

DIGITAL IMAGE PROCESSING USING CLASSIFICATION TECHNIQUE

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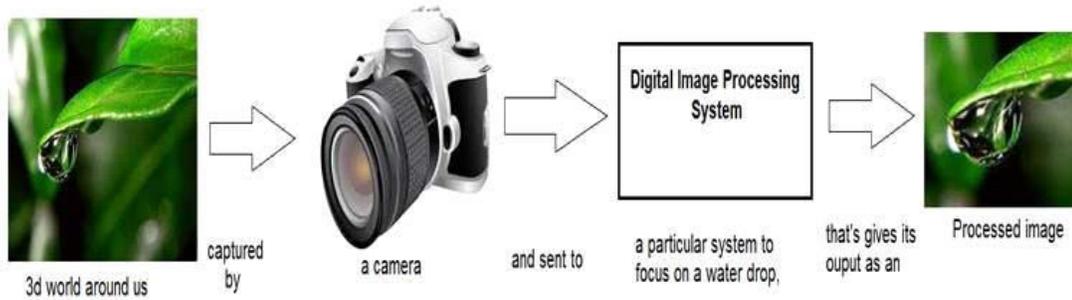
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Abstract-Digital image processing is a technique for converting any image into digital form and performing some operation in it, so that an enlarged image can be obtained or some useful information can be extracted from it. It is a type of signal dispense within which the input image is, such as a video frame or photograph and the output is also the image or features related to that image. sometimes Image processing system includes treating pictures as two-dimensional signals whereas applying already set signal processing strait is among quickly growing technologies nowadays, with its applications in numerous aspects of a business. Image process forms core analysis space at intervals engineering and applied science disciplines too eggiest to them. Image processing basically following three steps, importing an image with an optical scanner or digital photography. Manipulation and manipulation of an image including data compression and image enhancement and spotting patterns that are not like satellite photographs for human photographs. The output is the last step in which the result can be changed to an image or report that is based on image analysis.

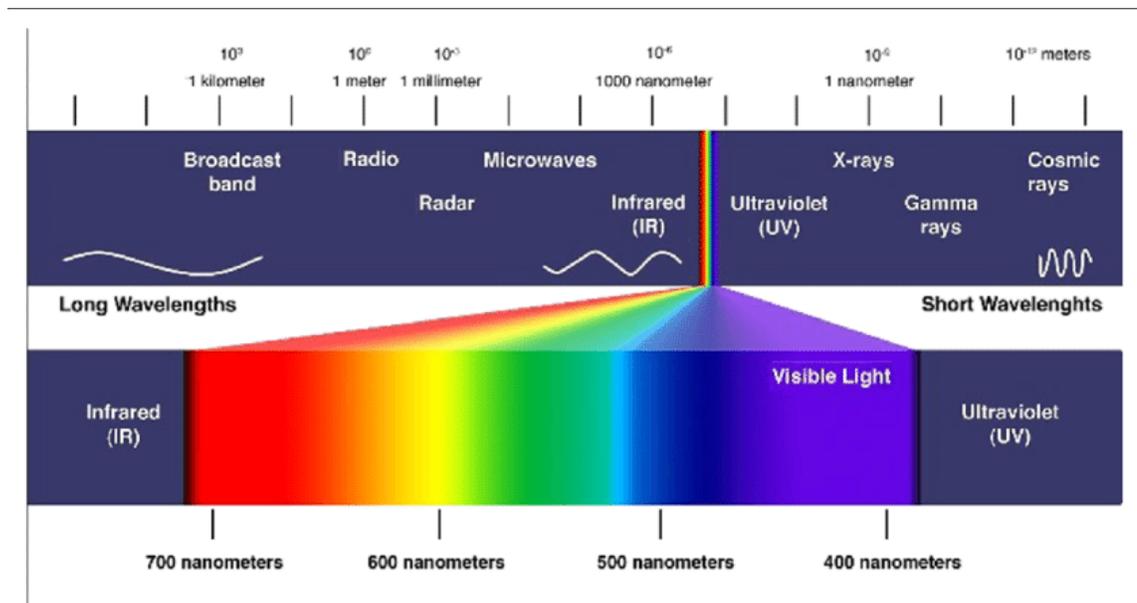
keywords-Image Classification ,Image processing ,Image Segmentation

