IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, July 2022
Impact Factor: 6.252

Analysis of Featute Extraction Techniques for Medical Images

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Abstract: *In the image downloading process, image processing method, data mining method, and computer scanning technique, feature removal is an important step. The process of extracting logical data from original data is known as feature extraction. However, many FE methods still struggle with the difficulty of extracting relevant features that can accurately capture the basic content of a piece of data or database. We provide a survey of existing methods of extracting features used in recent years in this work. Brightness, homogeneity, entropy, meaning, and strength were shown to be the most of the distinctive features that could be obtained when using global learning and development community features extraction method in the images in the study. In addition, it was found that the extraction methods are not specific to the application and can be used in a variety of situations.*

Keywords: Image processing, data mining, Homogeneity, Entropy

I. INTRODUCTION

Many processes including computer detection, object and the location detection, image processing method, image retrieval process, speech recognition process, data mining work, pattern detection process, machine learning work, and bioinformatics process have become clear requirements for the extraction methods. It will be used to extract the most of the distinctive features of a database and is used to represent the data and also to interpret the data. As the famous saying goes, "a picture costs a thousand words." Data is a combination of many outstanding features. Digital image processing, on the other hand, is a computer-based process that manages colour, binary, grey images and Image Recovery is a computer's ability to retrieve images on a specific domain site, or that can be a text image or non-text image. Images with a comparable or different location are computerized using IR. It is done by the process of searching and browsing, or in the process of retrieving images on a large set of data base of various images. Text-based Image recovery and the Content-Based Image Recovery, and Mixed Image Recovery (MIR) are three types of image acquisition techniques, and TBIR is widely used This method is mainly used in standard systems. Text can also be extracted from the image using IR. There are two types of problem with TBIR: the first is related costs and the second is the distorted outcomes available. CBIR technology is used to solve this problem. The effective use of CBIR technology for image processing is excellent. CBIR is a technology that integrates a wide range of the technologies to applications in human perception, information science, signal the processing and multimedia and for pattern recognition and also for human computer interactions. The different algorithms used in the CBIR are classified into two categories. Feature selection process, Feature release method, and the feature editing are three process elements. Selecting content features in an image, using image processing and computer recognition. Filters and wrappers are two FE pieces. Wrappers use aggregation, separation, or recognition algorithms. Although filters do not include machine learning. This study provides an overview of the different FE mechanisms. In a few types of processing, FE plays an important role. We provide a recent development survey on feature extraction in the paper. Feature extraction is a system for extracting the raw data from an images and used for the classification and the basic goal of feature extraction methods is to extract the data from the raw data to represent a low dimensional environment. As a result, data from big data with less information is translated into a vector feature. The selected feature set will release the required information if the features are carefully extracted.

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II. RESEARCH OF TYPES OF SUBJECT REMOVAL

In the stream of computer vision or in the image processing, factors play a vital role in identifying useful information. Integrated image is subject to a number of pre-processing techniques such as standardization, retrieval, duplicate, measurement, etc. before removing the image element. As shown in Figure 1, the features are divided into two categories: standard features and the domain-specific features .GF refers to application-based features such as colour, form, and textures, while DSF refers to application-based features such as visual and human features. Both are divided into three categories: like pixel level features, local type features (features are analysed based on image classification acquisition), and global type features (features are tested for image). The categories of image elements, as well as their structures and models.

2.1 A Colour Feature

In computer vision or image processing, factors play a vital role in identifying useful information. An image from before colour markers is widely used to extract visual features in the form of a video or image. Colour is one of the most important elements of an image and is defined by colour space and the models such as Red-Green-Blue, HMMD visualization, HSV, and the LUV. Colour elements hold up well when translated or viewed at different angles. Colour space is used for the specification of different colour features. once the colour space of the image is selected, the elements associated with the image can be easily removed. Colour correlogram, colour histogram, colour coherence vector, and colour times are among the many colour features described in the literature CM is a basic and effective element among them.

