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Disease Prediction Based on Pattern Matching

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Abstract **- The management of health care produces and consists of the large amount of biological data, which are produced under high time complexity and with the manipulation error. The data are mostly in numbered and text format. Those data are analyzed easily but the data which are analyzed by the image are very difficult in analyzing because the images of cells have different structure which is different for various diseases. For the determination of the disease which is analyzed through the cells images are difficult. To make the process simple of analyzing are by matching the cells with the previous sample disease affected cells. For processing of the images uses the pattern matching algorithms. Those algorithms are matching the similar pattern of the sample images. The algorithm used for pattern matching are the hausdorff and the SIFT algorithms. The performance of these algorithms is highly efficient. This research paper discuss and summarize the performance analysis of the hausdorff algorithm and the SIFT algorithm.**

***Keywords*: Biological data, hausdorff algorithm, SIFT algorithm, pattern matching, object recognization.**

I.INTRODUCTION

The health care management produces huge amount of data about the human cells. The human cells have structures which are differing from every human. Those cells are analyzed by different procedures. The management consists of details about both the normal cells and disease affected cells. Most of the disease are found by their symptoms and is cured and some disease are found by their symptoms at the final or severe stage. That disease is not known at the early stage because the actions of the disease are inside the cells or organs.

The affected cells are analyzed by various methods, but the simplest way to analyze the cell is by matching the cells of affected and sample cells using pattern matching algorithms. For this many algorithms are being are used. The matching are very much useful for analyzing because the affected cells are identified easily when compared with previous sample affected cells. Those cell images are split into patterns for the comparison. These are very useful to represent details about the affected cells. These methods are useful in health care management to produce absolute details about the patient's disease.

The algorithms used for matching images are such as hausdorff basic matching algorithm[1] and the scale invariant feature transform algorithm[5]. These algorithms are highly used for matching image patterns. The difference in cells are analyzed by splitting the images into horizontal and vertical grid and each box in the images are marked with the key points and the points are centralized and measured the distance of the box corners and pattern of each box to identify the affected cells. The algorithms provide high performance in pattern matching which are more useful to the health care management.

II.ALGORITHMS USED IN PATTERN MATCHING

There are many algorithm used for the pattern matching the images such as distance transformi, wavelet decomposition based methods[2], hamming distance of computer vision and difference map algorithms. Among them the following 2 algorithms are well known for their good performances.

- Hausdorff based matching algorithm
- SIFT(Scale Invariant Feature Transform)algorithm

A.Hausdorff Based Matching Algorithm:

The hausdorff algorithm [1] measures the distance that extent to which each point of a model are lays some point of an image set. This distance is used to determine the degree of resemblance between two objects. Hausdorff distance is defined as measurement tool which describes the degree of similarity between two point sets.

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$A=\{a_1, a_2, \ldots, a_p\}$ and $B=\{b_1, b_2, \ldots, b_q\}$

Hausdorff distance of two points set is defined as

$$H(A,B)=\max(h(A,B),h(B,A)) \quad ---(1)$$

Where $h(A,B) = \max_{a_i \in A} \min_{b_j \in B} \|a_i - b_j\|$ --- (2)

$$h(B,A) = \max_{b_j \in B} \min_{a_i \in A} \|b_j - a_i\| \quad --- (3)$$

The symbol ||.|| in (2) and (3) is the Euclidean distance[3] between point a_i and point b_j. Equation (1) known as undirected hausdorff distances or also defined as basic form of hausdorff. Then the equation (2) and (3) are defined as the directed hausdorff distance from point set A to point set B and from point set B to point set A. The equation (1) is the bigger one between direct distances of (2) and (3). The equation (1) measures the largest degree of non-similarity between two point sets. The hausdorff distance defines the non similarity of two points and it is very sensitive to sudden noises.

B.SIFT Algorithm:

The ability of the SIFT algorithm is to extract features that are invariant to scale and rotation. This approach generates large number of features densely covering the image with the overall scales and locations.

The components of the SIFT framework [5] for the key point detection:

- Space scale extreme detection
- Key point localization
- Orientation assignment
- Key point descriptor

A.Space Scale Extreme Detection:

With the use of cascade filtering approach a set of octaves are produced, every octave containing the difference-of-gaussian images which covering the range of scale local maxima and minima are then detected overall scale and the image locations. They form the candidate key points.

$L(x,y,\sigma)=G(x,y,\sigma)*I(x,y)$ [6]

$$G(x,y,\sigma) = \frac{1}{2\pi\sigma^2} e - (x^2+y^2)/2\sigma^2$$

Difference-of-Gaussian (DoG):

$$D(x,y,\sigma) = \big(G(x,y,k\sigma) - G(x,y,\sigma)\big) * I(x,y)$$

$$= L(x,y,k\sigma) - L(x,y,\sigma))$$

The image must have 3 key points matches reliable identification. Each key point is represented as (x,y,σ).

B.Key Point Localization:

Every candidate key point is fit to a detailed model to define the location and scale. If the points are low contrast and poorly localized edges then the points are rejected. The inaccurate key points are localized using the low contrast key points by the function value at the extremum-$(D(\hat{x}))$, if the $|D(\hat{x})| < 0.03$. The pixel value in range [0,1]. Then the key point is discarded.