I. INTRODUCTION-

Digital image processing is the use of a digital computer to process digital images through algorithms. As a subcategory or field of digital signal processing, digital image processing has several advantages over analog image processing. This allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the creation of noise and distortion during processing. Since images are defined by two dimensions (perhaps more), digital image processing can be modeled as multidimensional systems. The generation and development of digital image processing are mainly influenced by three factors: first-the development of computers; Second-the development of mathematics (especially the formulation and improvement of discrete mathematics theory); Third-the demand for a wide range of applications in the environment, agriculture, military, industry and medical sciences has grown.



Digital image processing is not limited to simply adjusting the spatial resolution of everyday images captured by the camera. This is not only limited to increasing the brightness of the photo, etc.. Rather it is more than that.

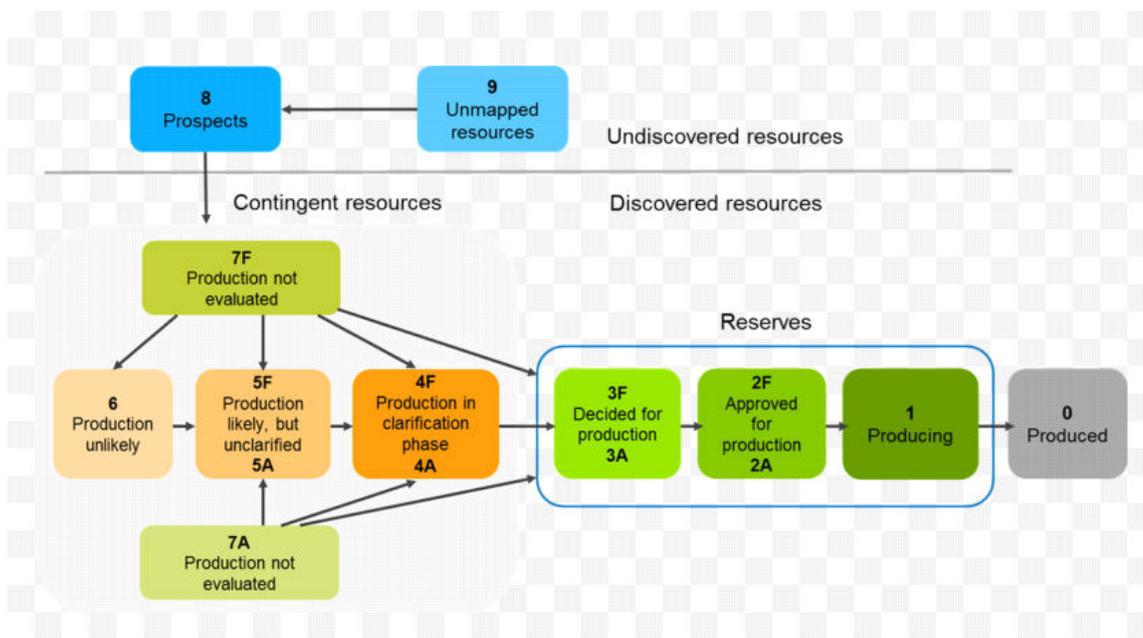


Electromagnetic waves can be thought of as a stream of particles, where each particle is moving at the speed of light. Each particle has a bundle of energy. This bundle of energy is called a photon. The electromagnetic spectrum according to Photoman's energy is shown below. In this electromagnetic spectrum, we are only able to see the visible spectrum. The visible spectrum mainly consists of seven different colors commonly referred to as (VIBGOYR). VIBGOYR means Violet, Indigo, Blue, Green, Orange, Yellow and Red But this does not reduce the existence of other goods in the spectrum. Our human eye can only see the visible part, in which we saw all the objects. But a camera can see other things that the naked eye is unable to see. For example: X rays, gamma rays, etc. .. so all of them are also analyzed in digital image processing.

