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Trees Leaves Extraction in Natural Images Based On Image Segmentation and Generating Its Plant Details

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Abstract— It is always a difficult task to analyze plant leaf images by a common man because there are very minute variations in some plant leaf images & larger data set for analysis. The identification becomes much difficult if we deal with medication plants. Wrong detection of plant through leaf can cause serious catastrophes as the medicine made of these plants is directly consumed by human and animals. It is a quite difficult to develop an automated recognition system which could process on a large information and provide a correct estimation. Block Matching and Watershed Algorithm have been successfully applied to problems in leaf pattern recognition, classification and image analysis. In this paper, Multilayer feed- forward networks are trained using back propagation learning algorithm. The main objective of this paper is to develop a classification system for agriculture and Ayurveda plants by image pre-processing, leaf contour, feature extraction, and classification. In our proposed algorithm we can analyze any big database of leaves of different plants with accuracy greater than 95%.
Index Terms— Database, Watershed, Block Matching.

I. INTRODUCTION

In case we get a rare leaf in our hand most of us gets confused about the specie of the plant its origin and use. Our project is mainly concentrated on leaf specie identification using image processing technique. In recent decades, digital image processing, image analysis and machine vision have been sharply developed, and they have become a very important part of artificial intelligence and the interface between human and machine grounded theory and applied technology. These technologies have been applied widely in industries, medicine and agriculture. Finger print recognition is well developed and face recognition is rapidly improving. As part of this project, the elaboration of such an application has been attempted. The recognition of leaves from photographs implies several steps, starting with image preprocessing, feature extraction, plant identification, matching and testing and finally obtaining the results implemented in MATLAB. While a botanist could be content with a system for recording a plant species discovered in its natural habitat, to be identified and logged later, this application aims at providing a detailed identification to hikers, campers, doctors etc.

The main purpose of this program is to use MATLAB resources. Indeed, there are several advantages of combining MATLAB with the leaf recognition program. The result proves this method to be a simple and an efficient attempt. Future sections will discuss more on image preprocessing and acquisition which includes the image preprocessing and enhancement, histogram equalization, edge detection. Further on sections introduces texture analysis and high frequency feature extraction of a leaf images to classify leaf images i.e. parametric calculations and then followed by results.

The objective is to create a leaf based plant identification system and a fast database matching approach to check the leaf association with plant. It should be an accurate system to provide reliable output and to show the use of the leaf and plant in real time. In existing system, gradient value of each leaf in database is detected and matched against the other leaves. If it matches then detailing program of the plant name is called out. It provides the manual threshold value for each plant and plant given as the input can only be HQ images from HD camera and scanners. But the accuracy level of this type is 50% and can cause serious issues if the wrong leaf is blended in the medicine. So this is a slow database matching.

II. WATERSHED AND BLOCK MATCHING BASED LEAF TRACKING SYSTEM

We propose a system of leaf extraction method which will be matched with the database using block matching algorithm. Block Matching checks the overall pixel features of the leaf and matches with the database. Watershed algorithm is used to automatically check the leaf area. It is efficient enough to provide accurate result in the form of leaf related details. It is highly useful in medicinal use and leaf related studies. It reduces the chance of error and avoids medicinal accidents. Automatic plant detailing also is

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implemented in our project. Block matching is generally used in motion estimation to track motion in video. But here it is used to detect similarity in images along with watershed algorithm. This process accuracy level is 95% and faster blocks matching. The software used for this process is Matlab 8.1

