

Detection of Micro Organisms using Shape Based Contour Analysis

Vipul Vinod Phayade¹, Pranay Arun Pagare², Sachin Krishnarav Pawar³

^{1,2,3} Student, Department of Computer Engineering, Shivajirao S Jondhale College of Engineering, Dombivli East, Maharashtra 421204

Abstract - In this paper we introduce an approach for object retrieval that uses contour segment matching for shape similarity computation. The object contour is partitioned into segments by skeleton endpoints. Each contour segment is represented by a rotation and scale invariant, 12-dimensional feature vector. The similarity of two objects is determined by matching their contour segments using the Hungarian algorithm. Our method is insensitive to object deformation and outperforms existing shape based object retrieval algorithms. The most significant scientific contributions of this paper include the introduction of a new feature extraction technique for contour segments as well as a new similarity measure for contour segments cleverly modeling the human perception and easily adapting to concrete application domains, and the impressive robustness of the method in an object retrieval scenario.

Key Words: Object Retrieval, Contour Analysis, Shape Detection, Boundary Detection, Shape Retrieval

1. INTRODUCTION

The purpose of this project is to provide identification of various types of micro organisms. It will explain the purpose and features of the system, the interfaces of the system, what system will do, constraints under which it must operate and how the system will react to external stimuli. This document is intended for medical students and pathologies in their field of research and further development.

1.1 AIM & OBJECTIVE

The goal of Detection of Microorganisms using Shape based Contour Analysis is to provide data with detection and identification of various microorganisms based on the images thus reducing the overall time to retrieve information. It is easy to handle and functionality can be understood by everyone. It provides immediate detection based on the shape. The scope of this system is in Medical Institutions and Pathologies where even students can use the system.

1.2 PROJECT SCOPE

Detection of Microorganisms using Contour Analysis helps in Determining which virus or bacteria is attacking our body is always an issue. This system provides hassle free detection of types of Micro organisms including various bacteria and viruses by automatically detecting the micro organisms and showing the type of Micro organism i.e. the name of micro organism. The system works with the help of data collected from multiple pathologies and biological research

departments, the techniques, algorithms and parameters that is to be used can be adjusted easily for any institution depending upon its requirement and also helps in updating our database while constantly gaining information about the various types of micro organisms.

2. LITERATURE SURVEY

The existing system deals with image detection in a specific orientation. This traditional system is very time consuming and data cannot be provided accurately according to the demands of user. Data in present system contains a lot of errors

The existing system of number plate detection is distributed into several parts:

1. Input raw image
2. Image linearization
3. Reduce noise using mid-filtering method
4. Enhance contrast using histogram equalizer
5. Plate localization
6. Character segmentation

3. IMPLEMENTATION

Image acquisition or capturing the image.

Grayscale of image – The RGB image is converted into grayscale image.

Smoothing - It is usually done to reduce noise and camera artifacts.

Thresholding – Thresholding is the simplest method of image segmentation. It is a non-linear operation that converts a grayscale image into a binary image where the two levels are assigned to pixels that are below or above the specified threshold value.

Erosion and Dilation - As the result of thresholding operation gives black and white image. But this image contains lots of noise in it. To reduce the noise erosion and dilation operations are performed.

Block Detection – It detects the blocks of different distinct parts of micro organisms.

Contour Analysis - It is optical character recognition technique which detects the characters in the block.

