

# A Survey of Content based Image Retrieval System in Detecting Ocular Tuberculosis

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**Abstract:-** Tuberculosis is one of the major diseases in the developing countries. Generally TB is detected based on 'ZN' test method which involves both skin test and blood test. This current method needs human expertise and intensive examination. Besides, this method requires more time and cost for TB detection. Indeed, tuberculosis may affect any organs in human body. When the lungs are affected by TB, its symptoms are visible. But when it affects other organs especially human eyes, symptoms are invisible. So the patient has to go for ZN test. Since ZN test consumes more time and cost, my research focuses on automation process using the digital images to detect TB in human eyes. For this purpose, CBIR technique is to be used, so various image retrieval methods have been analysed and their analyses are presented here.

**Keywords –** CBIR, ZN, TB,

## 1. INTRODUCTION

Tuberculosis is one of the most dangerous diseases in the world. It affects all the organs of the human body including eyes. But nowadays it is very difficult to find the symptoms of ocular TB because it is not identified easily by any symptoms in eyes. If we are not aware of its growth, it may cause vision loss. But an early identification of ocular TB may prevent vision loss. So the early identification of it is very important.

In today's digital era, the Content based image retrieval is the most important emerging field in all departments. There are lots of applications are used in the digital world by using content based image retrieval. Nowadays datas are stored in digital images. Because images provide more accurate information than normal data do. Technology development can help to process the images efficiently. In the medical field the image processing techniques are applied to handle very complicated cases. It can be used to identify any diseases using digital images like Scan, X-Ray. This process of diagnosing takes very few seconds to identify the diseases. Therefore the treatment becomes very easy. The content based image retrieval technique uses the image features like colour, shape and texture information. So the results will be accurate when identifying similar images.

Suzana Batista et al [1] have done their research on the impact of ocular TB on vision after two months of intensive TB treatment. For the purpose of their study, 143 adults with suspected pulmonary TB have been evaluated. This paper states that extra pulmonary TB occurs at varying frequencies in both immunocompetent and immunocompromised patients. This study also states that

extra pulmonary involvement may occur, including kidney, central nervous system, eyes, in association with clinically apparent pulmonary TB or in isolation. As for ocular TB, this paper states, it may result from hemotogenous, primary exogenous or direct contiguity dissemination. It also involves ocular adnexa (orbit, eye globe, eye lids, tear glands)

They have also examined and interviewed the patients with TB infection and have recorded the patients' epidemiologic, demographic and clinical information. They have used Snellen chart to examine the patients' visual acuity. Also the patients have undergone ophthalmic evaluation. They have used bio-microscopic slip amp to examine the interior chamber of the patient's eye. Besides, all the patients have undergone fluorescent angiography due to the presence of retinal vasculitis.

For the purpose of this study on ocular TB, they have done the diagnosis on ocular TB based on the criteria for probable and possible diseases. The researchers have photographed all ocular lesions consistent with TB and the patients have been reassessed within sixty days so as to monitor their conditions clinically. This paper states that all the patients have been offered HIV test during this study period and none of them has been affected by HIV. Also as per the paper, it states that patients with ocular lesions in the anterior chamber have been tested for syphilis using treponemal and nontreponemal serologic test. During the study period, the patients have been given two months of daily isoniazid, rifampin, pyrazinamide and ethambutol followed by four months of daily HR. Also patients with ocular TB have received official Brazilian guideline for treating TB. Ocular TB can involve any parts of the eye and can occur with or without an evidence of systematic TB. Also, it states that the rate of the ocular TB involvement across the world varies.

Finally, this paper concludes that 6 out of 143 patients have TB related ocular involvement in the choroidal nodules that progressed favourably after two months of intensive anti-tuberculosis therapy without causing any damage to vision provided that it should be treated earlier treatment, if not, it may cause a severe damage to eyes hence leading to vision loss.

J.Z.Wang, J.Li and G.Wiederhold [2] have proposed the concept of semantics sensitive integrated matching for picture libraries. Here images are categorized by its semantic features and regions, based upon the distance similar images are retrieved.