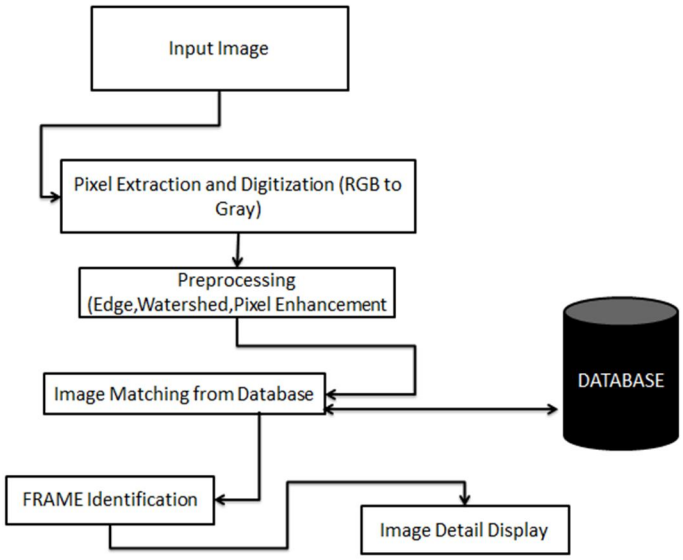
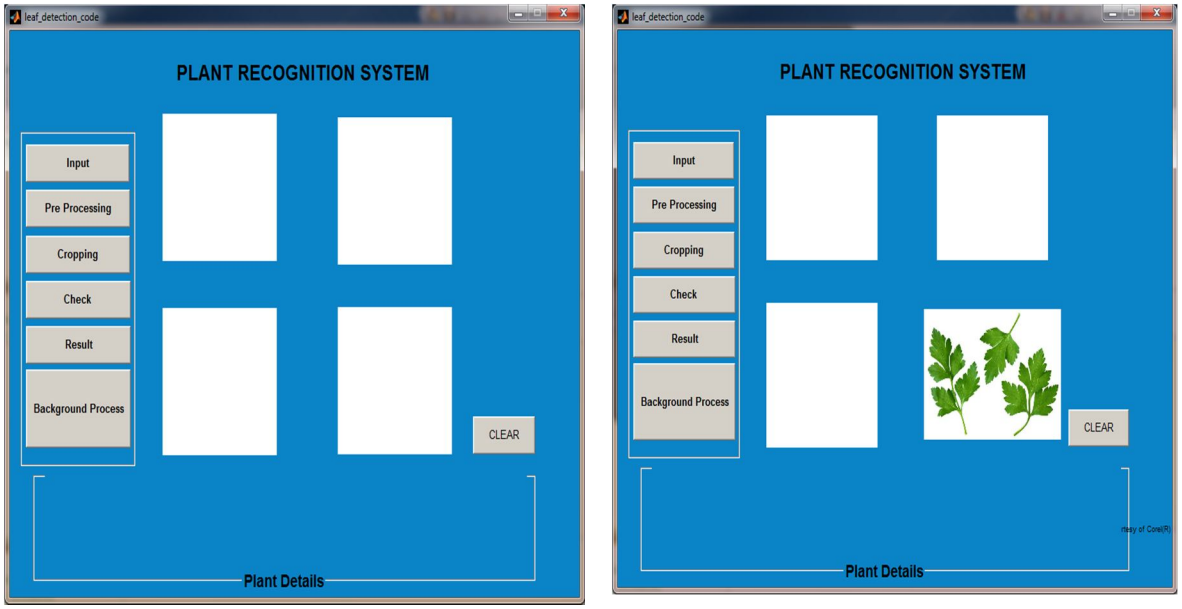


Fig 2.1 Process Layout

III. WORKING OPERATION

The image is given as an input without any restriction with size or type. The given image pixels will be extracted as gray scale image and it will be converted as digital counterpart. Then the image is preprocessed. We apply watershed algorithm to automatically extract leaf image and calculate its overall digital values. We apply watershed algorithm to automatically extract leaf image and calculate its overall digital values. All the digital values of the input image are matched with the overall database images and show the output. The text of the output image is displayed in our GUI.

IV. OUTPUT



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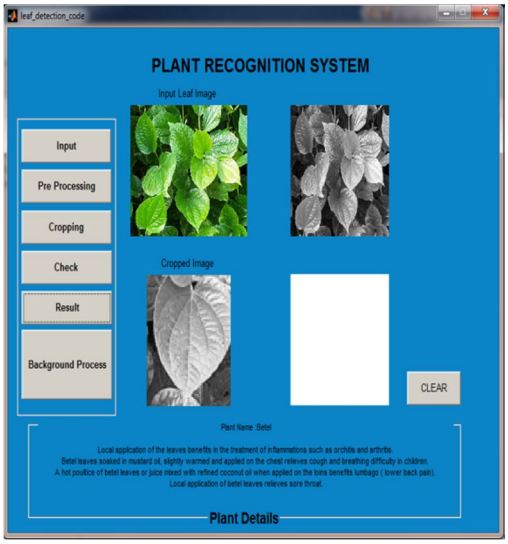