Analog image processing is performed on the analog signal. It involves processing on two dimensional analog signals. In this type of processing, images are manipulated by electrical means by separating electrical signals. Common examples include television image. Digital image processing has dominated analog image processing over time due to its widespread applications. Digital image processing, computer algorithms are used to do image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has several advantages over analog image processing. This allows a wide range of algorithms to be applied to the input data and can avoid problems such as noise and signal distortion during processing. Since images are defined by two dimensions (perhaps more), digital image processing can be modeled as multidimensional systems.

Signal images processing is an umbrella and image processing belongs to it. In the physical world (3D world) the amount of light reflected by an object passes through the camera lens and becomes a 2D signal and this causes image formation. This image is then digitalized using signal processing methods and then this digital image is manipulated into digital image processing.

II. IMAGE CLASSIFICATION- Since capturing an image with a camera is a physical process. Sunlight is used as a source of energy. A sensor array is used for image acquisition. So when sunlight falls on the object, the amount of light reflected by that object is sensed by the sensors, and a constant voltage signal is generated by the amount of data transmitted. To create a digital image, we need to convert this data into digital form. This includes sampling and quantization. (They are discussed later). Sampling and quantization result in two dimensional arrays or matrices of numbers that are nothing but a digital image. Millions of images were produced every day. Each image needs classification in such a way, by which they can be easily and in high speed. Humans have the ability to easily classify images then computers. In a simple classification system, a camera is fixed above the area of interest, where pictures are captured and the resulting process occurs. Classification is a process of classifying images into several categories based on their similarity. We can easily understand or analyze our surroundings by classifying images. But it is not always easy to categorize an image, especially when it contains noisy or blurred material. In a classification system, users deal with a database and that database contains some patterns or images that are predefined or that are being classified. Image classification is always an important but an important task for many applications. Sometimes it is very difficult to identify an object in an image. Especially when it has noise, background clutter or poor quality. And if any image contains more than one object, the task becomes more difficult. So we can say that, the main principle of image classification is to identify the characteristics that occur in an image. In this paper we can discuss three major techniques of image classification and some other related techniques.



First technique is supervised classification. IN supervised learning labeled data points are used. Or we can say that training is required in the supervised learning. Second are unsupervised classification uses no labeled data that means no training is required. In this case we can take any random data. Third technique is Semi-supervised classification take several advantages over Supervised and Unsupervised classification. It uses unlabeled data points in order to remove the need for extensive domain scientist interaction and deal with bias that is the result of poor representation of labeled data. In this survey paper Semi supervised learning has been taken from [3]. As we know that the main principle of an image classification is to recognize the characteristic that occurs in an image. Classification is usually done by computer. The computer classifies images with the help of various mathematical techniques. Prabhsharan Kaur et al.,(2013) on their study on “Image Registration in Digital Image Processing” concludes that Image registration is the fundamental task used to match two or more partially overlapping images taken. It is a fundamental image processing technique and is very useful in integrating information from different sensors, finding changes in images taken at different times, obtaining three-dimensional information from stereo images, and identifying model-based objects.

III. IMAGE SEGMENTATION

The partition subdivides an image into its constituent regions and objects. The level to which the subdivision is taken depends on the problem being solved, which should stop fragmenting when objects of interest in an application have been isolated. Splitting non-trivial images is one of the most difficult tasks in image processing. Segmentation accuracy determines the ultimate success or failure of a computer's analysis processes. Segmentation algorithms for monochrome images are usually based on one of two basic properties of image intensity values: incontinence and similarity.

The approach in the first category is to segment an image based on a sudden change in intensity such as edges in an image. The major approaches in the second category are based on dividing an image into regions that are similar according to a set of predefined criteria.

IV. PERFORMANCE PARAMETERS

The performance of the encryption technique is measured by some basic parameters which are listed below.

A-visual degradation (VD)

Visual distortion identifies perceptual distortion of image data with respect to the plain image

B-compression friendliness (CF)

Compression friendliness does not measure any or very little effect on data compression efficiency on the image. Some encryption schemes affect data compression or introduce additional data that is required for decryption.