Domokos varga, Tamas Sziranyi [3] have proposed the concept of CNN and hash function for retrieving the image. It describes the convolutional neural network and probability based semantic level similarity for matching process. It is calculated from the various image features extracted from an image. Then the derived hash code helps us for getting the result value.

Manish dixit, Mohd Ansari [4] has proposed the concept of a refined approach of image retrieval using RBF- SVM classifier. Here image features are extracted by histogram Quantization, discrete wavelet transform from HSV colour space of an image. For this purpose RGB image spaces are combined to form a single feature vector then apply the RBF-SVM classifier is applied for identifying class difference, so based upon the classes the similarity is measured.

Moshira Ghaleb, Hala Mousher Ebied. [5] have proposed the concept of Image retrieval based upon self-organizing feature map and multilayer perception neural networks classifier. They have extracted energy, inverse difference moment, angular second moment and correlation using gray level co-occurrence matrix, then have calculated the similarity measurement.

Manpreet kaur, Neelofarsohi [6] has extracted the color features using color moment, wavelet transform and Gabor wavelet for extracting the texture feature, then has used the edge gradient techniques for extracting the shape feature, after that he has applied the manhattan distance formula for similarity measurement.

Yogitaet [7] has extracted the color features by autocorrelogram and HSV histogram, and then he has used the distance formula to extract the image.

Suman et al. [8] have used the Zernike moments to the segmented image and obtain the amplitude and phase value of an image, then have extracted the features of an image using GLCM and also have extracted the color feature value using histogram, then have measured the similarity.

Ng. et al. [9] have used the principal component analysis (PCA) for calculating the covariance matrix with low dimension for processing the image.

Shah et al. [10] have extracted the image features using convolution neural network, for similarity measurement they have used Euclidian distance.

Ammar et al. [11] have used the DWT and SOM for dimension reduction and clustering color feature extraction, then, they have applied the Euclidean distance for similarity measurement.

M. Huneiti [12] has proposed a concept of interpreting web usage patterns generation using a hybrid som based clustering, here he has used k means clustering and normalization for reducing the user navigation matrix value, then, he has interpreted the generated clusters in order to identify prototypes of users and has extracted the list of relevant pages from the log file.

Mohamed ouhda [13] et.al have proposed the concept of content based image retrieval using convolutional neural network, here an image is passed through a succession of filters, it forms a convolution map image, it forms a feature vector called CNN code, it uses

svm for classification, it performs the recognition step and takes new decision on testing images based on the extracted feature.

Satyavarma [14] has proposed the content based image retrieval with multi feature classification by back propagation. Neural network uses the GLCM for getting the texture feature. Then it extracts 22 image features from GLCM after that, Zernike moments are applied for shape feature extraction. Then, the distance is measured. Based upon the distance similar images are retrieved.

Dimiris K. Lakovidis [15] has proposed the concept of a pattern similarity scheme for medical image retrieval, here first the images are splited into blocks of pixels, from the blocks of pixels forms a feature vector, this vectors are clustered using Gaussian mixture depending upon the clusters. Then, they extract the images.

Guang – Hai Liu et al. [16] have proposed the image retrieval concept based on the texton co-occurrence matrix. This system uses the low level image features, that is, color texture and shape. It computes both maximum and minimum color gradient value for an image. Then, the texton value of an image is calculated. After detecting the final texton image, then co-occurrence matrix is calculated for  $0^\circ$ ,  $45^\circ$ ,  $90^\circ$  and  $135^\circ$  and the features of an image are extracted. Then, the similarity is computed by using Euclidean distance formula.

Mari partio [17] has proposed the concept of rock texture retrieval using gray level co-occurrence matrix. Initially the gray value of images are calculated, then the co-occurrence matrix of  $0^\circ$ ,  $45^\circ$ ,  $90^\circ$  and  $135^\circ$  are computed, then the distance formula is used for similarity measurement.