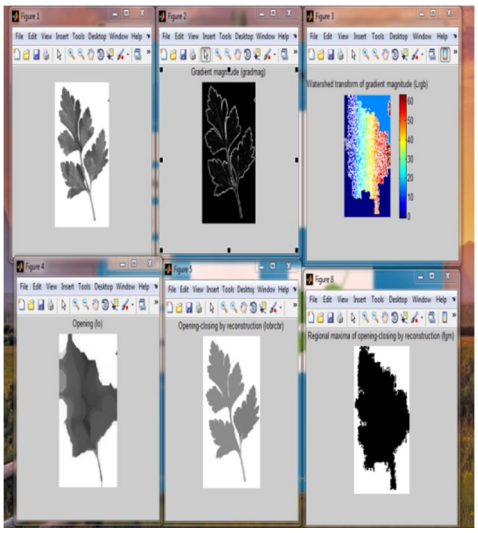

V. CODING

```
% Get default command line output from handles structure
varargout{1} = handles.output;

% --- Executes on button press in input_leaf.
function input_leaf_Callback(hObject, eventdata, handles)
% hObject    handle to input_leaf (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

row = 256;
col = 256;
cd 'input'
[file,path] = uigetfile('*.jpg','Select Leaf image ');
if isequal(file,0) | isequal(path,0)
   warndlg('Please select leaf image');
else
   input_img = imread(file);
end
axes(handles.axes1);
imshow(input_img);
title('Input Leaf Image');

cd ..
handles.row = row;
handles.col = col;
handles.input_img = input_img;
guidata(hObject,handles);


% --- Executes on button press in pre_process.
function pre_process_Callback(hObject, eventdata, handles)
```

```
% hObject    handle to pre_process (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
row = handles.row;
col = handles.col;
input_img = handles.input_img;
gray_img = rgb2gray(input_img);
resized_img = imresize(gray_img,[row,col]);
axes(handles.axes2)
imshow(resized_img);
title('Pre-PRocessed Image');
handles.resized_img = resized_img;
guidata(hObject,handles);

% --- Executes on button press in crop.
function crop_Callback(hObject, eventdata, handles)
% hObject    handle to crop (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
resized_img = handles.resized_img;

template_img = imcrop(resized_img);
axes(handles.axes3);
imshow(template_img)
title('Cropped Template Image');
temp_height = size(template_img, 1);          %height of the Template image
temp_width = size(template_img, 2);          %width of the Template image
temp_color_depth = size(template_img, 3);          %colour depth
template_img1 = im2double(template_img);

template_img_value = reshape(template_img1, temp_height * temp_width,1);

handles.temp_height = temp_height;
handles.temp_width = temp_width;
handles.template_img_value = template_img_value;
handles.template_img = template_img;
guidata(hObject,handles);

% --- Executes on button press in data_baes_leaf.
function data_baes_leaf_Callback(hObject, eventdata, handles)
% hObject    handle to data_baes_leaf (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
template_img_value = handles.template_img_value;
row = handles.row;
col = handles.col;
temp_height = handles.temp_height;
temp_width = handles.temp_width;
corr = 0;                    % to check the best correlation found
```

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```
% global dd;
dd = [];                        % collect correlation value
%% two for loops to go through the original image.
cd 'Image Database'
file = fopen('dataset1.txt');
% for ii = 1 : 5
img_fmt = '.jpg';
matching_leaf_name = {};
kk = 1;
while 1
   disp('**** Processing ! Please Wait  *****');
   get_img = fgetl(file);
   %          disp(tline);
   if ~ischar(get_img), break, end
%     disp(get_img)
   get_img1 = strcat(get_img,img_fmt);
   hh1 = imread(get_img1);
   hh2 = rgb2gray(hh1);
   Original = imresize(hh2,[row col]);