Red-Green-Blue(RGB) and Hue-Saturation Value(HSV), and Luminance-chrominance, Hue-Max and Min-Diff, and CIE LUV RGB are some of the colour space widely used in the study. Filling in the space in HSV indicates how bright the colour is and is represented by Eq (1). If the Maximum values like - (maximum R, G, and B value) are zero, the filling value of the space is zero; otherwise.

Saturation= Max-Min/Min eq(1)

The value (V) defines how bright or dark a colour is which is equal to the Max value and Hue(H) specifies one colour family and angle from o degree to 360 degree which is represents by eq(2) . In Eq(2) maximum value of its represented by Max and minimum value of R, G ,B is denoted by Min

$$\text{Hue} = \begin{cases} 0 & \text{if Max==Min} \\ 60*\frac{G-B}{max-Min} & \text{if Max== R and G >=B} \\ 60*\frac{G-B}{max-Min} & \text{if Max== R and G >=B} \\ 360*(60*\frac{G-B}{max-Min}) & \text{if Max ==R and G<B} \\ 60*(2.0*\frac{B-R}{max-Min}) & \text{if G== Max} \\ 60*(4.0*\frac{R-G}{max-Min}) & \text{otherwise} \end{cases}$$

eq(2)

YCbCr represents the luminance (Y0 ,blue chrominance (Cb) and red chrominance (Cr) as given by matrix in eq (3).

$$\begin{vmatrix} Y \\ Cb \\ Cr \end{vmatrix} = \begin{vmatrix} 0.299 & 0.587 & 0.114 \\ 0.169 & -0.331 & 0.500 \\ 0.500 & -0.419 & -0.081 \end{vmatrix} \begin{vmatrix} R \\ G \\ B \end{vmatrix} \quad (3)$$

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The HMMD colour spacing method is close to the colour space that looks homogeneous. There are five different parts: Hue is similar to Eq. (2), Max represents the black colour in the image and Min represents the white colour in the image, Diff represents the difference between High and Low values, which determines the pure colour of the image / direct, and Total represents the Max and Minor scale. numbers, which reflect the brightness of the colour. A combination of the H, Diff, Sum or H and Max and Min is required to create the HMMD colour space. The International Commission on Illumination adopted the CIE colour scheme (L *, U *, V *) in 1976, commonly known as CIE LUV. It is widely used in systems using coloured lights.

In accordance to the colour distribution, which is going to defines the colour space and the colour layout, and also the MPEG standard includes many of the colour definitions that represent the different aspects of the coloured element. As a result, another method of extracting nutrients may be based on their colour. Shameless self-promotion for Color Cards, Framework or Graphics Group, Colour Structure and Colour Structure Definition are five key tools used to describe colour . Image colour distribution is shown by CSD, DCD, and SCD, while GoF and GoP or the CLD reveals the relationship between the series of images or the sequences. Colour structure definition provides a detailed description of image colours. Allows the definition of mathematical features such as variability and distribution, as well as the high coloured values. DCD on the other side, allows for faster and more accurate identification of images in an image.

The coloured histogram process in the HSV coloured space is represented as SCD, which can be hidden using the Har transform. SCD is used for the primarily to simulation. GoP is a type of the SCD that uses a collection of the frames from a video or image collections. Different colours of the video frames or the images are collected in this process. CSD uses a moderate shortcut type windows to separate the compressive colour distribution. Colour histograms are used in this process as well. CSD only works with HMMD colour space. The CLD method is advanced for programs that require faster browsing and search. It is a small description that can be applied to both photos and videos. The Discrete Cosine Transform coefficients are used in the CLD method. CLD and DCD are the most commonly used adjectives because of their benefits. DCD assists in the functional definition of the bright colours of the image, while CLD assists in preserving the local distribution of the image colour. When it came to choosing adjectives, these factors were important. Colour space conversion, colour space integration method like CIE LUV, and per cent centimetres calculation are all part of the DCD output process. In table I we present the different colour descriptors.