C-Format Compliance (FC)-

The format compliance parameter is used for complying with encrypted bit streams with Compressor. The standard decoder must be able to decode encrypted bit streams without decrypting.

D-Encryption ratio(ER)-

It measures the amount of data to be encrypted. The encryption ratio should be minimized so as to reduce the computational complexity.

E-Speed(S)-

This parameter measures how fast the encryption and decryption algorithm is sufficient to meet real-time requirements.

F-Cryptographic Security (CS) -

Cryptographic protection is used to identify whether the encryption scheme is protected against various plaintext-cipher text attack.

V.CONCLUSION

In this paper, we have discussed about the image Classification ,processing, segmentation and it's the various techniques. As interpolation is the technique which is used for improving and modification of image, video or any other data, so many interpolation techniques are been developed in the area, basically interpolation was the application of signal processing now it has versatile uses. One can conclude that after implementation of our defined approach of interpolation we will have very good and better quality of image as desired modification in it.Digital image processing has dominated over analog image processing with the passage of time due its wider range of applications.Segmentation accuracy determines the eventual success or failure computerized analysis procedures.

REFERENCES

- [1] Zhang, and Q. Liu, "A novel image encryption method based on total shuffling scheme," *Opt. Commun.* vol. 284, pp. 2775-2780, 2011.
- [2] X. Wang and G. He, "Cryptanalysis on a novel image encryption method based on total shuffling scheme," *Opt. Commun.* vol. 284, pp. 5804-5807, 2011.
- [3] Yue Wu, Joseph P. Noonan, and Sos Agaian, NPCR and UACI Ran- domness "Tests for Image Encryption," *Cyber Journals: Multidisciplinary Journals in Science and Technology, Journal of Selected Areas in Telecommunications (JSAT)*, April Edition, 2011.
- [4] Mr. ShengHsien Hsieh and Mr. Ching Han Chen publish paper entitle "adaptive image interpolation using probalistic nural network"
- [5] Yong Zhang, "Encryption Speed Improvement on Total Shuffling," *International Conference on Sensor Network Security Technology and Privacy Communication System*, 2013.
- [6] Z. Eslami, and A. Bakhshandeh, "An improvement over an image encryption method based on total shuffling," *Opt. Commun.* vol. 286, pp. 51-55, 2013.
- [7] Ballard, D. H. and Brown, C. M. (1982). *Computer Vision*. Prentice-Hall Inc., New Jersey.
- [8] T. Shraddha, K.Krishna , B.K Singh and R.P Singh, "Image Segmentation: A Review" *International Journal of Computer Science and Management Research* vol.1 issue. 4 November 2012.
- [9] Siddheswar Ray, rose H.Turi and peter E. tischer, *Clustering- based colour Image Segmentation: An Evolution Study*.
- [10] Dimitris N. Varsamis · Nicholas P. Karampetakis, *On the Newton bivariate polynomial interpolation with applications*, *Multidim Syst Sign Process* DOI 10.1007/s11045-012-0198-z, springer, 05 september 2012
- [11] Shuyuan Zhu, Bing Zeng, G. Liu, Liaoyuan Zeng, Lu Fang, M. Gabbouj, *Image interpolation based on non-local geometric similarities*, *IEEE International Conference on Multimedia and Expo (ICME)*, 2015
- [12] Y. Zhang, J. Xia, P. Cai, and B. Chen, "Plaintext related two-level secret key image encryption scheme," *TELKOMNIKA.* vol. 10, pp. 1254-1262, 2012.
- [13] Jawad Ahmad and Fawad Ahmed, "Efficiency Analysis and Security Evaluation of Image Encryption Schemes," *International Journal of Video & Image Processing and Network Security IJVIPNS-IJENS* Vol: 12 No: 04.
- [14] Payal Sharma, Manju Godara, Ramanpreet Singh, "Digital Image Encryption Techniques: A Review," *International Journal of Computing & Business Research*, 2012.