   OriDu = im2double(Original);    % convert original image
   OriH = size(Original, 1);       %height of the Original image
   OriW = size(Original, 2);       %width of the Original image
   OriD = size(Original, 3);       %colour depth
   for i = 1 : OriH - temp_height
      for j = 1 : OriW - temp_width
         % take a segment of the original image( same size as the template size)
         segment = OriDu(i: (i - 1) + temp_height, j: (j - 1) + temp_width, :);
         segment1 = reshape(segment, temp_height * temp_width, 1);
         output = corr2(template_img_value, segment1);
         if output > corr
            corr = output;
%              x = i;
%              y = j;
            dd  = [dd output];
            jh = sort(dd,'descend');
            if jh(1) == 1
               ff = kk;
%                 kj = strcat(num2str(ff),'.jpg');
%                 out_img = imread(kj);
                matching_leaf_name = {get_img};
            else
               ff = 0;
               kj = 0;
               matching_leaf_name = 0;
            end
         end
      end
```

```
    end
    kk = kk + 1;
end

cd ..
handles.ff = ff;
handles.kj = kj;
handles.matching_leaf_name = matching_leaf_name;
handles.img_fmt = img_fmt;
helpdlg('Process Completed');
guidata(hObject,handles);

% --- Executes on button press in result.
function result_Callback(hObject, eventdata, handles)
% hObject    handle to result (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
ff = handles.ff;
kj = handles.kj;
img_fmt = handles.img_fmt;
matching_leaf_name = handles.matching_leaf_name;
input_img = handles.input_img ;
text_fmt = '.txt';
if ff ~= 0
    cd 'Image Database'
    match_leaf_img= matching_leaf_name{1};

    plant_img = strcat(match_leaf_img,img_fmt);
    out_img = imread(plant_img);
    axes(handles.axes4);


    cd ..
    cd 'Plant Description'

    text_file = strcat(match_leaf_img,text_fmt);