2.2 Feature for Textures

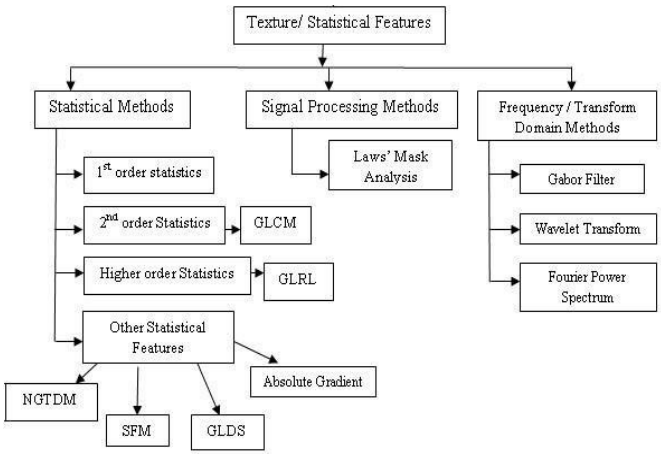

Figure 1. Strategies for extracting a different texture element.

Colour elements use the individual pixel but the texture features uses groups of pixels. The texture is used by the human visual system to analysed and visualize images. The quality of the homogeneity of the texture defines the visible patterns. Texture elements are divided into two types: local and spectral. Figure 1 shows several episodes. Features are rendered to the local TF by calculating the pixel in the first image, but in the visible TF, the images are first converted into a background image and the elements are extracted to get the correct image. Because the sample is the background of the image frequency by defining the stop parameters and the frequency range, the Gabor filter is widely used in TF

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extraction. Table II compares and contrasts these two methods of extracting TF. Image Sharing is a popular local TF app for extraction. This method is used to convert differences in the local structures of the geometric or in the stochastic elements into grey values.

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First Order Statistics, Gray Level Run Length Matrix method, Gray Level Co-occurrence Matrix method Neighbourhood Gray Tone Difference Matrix method ,and Statistical Feature Matrix are all some of the examples of this . The legal mask features are used in signal processing for FE methods, while the Gabor wavelet, Furrier of Power Spectrum features and the differential wave conversion are used in background conversion methods, as shown in below Table III .

Table I: Colour descriptor merits and demerits.

Colour method	Merits	Demerits
DCD	Robustness, compact and perceptual meaning	Post-processing process needed for the spatial information
CSD	Uses the spatial information (SI)	Sensitive to the noise and rotation and scales
SCD	Scalable and complexity	No use of SI, less accurate if the process is complex
CM	Robustness and compact	sufficient to be describe in all colours, no use of SI
CCV	Usage of SI	Has the high dimension and the computational cost
Histogram	Intuitive and the simple to the computation process	Sensitive to the noise, high dimension and no use SI,
Correlogram	Usage of SI	Sensitive to the noise, rotation and scaling, high computational cost is required

TABLE II: Different between the extraction methods.

Texture feature types	Advantages	Disadvantages
Spatial	Easy to understand the method and it shares similar properties in small neighborhood and also when extracted from any shape they don't lose the original data in the process.	Sensitive to the alternation and the noise
Spectral	Requires less computation time and also it has property of Robustness	It needs the square image regions with sufficient size and it can't distinguish between the objects made of the same material

2.3 Features of Shape

To identify and identify real-world objects, physical features are important. They are a common visual indicator that people use to test similarities and similarities. There are two types of SF: regional and contour-based. contour based determines the SF from the boundary, while the RB pulls the elements into a complete object. The Hough Transform has been described as a useful tool for extracting geometric features from forms and identifying lines and edges. Pattern recognition process and image processing method, and also computer vision are all areas where it can be used.

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TABLE III: Various features from the different feature extraction methods

Various features	Features
First order statistics	Third moment, homogeneity, smoothness, mean, standard deviation, and entropy
GLCM features	Contrast, correlation, difference entropy, angular moment, inverse difference moment, variance, and difference variance
GLRLM features	Short run high grey emphasis, short run low grey emphasis, run length non uniformity, long run emphasis, long run high grey emphasis, low grey level run emphasis, and grey level non uniformity.
GLDS features	Energy, entropy, homogeneity, contrast, and mean
NGTDM	Strength, intricacy and contrast, coarseness, and business
SFM	Sharpening, contrast, regularity, and roughness
FPS	Angular sum and radial sum
Gabor filter based	Mean and variance
Shape features	Area, eccentricity, solidicity, circumference, diameter, Euler number, orientation, concave area, extent, major axis, and minor axis

III. APPLICATIONS FOR STRENGTH OF WARRANTY AND ITS TERMS

Feature domain identifies, finds, and analyses areas of interest using the in-app features. Algorithms are developed in this way using supervised learning or non-supervised learning methods. Other studies in the literature have highlighted the various methods used by writers to identify and consider key points of drawings.

