A Review on Content Based Image Retrieval with SURF, SVM and BAYESIAN

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ABSTRACT: This paper proposes the method for content based image retrieval which based on SURF (Speeded up Robust Features) algorithm, SVM classifier (Support Vector Machines) and Bayesian classifier. Performing feature of image matching which based on improves the SURF algorithm using SVM and Bayesian classifier.Content Based Image Retrieval (CBIR) is a challenging task which retrieves the similar images from the large database. Most of the CBIR system uses the low-level features such as colour, texture and shape to extract the features from the images and proposed result increasing the accuracy and PSNR value. SVM, Bayesian has been successfully used in content based image retrieval.

KEYWORDS*:* Content based image retrieval, SURF algorithm, Support Vector Machines and Bayesian*.*

I. INTRODUCTION

Content Based Image Retrievalis the retrieval of images which based on are visual features such as color and shape with its development for many large image databases, methods of image indexing which prove to be insufficient, and extremely time consuming. Where these methods are old for imageindexing, ranging from storing an image in database and affiliate with number, categorized description become anachronistic but this is not CBIR. The CBIR where each image stored in the database having its features extracted and compared to features of the query image where this involves two steps as follows:

- **Feature Extraction**: This process extracting the image features to different extent.
- **Matching**: This step involves matching these features to produce the result which visually same.

Where proposing four steps which are preprocessing, extract of feature, store information of Image and retrieval the Image.

Speeded Up Robust Feature (Surf)

SURF (Speeded up Robust Features) is a robust local feature detector first presented by Herbert Bay et al. in 2006 use in computer vision tasks as object recognition or 3D reconstruction. Inspired by the SIFT descriptor and standard version of SURF is several times faster than SIFT and claimed by its authors to be more robust against different image transformations than SIFT. SURF is based on sums of 2D Haar wavelet responses and makes an efficient use of integral images. It uses an integer approximation to the determinant of Hessian blob detector which can be computed extremely quickly with an integral image where for features it uses the sum of the Haar wavelet response around the point of interest.

Support vector machine (SVM)

Support vector machines (SVMs) are supervised learning models with associated learning algorithms that analyze data and recognize patterns used for classification and regression analysis. Set of training examples where each marked as one of two categories an SVM training algorithm builds a model that assigns new examples into one category or the other making it a non-probabilistic binary linear classifier. An SVM model is a representation of the examples: points in space mapped so the examples of the separate categories are divided by a clear gap that is as wide as possible. Where

the new examples are then mapped into that same space and predicted to belong to a category based on which side of the gap they fall on.

II.   LITERATURE REVIEW

XiaoningZong ,Xinzhi LiResearch on Feature Matching Algorithm Based on Three-dimensional Information Acquisition Image feature matching in three dimensional information acquisition technology is important for machine vision and in order to get the real-time and matching robustness requirement an image registration method which based on SURF algorithm is proposed.Thisproposes an image registration method based on SURF algorithm and give the comparison of the real-time performance and robustness requirement with SIFT-based image registration algorithm. The results showed that compared to image features registration method based on SIFT algorithm, this method has low complexity, good real-time performance and robustness etc**.**

Juan C. Caicedoa, Fabio A. Gonzáleza, Eduardo Romerob Content-based histopathology image retrieval using a kernelbased semantic annotation framework Large amounts of histology images are captured and archived in pathology departments due to the ever expanding use of digital microscopy. Manage and access these collections of digital images are regarded as a key component of next generation medical imaging systems and addresses the problem of retrieving histopathologyimages from a large collection using an example image as query.

Qianni Zhang and EbroulIzquierdo Histology Image Retrieval in Optimized Multifeature Spacespresents an approach to automatically combine heterogeneous visual features for histology image retrieval. Propose a strategy for multifeature-based retrieval in histology image databases. The multifeature fusion model is obtained using a MOL method which automatically derives a suitable model for feature combination based on multiple query images that are associated with the keyword in concern. The advantage of the proposed feature fusion approach is that it considers a fusion model for each keyword individually.