H. Permuter et al. [18] have proposed the concept of image retrieval using Gaussian mixture model for identifying texture classes, these classes use a probability distribution for representing the feature statistics of an image which uses EM algorithm or K-means. Then the color and structure features are extracted and based upon that, the images are retrieved.

Maisa Dabud et al. [19] have proposed the concept of image retrieval using SOM and DWT they have extracted two kinds of vectors, one for color information and another for texture information. For that, the images are converted into HSV image and gray image, then, the discrete wavelet transform is applied. After the image is decomposed, it is quantized and its value is clustered, after that the mean value is computed, from that value similar images are retrieved.

Robert M. Haralick et al. [20] have proposed the concept of textural features for image classification and they have used the texture features for image retrieval, it is specified by a set of gray tone spatial dependence matrix, it is computed for various angular relationship and distances between neighbouring pixels. It calculates the resolution cells for  $0^\circ$ ,  $45^\circ$ ,  $90^\circ$  and  $135^\circ$  and the distance formula is applied for similarity measurement.

Junyue et al. [21] have proposed the concept of image retrieval using color and texture fused features, for color features it uses the global color histogram, for that RGB space is converted into HSV space. Then, they have

extracted the feature value which uses the Euclidean distance formula for similarity measurement. For texture feature extraction, the co-occurrence matrix is computed, then, the matrix value is normalised using Gaussian normalize approach. For similarity measurement it uses the Euclidean distance formula.

Sameer Antani [22] has proposed the concept of pattern recognition methods in image and video database. He has used the histogram based color image retrieval.

Kelly L.wiggers et al. [23] have proposed the concept of image retrieval and pattern spotting using Siamese neural network. It detects the pattern location based on selective search algorithm. It follows the layered approach for candidate list selection, then the features are extracted and the similarity is measured based upon the distance formula.

Mandar mitra [24] has proposed the color correlogram concept for image retrieval. In this method images are indexed by color pairs, then the probability of the pixel is found for color retrieval

John R.smith [25] has proposed the concept of Quad tree segmentation for feature image query, here the images are converted into wavelet image using quadrature mirror filter, then the features of an image is extracted using the distance formula for similarity measurement.

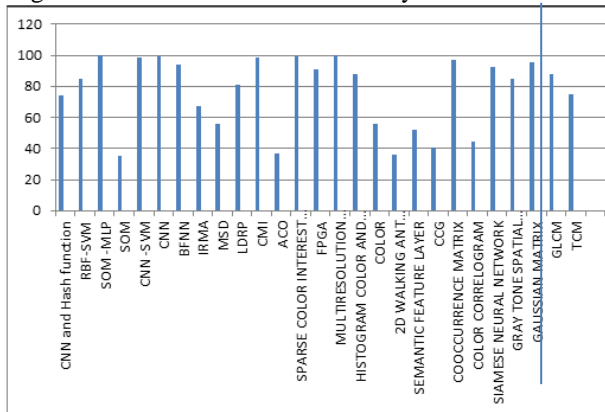


Fig.1. Performance Comparison between various methods

CONCLUSION:

The survey from various medical data says that ocular tuberculosis is curable one. The early identification of ocular TB can help to easily recover from the disease. For the early detection of ocular TB the TCM CBIR techniques are to be used. This method can give accurate result with a minimum amount of time. So we can avoid vision loss.

REFERENCE

[1] Suzana Batista Vereza de Oliveira , Angelo Ferreira Passos , David Jamil Hadad, Lorena Zbyszynski , Pedro souze de Almeida junior , Luiz Guilherme Schmidt Castellani , Reynaldo Dietze , Moises palace , “ The impact of ocular tuberculosis on vision after two months of intensive therapy “ ,Brazilian journal of infectious diseases , vol no 22(3),pp 159-165,2018.

[2] J.Z.Wang, J.Li, and G.Wiederhold, “Simplicity: Semantics – sensitive Integrated matching for Picture Libraries,”IEEE transaction pattern Analysis and machine Intelligence, vol 23(9), pp 947-963, 2001.