3.1 Digging The Text

In text mining and data retrieval, extracting a text feature is very useful. The concept of archaeology was first introduced in the year of 2000. It is a way of extracting relevant information from the text. Text mining is used in the data mining and also in the various methods for obtaining the information where data is required for patient records and health insurance data and also in the social networks, and media. It is also used for the computer detection and image processing systems such as detecting and identifying the license plate numbers. Given a survey of many excavations works and methods.

3.2 Image Processing

Image processing is one of the ways of doing tasks using image. It is done to obtain certain information that is important to it. Image processing complete. It is a type of the signal processing where the input used is image and the output obtained can be in that image form or in its features form. Image processing is one of the fastest-growing technologies today. It is also an important research field in engineering and computer science.Analog and the digital image processing are two types of image processing methods which is used. Solid copies, such as prints and photographs, can benefit from analogue image processing. When using these visual aids, image analysts use a variety of translation bases. Digital image processing techniques allow computer-assisted conversion of digital images. Pre-processing, scaling, and presentation, and extracting information, are the three most common processes all data types must go through when using digital techniques.Medical research has made extensive use of image processing, which has led to more effective and more effective treatment methods. For example, it can be used in breast screening to detect breast cancer early using a sophisticated lump screening algorithm. Because medical applications require highly processed image processors, these applications require extensive development and testing before they can be approved for us.

3.3 Data Mining

Learning from traditional data strategies required that data be in the same format. Data should be encrypted in numerical format, such as true or false, numeric, or numeric. Additionally, a specific learning goal must be established to differentiate. Although some databases are organized in the same format, many others are made up of a combination

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of number and name fields, and each data field contains hundreds of possible combinations and a few field definition conditions. In a real-world data mining application, interpreting, classifying, and encoding data on relevant features takes time.

IV. RESULTS

We give some of the extracted GLDS features from the photos in this part. The parameters in Table were derived from the photos. The results reveal that visual contrast varies a great deal.

TABLE IV: Feature extracted from GLD method

Image	Homogeneity	Contrast	Energy	Entropy	Mean
1	0.76	296.75	0.54	1.55	4.72
2	0.74	390.13	0.52	1.68	5.79
3	0.83	338.60	0.66	1.22	4.46
4	0.76	201.61	0.53	1.46	3.48
5	0.49	239.12	0.20	2.47	5.83
6	0.66	183.85	0.40	1.84	4.06
7	0.72	241.21	0.49	1.64	4.13
8	0.74	162.17	0.50	1.53	3.29
9	0.68	172.60	0.41	1.74	3.52
10	0.67	136.41	0.39	1.75	3.20

V. CONCLUSION

Feature extraction is one of the commonly utilised method. It is an efficient strategy in a range of applications as well as academic subjects. This study looked into the methodology, types, and applications offeature extraction. The types of features to be extracted are determined by the applications of feature extraction. The accuracy of the extraction and the performance of extraction methodologies are moresignificant elements to consider when performing feature extraction.

REFERENCES

[1]. D. P. Tian, "A review on image feature extraction and representation techniques," *International Journal of Multimedia and Ubiquitous Engineering*, vol. 8, no. 4, pp. 385-396, 2013.

[2]. N. Goel and P. Sehga, "A refined hybrid image retrieval system using text and color," *International Journal of Computer Science Issues*, vol. 9, no. 1, pp. 48-56, 2012.

[3]. J. Tang, S. Alelyani and H. Liu, "Feature selection for classification: A review," *Data classification: Algorithms and applications*, pp. 129, 2014.