Bob Zhang, B. V. K. Vijaya Kumar(Detecting Diabetes Mellitus and Nonproliferative Diabetic Retinopathy Using Tongue Color, Texture, and Geometry Features presents the diabetes mellitus (DM) and its complications leading to diabetic retinopathy (DR) are soon to become one of the 21st century's major health problems where presents a huge financial burden to healthcare officials and governments. Proposes a non-invasive method to detect DM and no proliferative diabetic retinopathy (NPDR), the initial stage of DR based on three groups of features extracted from tongue images where including color, texture and geometry. A non-invasive capture device with image correction first captures the tongue images and tongue color gamut is established with 12 colors representing the tongue color features.

III.   SURF ALGORITHM & FEATURES

Detection
The SURF algorithm is based on the same principles and steps of SIFT but it uses a different scheme and should provide better results faster. Detect scale invariant characteristic points where SIFT approach uses cascaded filters and the difference of Gaussians (DoG) calculated on rescaled images progressively.

Integral image
The image with a square is much faster if the integral image is used. The integral image is defined as:

$$S(x,y) = \sum_{i=0}^{i<=x} \sum_{j=0}^{j<=y} I(i,j)$$

Sum of the original image within a rectangle D image can be evaluated quickly using the integral image. I(x, y) added over the selected area requires four evaluations S(x, y) (A, B, C, D)

Points of interest in the Hessian matrix
SURF uses a blob detector based on the Hessian to find points of interest and determinant of the Hessian matrix expresses the extent of the response which expression of a local change around the area.

Blob structures are detected in places where the determinant of the Hessian is maximal. In contrast to the Hessian-Laplacian detector by Mikolajczyk and Schmid, SURF also uses the determinant of the Hessian for selecting the scale done by Lindeberg. Given a point p = (x, y) in an image where the Hessian matrix H (p, σ) in p at scale σ, is defined as follows:

$$H(p,\sigma) = \begin{pmatrix} Lxx(p,\sigma) & Lxy(p,\sigma) \\ Lxy(p,\sigma) & Lyy(p,\sigma) \end{pmatrix}$$

Where $Lxx(p,\sigma)$ is the convolution of second order derivative $\partial x/\partial x^2 g(\sigma)$ with the image in the point x, y similarly with $Lxy(p,\sigma)$ and $Lyy(p,\sigma)$.

IV. PROPOSED CBIR SYSTEM
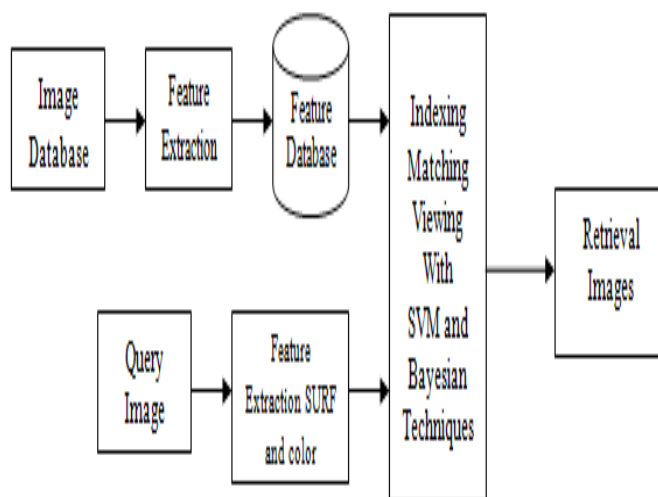
Proposed CBIR model

To retrieve images where feature vectors are extracted from the given query image where the similarities between the feature vectors of the query image and the feature vectors of the database images are calculated and the retrieval is performed with an indexing scheme and matching strategy with SVM and Bayesian techniques provides efficient way to search the image database. Here SURF algorithm is used to extract the features and first order and a second order color moment is calculate for SURF key points to provide the maximum distinctiveness for the key points.

IV. CONCLUSION

The proposed method will overcome the shortcomings of the previous methods to a great extent. Many CBIR techniques have been proposed earlier but they were not good enough and can be temporarily tampered with so the task was not fulfilled.CBIR alone with Surf and SVM Method could not provide better results.Results of previous CCR, ACCURACY AND PSNR obtained were poor and unsatisfactory. Content-Based Image Retrieval (CBIR) is a challenging task which retrieves the similar images from the large database. Most of the CBIR system uses the low-level features such as colour, texture and shape to extract the features from the images.

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BIOGRAPHY

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