

ANALYZING OF THE LEAF BOUNDARY IN DIFFERENT LEAVES

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ABSTRACT

The present study deals with the analysis of medicinal plants specifically Hibiscus leaf by using the techniques of Image Processing, Boundary tracing of a binary digital region is an important first step in the analysis of that region. With an abstract cell complex representation of a digital image the boundary point coordinates may be extracted from that digital image. The results are presented and discussed. Boundary value analysis is a technique for test data selection Boundary values which include maximum, minimum, just inside boundaries, just outside boundaries, typical values, and error values. The expectation is that, if a systems works correctly for these extreme or special values, then it will work correctly for all values in between. An effective way to the test code is to exercise it at its natural boundaries.

Key Words: Image Processing, Hibiscus Leaf, abstract cell complex, medicinal.

1. Introduction

Analyzing and manipulating images with a computer. Generally involves three steps:

- i) Import an image with an optical scanner or directly through digital photography.
- ii) Manipulate or analyze the image in some way. This stage can include image enhancement and data compression, or the image may be analyzed to find patterns that aren't visible by the human eye. For example, meteorologists use image processing to analyze satellite photographs.
- iii) Output the result. The result might be the image altered in some way or it might be a report based on analysis of the image.

The two aspects of Image Processing are:

Improving the visual appearance of images to a human viewer

Preparing images for measurement of the features and structures present Image Processing is necessary since the digital image is "invisible" it must be prepared for viewing on one or more output device (laser printer, monitor, etc)

The digital image can be optimized for the application by enhancing or altering the appearance of structures within it (based on the body part, diagnostic task, viewing preferences .etc).

It might be possible to analyze the image in the computer and provide cues to the radiologists to help clues the detection important/suspicious structures (ex: computed Aided Diagnosis, CAD) acquiring image; special care has to be taken.

Scientific instruments commonly produce images to communicate results to the operator, rather than generating an audible tone or emitting a smell.

Space missions to other planets and Comet Halley always include cameras as major components, and we judge the success of those missions by the quality of the images returned.

The following are the types of Image processing:

Image- to – image transformations

Image – to- Information transformations

Information- to – image transformations

Image-to- image transformations:

Enhancement (make image more useful, pleasing)

Restoration Egg. deblurring, grid line removal

Geometry:

(Scaling, sizing, zooming, morphing one object to another)

Image –to – information transformation:

Image statistics (histogram)

Histogram is the fundamental tool for analysis and image processing

Image compression

Image analysis (Image segmentation, feature extraction, pattern recognition)

Computer –aided detection and diagnosis (CAD)

Information – to – image transformations

Decompression of compressed image data

Reconstruction of image slices from CT or MRI raw data Computer graphics, animations and virtual reality (synthetic objects).

Image processing basically includes the following three steps.

- 1 Importing the image with optical scanner or by digital photography.
- 2 Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs.
- 3 Output is the last stage in which result can

be altered image or report that is based on image analysis.

Purpose of Image processing

The purpose of image processing is divided into 5 groups. They are:

1. Visualization - Observe the objects that are not visible.
2. Image sharpening and restoration - To create a better image.
3. Image retrieval - Seek for the image of interest.
4. Measurement of pattern – Measures various objects in an image.
5. Image Recognition – Distinguish the objects in an image.

About the Medicinal Plants

Plants are extremely useful for us. On the one hand they provide us with the oxygen we need by means of photo synthesis necessary for us to breathe. But furthermore they contribute with nutrients through food, wood for fire, chemicals for the industries, etc.

The use of the plants as food has been the main aim from time immemorial Throughout history, civilizations have moved around the plants and , living beings have been benefited to a great extent.

Indian Medicinal Plants

About 80% of the world's population relies solely or largely on traditional remedies for their healthcare needs. Today, about 70,000 to 80,000 plant species are used for medicinal or aromatic purposes globally. India with its ecological, geographical and climatic diversities is perhaps the richest nation with a vast herbal medicinal wealth (About 15000-20000 plants have good medicinal values). In India the therapeutic use of herbs dates back to the Vedic period. The Rig-Veda has documented about 67 medicinal plants,

Yajurveda 81 species and Atharvaveda 290 species.