[4]. T. K. Shih, J. Y. Huang and C. S. Wang, "An intelligent contentbased image retrieval system based on color, shape and spatial relations," *in:Proceedings of the National Science Council, R. O.C., Part A: Physical Science and Engineering*, vol. 25, no. 4, pp. 232243, 2001.

[5]. P. L. Stanchev, D. Green, and B. Dimitrov, "High level colour similarity retrieval," *International Journal of Information Theories and Applications*, vol. 10, no. 3, pp. 363-369, 2003.

[6]. D. S. Zhang, Md. M. Islam and G. J. Lu, "A review on automatic image annotation techniques," *Pattern Recognition*, vol. 45, no. 1, pp. 346-362, 2012.

[7]. M. Zortea and A. Plaza, "Spatial Preprocessing for End member Extraction," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 47, no. 8, pp. 2679-2693, 2009.

[8]. S. Supriya and M. Subaji, "Intelligent based image enhancement using direct and in-direct contrast enhancement techniques: A comparative survey," *International Journal of Signal Processing, Image Processing and Pattern Recognition*, vol. 10, no. 7, pp. 167184, 2017.

[9]. J. Yue, Z. Li and L. Liu, "Content-based image retrieval using color and texture fused features," *Mathematical and Computer Modelling*, vol. 54, pp. 1121–1127, 2011.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
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[10]. V. P. Singh and R. Srivastava, "Improved image retrieval using fast colour-texture features with varying weighted similarity measure and random forests," *Multimedia Tools Applications*, vol. 77, no. 11, pp. 14435-14460, 2018. Https://doi.org/10.1007/s11042-017-5036-8

[11]. A. Lakshmi and S. Rakshit, "New curvlet features for image indexing and retrieval," *in:Computer Networks and Intelligent Computing*, Springer-Verlag Berlin Heidelberg, vol. 157, pp. 492– 501, 2011.

[12]. N. Ghosh, S. Agrawal, and M. Motwani, "A survey of feature extraction for content-based image retrieval system," *Proceedings of International Conference on Recent Advancement on Computer and Communication*, Lecture Notes in Networks andSystems, vol. 34, 2018. Https://doi.org/10.1007/978-981-10-8198-9_32.

[13]. S. Bhusri, S. Jain, J. Virmani , "Classification of breast lesions using the difference of statistical features" *Research Journal of Pharmaceutical , Biological and Chemical Sciences*, vol. 7 no.4, pp. 1365-1372, July-Aug 2016.

[14]. S. Rana, S. Jain, J. Virmani, "SVM-based characterization of focal kidney lesions from b-mode ultrasound images," *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, vol. 7 no. 4, pp. 837- 846, July- Aug, 2016.

[15]. A. Dhiman, A. Singh, S. Dubey, S. Jain, "Design of Lead II ECG waveform and classification performance for morphological features using different classifiers on Lead II," *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, vol. 7 no. 4, pp. 1226- 1231, July-Aug 2016.

[16]. A. O. Salau, T. K. Yesufu, B. S. Ogundare, "Vehicle plate number localization using a modified grabcut algorithm," *Journal of King Saud University - Computer and Information Sciences,* 2019. Https://doi.org/10.1016/j.jksuci.2019.01.011

[17]. Y. Saeys, I. Inza and P. Larranaga, "A review of feature selection techniques in bioinformatics," *Bioinformatics Review*, vol. 23, no. 19, pp. 2507–2517, 2007.

[18]. R. Feldman and I. Dagan, "Knowledge discovery in textual databases (KDT)," *in:KDD*, vol. 95, pp. 112–117, 1995.

[19]. A. O. Salau, "Development of a vehicle plate number localization technique using computer vision," Ph.D. Thesis, Obafemi Awolowo University, Ile-Ife, Nigeria, 200p, 2018.

[20]. M. Allahyari, S.Pouriyeh, M. Assefi, S. Safaei, E. D. Trippe, J. B. Gutierrez and K. Kochut, "A brief survey of text mining: classification, clustering and extraction techniques," *in:Proceedings of KDD Bigdas*, Halifax, Canada, 13p, 2017.