C.Orientation Assignment:

The additional key points are created by the strong direction of the candidate key points. Each key point is discarded based on a local image gradient.

D.Key Point Descriptor:

The key point descriptor is defined by the sampling image gradient magnitudes and orientations are covered every point and they put those in a array of orientation histogram which are used to cover the region around the key point.

III. APPLICATIONS OF THE ALGORITHM

The applications of the hausdorff algorithm are the computer vision; the hausdorff distance can be used to find the given template in an arbitrary target image. The template and image are often preprocessed through edge detector which gives an binary image. In computer graphics, the distance is used to measure the difference between two different representations of the same 3D object particularly when generating level of details for efficient display of complex 3D object.

The application of the SIFT algorithm are the object recognition, robot localization and mapping, panorama stitching, 3D [4] scene modeling, recognition and tracking, analyzing the human brain in3D magnetic resonance images.

A.Object Recognition using SIFT Features:

The SIFT's ability to find the key points that are invariant to location, scale, rotation and robust to affine transformation which are used to changes in illumination. They are usable for object recognition.

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B.Robot Localization and Mapping:

In the application, a trinocular stereo system is used to determine 3D estimate for key point locations. As the robot moves, it localizes using features matches to the existing 3D map and then incrementally adds features to the map while updating 3D positions.

C.Panorama Stitching:

SIFT feature matching can be used for image stitching for fully automated panorama reconstruction from non-panoramic images. The SIFT features extract from the input images are matched against each other to find k-nearest neighbors for each features.

D.Analyzing the Human Brain in 3D Magnetic Resonance Images:

The feature-based morphometry technique uses extreme in a difference of Gaussian scale space to analyze and classify 3D magnetic resonance images of human brain. FBM models the image probabilistic as a college of independent features, condition on image geometry and group labels.

IV. PERFORMANCE ANALYSIS OF HAUSDORFF AND SIFT

These algorithm are more useful for the image matching, hausdorff and the SIFT algorithms are highly performance in range, because they match the images as by the area patterns and similarly key points of the split area. The key points are more useful to analysis the distance to another key point to know the range between them and any noise are determined in the analyzed area. The patterns of the image can be found very easily. The efficiency of the process are very fast in finding the image matching. The algorithm also analysis the method of rotation and scaling.

The SIFT and SIFT-like GLOH[4] features exhibit the highest matching accuracies for an affine transformation of 50 degree. The SIFT based descriptors outperform both the textured and structured scenes, with the difference in performance larger on the texture scene.

The perform of image matching by SIFT descriptor can be improved by in the sense of achieving higher efficiency scores and lower 1-precious score by replacing the scale space extreme of the difference of Gaussian operator in original SIFT by scale extreme of the determinant of the family generalized scale-space interest points. The time complexity of the process of analysis images are reduced by the use of these algorithms. The noise occurred in the image are discarded and determined clearly by the key points of the manipulation of the algorithm.

V.CONCLUSION

The hausdorff and SIFT algorithm are used for the image analysis and pattern. The algorithms are to implement which provides the high efficiency in the manipulations. They also reduce the time complexity. The determination of images is by the arrangements of the key points in the sample images. These are more useful for the health care department, because the analysis of biological data is difficult. The matching of the images is more useful to produce data. The data produced by the algorithm are accurate and produce the reliable data.

REFERENCE

[1] "*Comparing images using hausdorff distance*" Daniel p.Huttenlocher, Gregory A.Klanderman, and willam J.Rucklidge

[2] "*Image Matching Algorithm Based on an Improved Hausdorff Distance*" XiaoHong Li, YiZhen Jia, Feng Wang, Yuan Chen Computer and Information HeFei University of Technology Hefei, China jlxh@hfut.edu.cn

[3] "*Image Matching Using Distance Transform*", [1]Abdul Ghafoor , [2]Rao Naveed Iqbal , and [2]Shoab Khan, [1]Department of Electrical Engineering, College of Electrical and Mechanical Engineering,National University of Sciences and Technology, Rawalpindi, Pakistan a_ghafoor30@yahoo.com, [2]Department of Computer Engineering, College of Electrical and Mechanical Engineering,National University of Sciences and Technology, Rawalpindi, Pakistan {rao_naveed,kshoab}@yahoo.com

[4] "*Image matching with SIFT features – A probablistic approach*" Jyoti Joglekar a, *, Shirish S. Gedam b, a CSRE, IIT Bombay, Doctoral Student, Mumbai, India – jyotij@iitb.ac.iN, b Centre of Studies in Resources Engineering, IIT Bombay, Associate Professor, Mumbai, India – shirish@iitb.ac.in

[5] "*Scale-Invariant Feature Transform (SIFT): Performance and Application*," Vedrana Andersen, The IT university of Copenhagen,vedrana@itu.dk, Lars pellarin, The IT university of Copenhagen,pellarin@itu.dk, Renee andreson, The IT university of openhagen,renee@itu.dk.

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