    open(text_file);
    fid = fopen(text_file);
    tes_re = fread(fid);
```

VI. CONCLUSION

Thus we developed a system of leaf based plant identification. It is efficient enough to find the matching leaf and its meditational use from the database. It is tested to provide accurate result in the form of leaf related details. It is highly useful in medicinal use and leaf related studies. It reduces the chance of error and avoids medicinal accidents. Automatic plant detailing also is implemented in our project. The accuracy level is checked for 95% level.

VII. ACKNOWLEDGEMENT

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REFERENCES

[1] S. Wu, F. Bao, E. Xu, Y. Wang, Y. Chang, and Q. Xiang, "A Leaf Recognition Algorithm for Plant Classification Using Probabilistic Neural Network," IEEE 7th International Symposium on Signal Processing and Information Technology, December 2007.
[2] Z. Wang, Z. Chi, and D. Feng, "Shape based leaf image retrieval," IEEE Proceedings Vision, Image and Signal Processing, vol. 150, no. 1, February 2003.
[3] H. Fu, Z. Chi, D. Feng, and J. Song, "Machine learning techniques for ontology-based leaf classification," IEEE 2004 8th International Conference on Control, Automation, Robotics and Vision, Kunming, China, 2004.
[4] J. Du, D. Huang, X. Wang, and X. Gu, "Computer-aided plant species identification (CAPSI) based on leaf shape matching technique," Transactions of the Institute of Measurement and Control. 28, 3 (2006) pp. 275-284.
[5] X. Gu, J. Du, and X. Wang, "Leaf recognition based on the combination of wavelet transform and Gaussian interpolation," in Proceedings of International Conference on Intelligent Computing 2005, ser. LNCS 3644. Springer, 2005.
[6] X. Wang, J. Du, and G. Zhang, "Recognition of leaf images based on shape features using a hypersphere classifier," in Proceedings of International Conference on Intelligent Computing 2005, ser. LNCS 3644. Springer, 2005.
[7] J. Du, D. Huang, X. Wang, and X. Gu, "Shape recognition based on radial basis probabilistic neural network and application to plant species identification," in Proceedings of 2005 International Symposium of Neural Networks, ser. LNCS 3497. Springer, 2005.
[8] S. Guarnieri, F. Piazza, and A. Uncini, "Multilayer neural networks with adaptive spline-based activation functions," in Proc. of Int. Neural Network Soc. Annu. Meet. WCNN, Washington DC, pp. I695– I699, 1995.
[9] Pai, G. V and Rajasekaran, S, (2006), 'Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications', 6th ed, Prentice Hall of India Pvt. Ltd.
[10] L. Vecci, F. Piazza, and A. Uncini, "Learning and approximation capabilities of adaptive spline activation neural networks," Neural Networks, vol. 11, no. 2, pp. 259–270, Mar. 1998.

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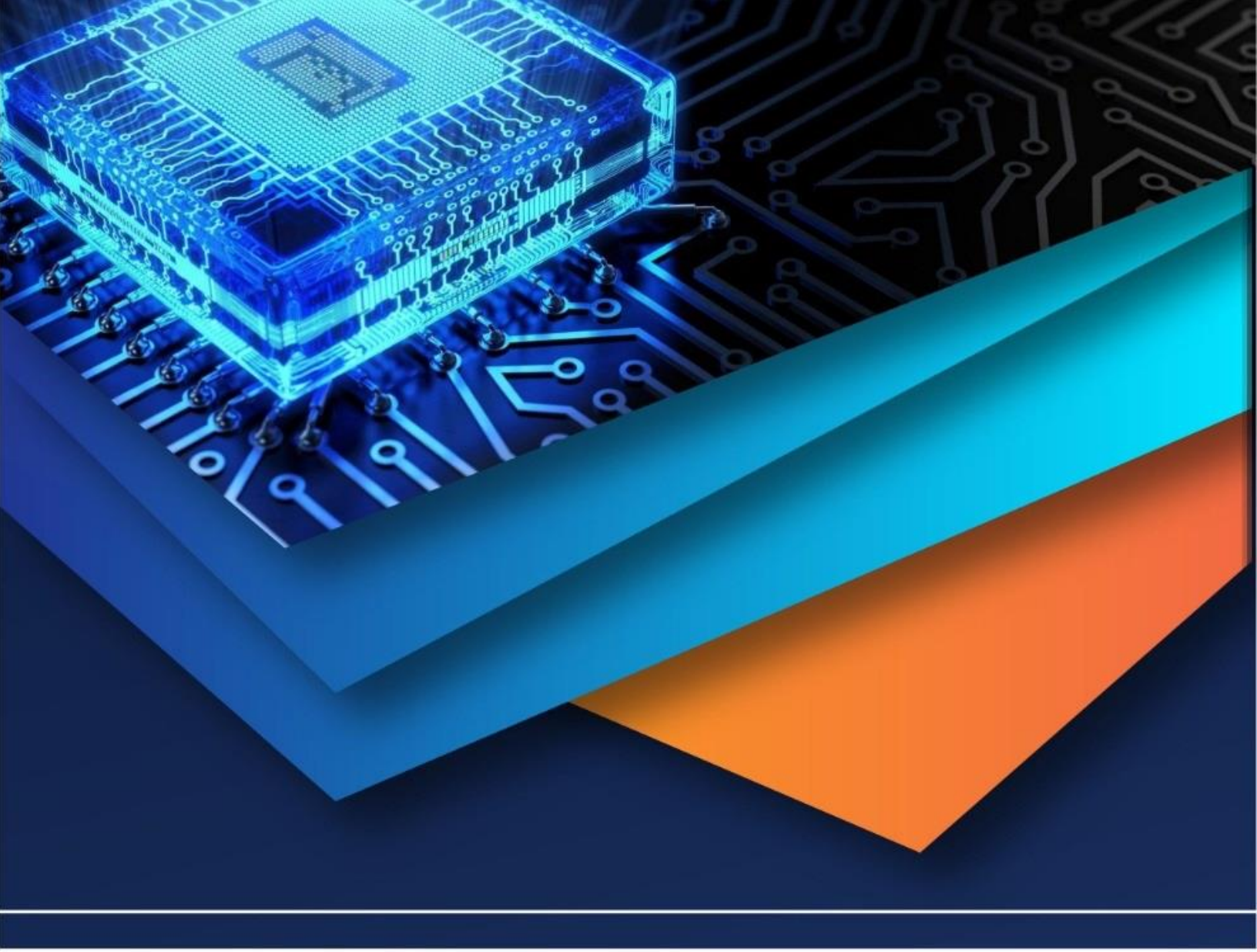

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