The ayurvedic classics also described the clinical uses of thousands of medicinal plants. With the increasing esteem of herbal medicine and ayurveda, use of medicinal plants is expected to rise globally. The popularity of herbs have increased because of the side effects of synthetic drugs, development of resistance to many drugs like antibiotics, public awareness, population explosion, insufficient supply of drugs, high cost of synthetic drugs etc.

RELATED WORK

In [1] an algorithm for generating the Medial Axis Transform (MAT) of 3D objects with free-form boundaries is discussed. The algorithm proposes the usage of the exact representation of the part and generates an approximate rational spline description (to within a defined tolerance) of the MAT. The algorithm generates the MAT by a tracing technique that marches along the object boundary. The level of approximation is controlled by the choice of the step size in the tracing procedure. Criteria based on distance and local curvature of boundary entities are used to identify the junction points and the search for these junction points is done in an efficient way. The algorithm works for multiply-connected objects as well. Results of implementation are provided.

In [2] the authors have discussed on Boundary tracing of discrete points is an important step to build up model reconstruction by using LiDAR data. Its result directly effects the location regularization of building corners and the reconstructed building models. At present, the convex hull based boundary tracing algorithm is not suitable for buildings with many concave part and grid index based algorithm is too complicated and not stable enough. This paper proposes a side ratio constraint based boundary

tracing algorithm for discrete points. This algorithm can effectively trace the boundary of concave polygons with holes. It doesn't depend on point densities heavily since it uses side ratio as qualification. This algorithm was finally proved in experiments.

In [3] the authors discuss on the review discussed several techniques to obtain boundary of an object in a digital image. Some of the well known techniques are contour tracing and edge detection techniques. The result of this boundary tracing is used for analyzing an object in the image. This result is critical for certain image analysis. In this study, the techniques are used for obtaining the fish boundary from a digital image. The study will evaluate the suitable approach to get the fish boundary. This study is important for the next study on analyzing the physical characteristic of the fish.

In [4] the authors discuss on the several techniques to obtain boundary of an object in a digital image. Some of the well known techniques are contour tracing and edge detection technique. The study evaluates the suitable approach to get the fish boundary. This study is important for the next study on analyzing the physical characteristic of the fish.

In [5] the authors discuss on the boundary that is necessary for the real estate industry, flood management, and homeland security applications. The extraction of building boundary is also a crucial and difficult step towards generating city models. This study presents an approach to the tracing and regularization of building boundary from raw lidar point clouds. This paper presents the mathematical and algorithmic formulations along with stepwise illustrations. Results from Baltimore city, Toronto city, and Purdue University campus are evaluated.

Boundary Tracing is given a “segmented” image (an image with foreground pixels labeled 1 and background pixels labeled zero), tracing of either boundary of the foreground.

PROBLEM SPECIFICATION

The main objective of the present study is to make a detailed analysis of the structure of veins in Indian Medicinal leaves. One Boundary tracing of a binary digital region which is an important first step in the analysis of that region. With an abstract cell complex representation of a digital image the boundary point coordinates may be extracted from that digital image. Different samples are taken and the experiments are conducted.

METHODOLOGY

MAT LAB 7.0 tool is used to make detailed analysis of the boundary detection of different medicinal leaves. This method is meant to complement an already-implemented leaf classification system whose decisions rely entirely on global shape information, and the combined results of the local and global models are presented.

In Order to make detailed analysis of the Betel Leaf and also to predict the RGB color combination and performed using ImageJ 1.48 version tool.

TYPES OF DIGITAL IMAGES

Binary: Each pixel is just black or white. Since there are only two possible values for each pixel (0,1), we only need one bit per pixel.

Grayscale: Each pixel is a shade of gray, normally from 0 (black) to 255 (white). This range means that each pixel can be represented by eight bits, or exactly one byte. Other grayscale ranges are used, but generally they are a power of 2.