[3] Domonkes Varga, Tamas Sziranyi “Fast Content based image retrieval using convolutional neural network and hash function”.

[4] Mohd Aquib Ansari and Manish Dixit “ A Refined Approach of Image Retrieval using RBF- SVM classifier” ,International journal of signal processing, Image processing and Pattern Recognition vol 10, No 9 pp 43-56 , 2017.

[5] Moshira Ghalet , Hala Mousher Ebied , Howida A. Shedeed and Mohamed Tolba “Image Retrieval based on self-organizing feature map and multilayer perception neural networks classifier “.

[6] Manpreet Kaur, Neelofarsohi , “ A Novel Technique For Content based image retrieval using Color , Texture and Edge features” , International Conference on Communication and electronics System (ICCES),2016.

[7] Yogita Mistry and D.T. Ingole , M.D. Ingole “ Content based image retrieval using hybrid features and various distance metric”,Journal of Electrical Systems and Information Technology”, Vol 5, pp 874-888, 2016.

[8] Suman Kh, Satya V, “content based image retrieval with multi feature classification by Back propagation Neural Network “ International Journal of Computer Applications Technology and research , Vol 6, pp 278-284, 2017

[9] S.C. Ng, “Principal component analysis to reduce dimension on digital image.” procedia Computer Science, Vol 111, pp 113-119, 2017

[10] Shah.A.Naseem, R.saida, Iqbal, “Improving CBIR Accuracy Using Convolutional Neural network for feature extraction “, International conference on emerging technologies, 2017.

[11] Ammer M. Huneiti, Maisa Daoud, “Content Based Image Retrieval Using SOM and DWT “, Journal of Software Engineering and Applications, Vol 8, pp 51-61, 2015.

[12] Ammer M. Huneiti, “Interpreting web usage patterns Generated using a Hybrid Som- based clustering technique “, International Review on computers and software, 2012.

[13] Mohamed ouhda , Khalid Elasnouli , Mohammed Ouanan,B . Aksasse, “Content based Image Retrieval using Convolutional Neural network “.

[14] Satya verma, “Content based Image Retrieval with multi- feature classification by back – propagation neural network, 2017.

[15] Dimitris K. Iakovidis, Nikos pelekis , Evangelos E.kotsifakos , Ioannis kopanakis , Haralampos Karanikas and Yannis Theodoridis , “ A pattern similarity scheme for medical Image Retrieval “.

[16] Guang – Hai Liu , Jing –Yu- Yang , “Image Retrieval based on the texton co-occurrence matrix “ , pattern recognition 41(2008) 3521-3527.

[17] Mari Partio, Bogdan Cramariuc, Moncef gabbouj and Arivisa, “Rock texture retrieval using gray level co-occurrence matrix “.

[18] H.Permuter, J. Francos, I.H.Jermyn , “ Gaussian Mixture Models of texture and color for image database retrieval “.

[19] Maisa Daoud, Ammar M. Huneiti, “Content Based image retrieval using Som and DWT”, Journal of software engineering and applications, 2015.

[20] R.M. Haralick, K. Shangmugam, I. Dinstein, “Textural feature for image classification”, IEEE Transaction, vol 3, No 6, pp: 610–621., (1973).

[21] Jun Yue, Zhenbo Li , Zetian Fu , “Content based image retrieval using color and texture fused features “ , mathematical and computer modelling 54(2011) 1121-1127.

[22] Sameer Antani, Rangachar kasturi, Ramesh Jain, “Pattern recognition Methods in Image and video Databases: Past, Present and Future.

[23] Kelly L. Wiggers , Alceu S. Britto , Laurent Heutle , Alessandro L. koerich , Luiz S . Oliveira, “Image Retrieval and Pattern Spotting using Siamese Neural Network “.

[24] Mandar Mitra, “Image Indexing using Color Correlograms”, may 1997.

[25] John R. Smith, Shih –fu Chang, “Quad Tree Segmentation for Texture based Image Query “, ACM International Conference on Multimedia, 1994.