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## International Journal for Research in Applied Science & Engineering Technology (IJRASET)

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

Mr.Raj Bharath[1], Mr.K.Aravindhraj[2], D.Sankar [3], M.Santhosh Kumar[4]
*[1,2,3,4] Manakula Vinayagar Institute of Technology, Puducherry, India*

*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
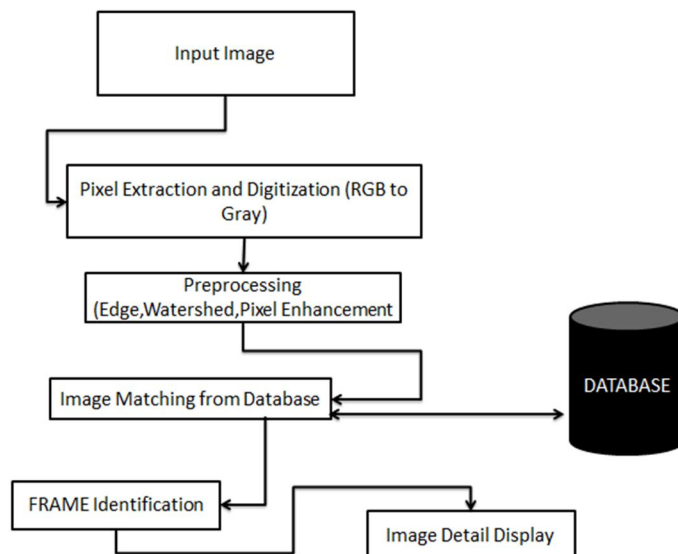


Fig 2.1 Process Layout

## 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
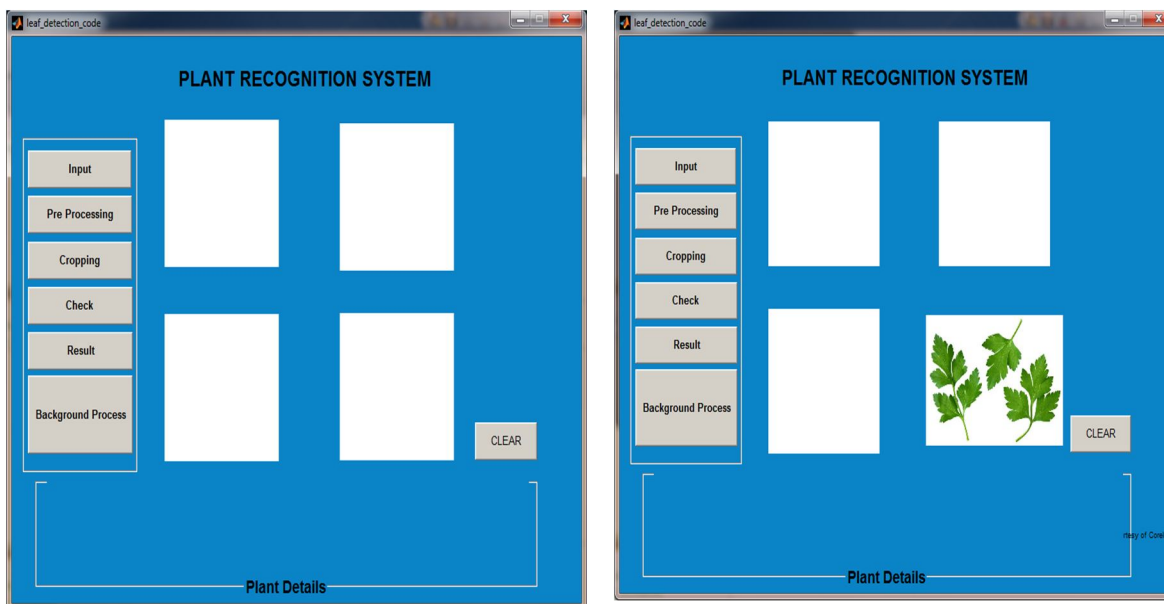
# International Journal for Research in Applied Science & Engineering Technology (IJRASET)
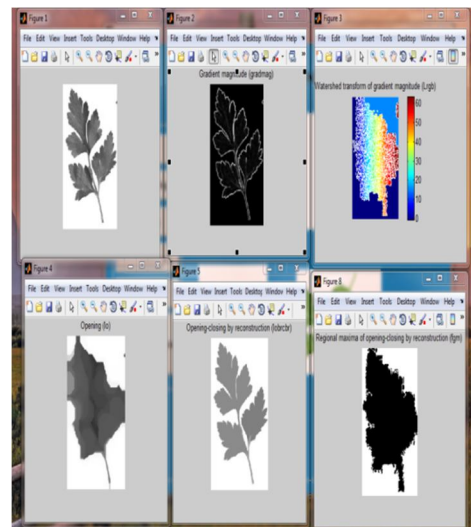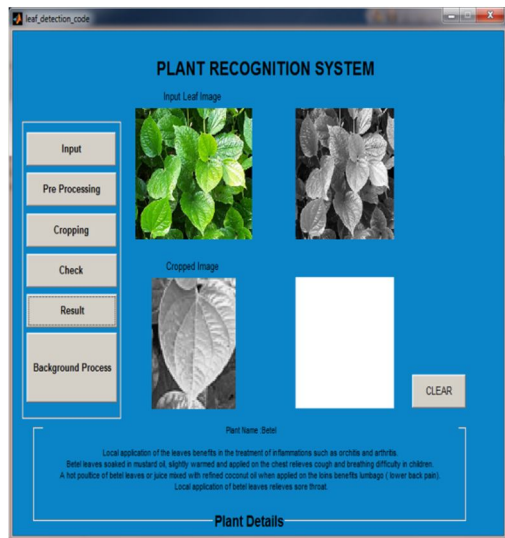


## V.     CODING

```
% 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)
```

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```
% 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
```

```matlab
% 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
```

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```
    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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Raj Bharath.R M.E,working Assistant Professor in the Department of Computer Science and Engineering, Manakula Vinayagar Institute of Technology,Puducherry. He has 10years of experience as published many papers in international journals and conference. His area of interest is Image Processing and Computer Vision.



Aravindhraj.K currently pursuing his B.Tech from Manakula Vinayagar Institute of Technology from the stream of Computer Science Engineering. His area of interest are Java, HTML,C and C++,SQL.



Sankar.D received diploma from "Sri Venkatachapathy Polytechnic College, Villupuram" in 2013.Currently he pursues his B.Tech from Manakula Vinayagar Institute of Technology from Department of Computer Science Engineering. His area of interest are Java, HTML,C and C++.



Santhosh Kumar.M currently pursuing his B.Tech from Manakula Vinayagar Institute of Technology from the stream of Computer Science Engineering. His area of interest are Java,C and C++.

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