True Color or RGB: Each pixel has a particular color; that color is described by the amount of red, green and blue in it. If each of these

components has a range 0–255, this gives a total of 256³ different possible colors. Such an image is a “stack” of three matrices; representing the red, green and blue values for each pixel. This means that for every pixel there correspond 3 values

Table 1

Sl. No.	Name of Leaf	Dimension (Row, Column)	Initial Column
01	Hibiscus	Dimension (454,605)	80
02	Peepal	Dimension (1329,913)	244
03	Betel	Dimension (1216,829)	211

EXPERIMENTS AND RESULTS

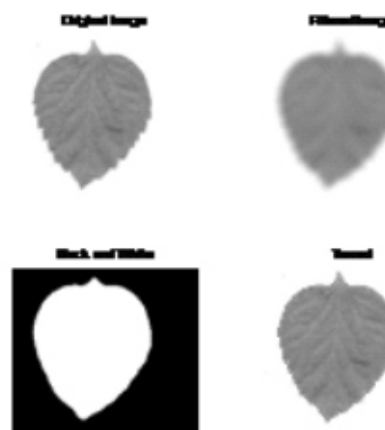


Figure 1

The above figure 1 shows Original Image, Filtered image, Black and white image and display traced boundary

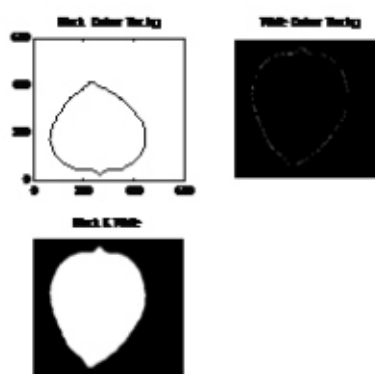


Figure 2

The above figure display finding of initial point, Inverting, fill inner boundaries where lesion is located

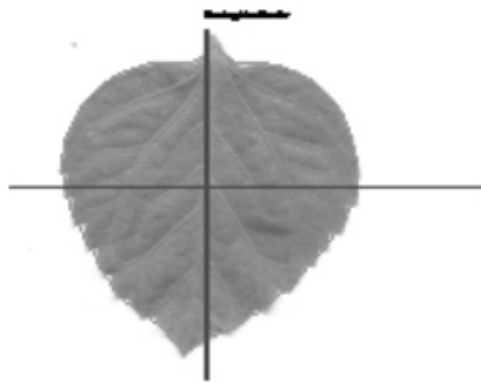


Figure 3

The above figure display the Geometrical center with tracing

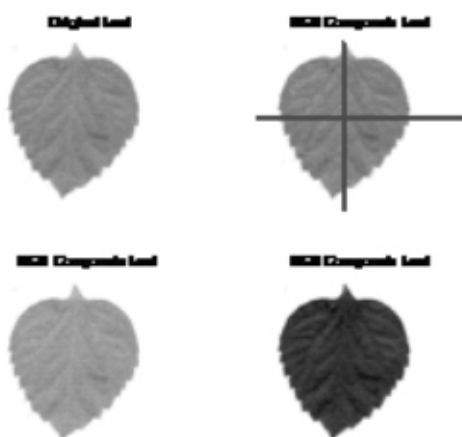


Figure 4

The above figure display Original leaf, RGB Components with intensity

CONCLUSION

Boundary values include maximum, minimum, just inside boundaries, just outside boundaries, typical values, and error values. The expectation is that, if a System works correctly for these extreme or special values, then it will work correctly for all values in the range. An effective way to test code is to exercise it at its natural boundaries.

Boundary Value Analysis (BVA) is a method of testing that complements equivalence partitioning. In this case, data input as well as data output are tested. The rationale behind BVA

is that the errors typically occur at the boundaries of the data. The boundaries refer to upper limit and the lower limit of a range of values or more commonly known as the “edges” of the boundary.

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