitter and nonlinearity, which typically results in trade-offs with signal bandwidth, power consumption, and space requirements. Another method to achieve high DR entails using high-resolution short-range TDC combined with a digital-to-time converter (DTC) for phase shifting. However, this can lead to problem in timing increments for each reference cycle, causing deviations in the synthesized frequency. This paper introduces a Fractional-N digital PLL with low in-band phase noise using the proposed high-resolution TDC. The in-band phase noise measured at various frequencies matched the effective resolution of the TDC. A high-resolution, DTC-free, and MOS-varactorless LC-DCO with bridging capacitors is proposed to reduce quantization noise. The design also embeds the structural blocks required for the Time – To – Digital Converter.

Advantages

The accomplished in-band noise measured at various frequencies was clear with the measured effective resolution of the Time-To –Digital Converter.

Disadvantages

The notable obtains of PLL in-band phase noise, very low power, and small space.

Conclusion

Image processing is a technique and approach of accessing important needs in an image to receive more number of further developed image or to extract some noisy information from it. In this critique few token of definitions was surfed like Image, Image Processing, Digital image and Digital Image Processing. Image processing is a relative part of signal processing where the input is an image and output result can be an image or feature or feature extracted associated with that image. Image processing is one of the rapidest growing technologies in this real world environment.

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