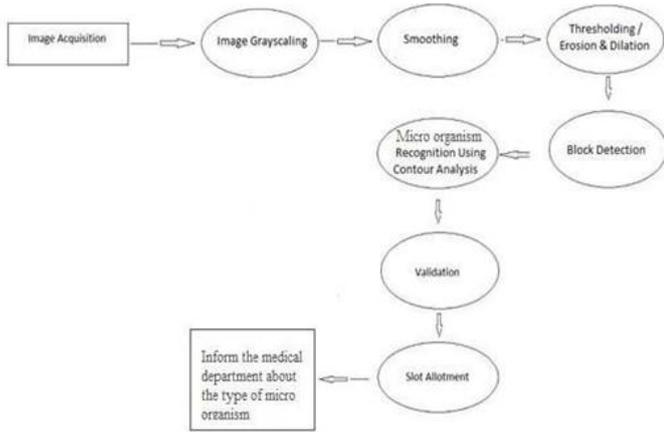
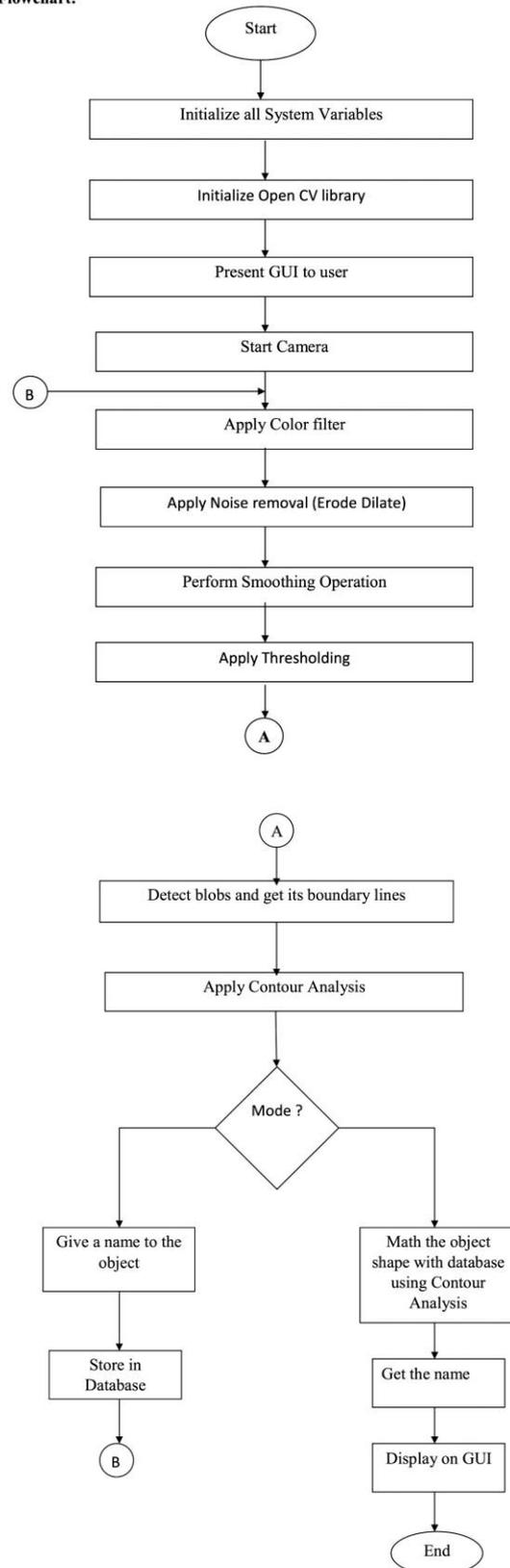


Fig 1: Mechanism of Contour analysis

Process of implementing Contour Analysis for shape based object retrieval is given as:

1. Image acquisition or capturing the image.
2. Grayscale of image – The RGB image is converted into grayscale image.
3. Smoothing - It is usually done to reduce noise and camera artifacts.
4. Thresholding – Thresholding is the simplest method of image segmentation. It is a non-linear operation that converts a grayscale image into a binary image where the two levels are assigned to pixels that are below or above the specified threshold value.
5. Erosion and Dilation - As the result of thresholding operation gives black and white image. But this image contains lots of noise in it. To reduce the noise erosion and dilation operations are performed.
6. Block Detection – It detects the blocks of different distinct parts of micro organisms.
7. Contour Analysis - It is optical character recognition technique which detects the characters in the block.

Flowchart:



3. RESULTS



Fig 2: Detection of Mitochondria

4. CONCLUSION

In this paper, we propose a method for 2D shape similarity measure based on contour segment matching and, after fusion with a state-of-the-art skeleton-based matching, use it for object retrieval. The most innovative part of our approach is the robust comparison and matching of contour segments. The algorithm can easily adapt to a concrete application domain by learning weights assigned to different dimensions of the feature space used for contour description. Its superior performance has been proven in a meaningful experimental setup.

ACKNOWLEDGEMENT

We sincerely wish to thank our project guide Prof. Uttara Gogate for her ever encouraging and inspiring guidance helped us to make our project a success. Our project guide made us endure, with her expert guidance, kind advice and timely motivation which helped us to determine about our project.

We would like to thank our project coordinator Prof. Uttara Gogate for all the support we needed from her for our project.

We also express our deepest thanks to our H.O.D. Prof. P. R. Rodge whose benevolent help aided us, making available the computer facilities to us for our project in our laboratory and making it a true success. Without his kind and keen co-operation our project would have been stifled to standstill.

Lastly, we would like to thank our college principal. Dr. J. W. Bakal for providing lab facilities and permitting us to go on with our project. We would also like to thank our colleagues who helped us directly or indirectly during our project.

REFERENCES

- [1] Cong Yang, Oliver Tiebe, Pit Pietsch, Christian Feinen, Udo Kelter and Marcin Grzegorzec "Shape-Based Object Retrieval by Contour Segment Matching".
- [2] Xiang Bai and L.J. Latecki, "Object -Based Retrieval By Contour Segment Matching" PAMI, vol. 30, no. 7, pp. 1282-1292, 2008.
- [3] Dengsheng Zhang & Guojun Lu "Shape Based Image Retrieval using Genetic Fourier Descriptor" ISBN: 0-7803-7304-9
- [4] Babu M. Mehtre Mohan S. Kankanhalli "Shape Measures for Content Based Image Retrieval: A Comparison" By PII: S0306-4573(96)00069-6
- [5] Dipti Prasad Mukherjee, Nilanjan Ray and Scott T. Acton "Level Set Analysis for Leukocyte Detection and Tracking" ISSN: 1941-0042