

```
function out = area_fraction(area_fractionc_call_1,thr_R_min,thr_R_max,thr_G_min, ...
    thr_G_max,thr_B_min,thr_B_max,group_name,group_number,dir_name,hole)
```

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% save data to file %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```
srcFiles = dir(append(dir_name, '\*.tif')); % the folder in which ur images exists%
fid = fopen(append(group_name, '.txt'), 'w');
DirName=dir_name;
fprintf(fid, '%6s\t %14s\r\n', 'Sample Name', area_fractionc_call_1);
fprintf(fid, '%6s\t %14s\t %14s\t %14s\r\n', 'Sample Name', area_fractionc_call_1, ✓
area_fractionc_call_2);
```

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Run analysis %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```
d=dir(DirName);
for i = 1:(length(d)-2)

    number_image=i;
    G(i,1)=number_image;
    filename = strcat(append(dir_name, '\'),srcFiles(i).name);
    I = imread(filename);
    fig_name=srcFiles(i).name;
```

```
%%%% split images %%%%
```

```
% c1:RED c2:GREEN c3:BLUE
```

```
c1=I(:,:,1); %%Red coolor%%
c2=I(:,:,2); %%Green coolor%%
c3=I(:,:,3); %%Blue coolor%%
```

```
if hole==1
```

```
c3= imfill(c3, 'holes');
c3 = imclose(c3, strel('disk',50)); % Close small gaps
```

```
end
```

```
%%%% zero value %%%%
```

```
c=zeros(size(c1,1),size(c1,2));
RED(i)=0;
GREEN(i)=0;
BLUE(i)=0;
REDGREEN(i)=0;
sumC1=0;
BLUEGREENRED(i)=0;
BLUERED(i)=0;
BLUEGREEN(i)=0;
GREENRED(i)=0;
BLUERED(i)=0;
```

```
% figure
```

```
% imshow (c1)
```

```
% title('Red')
```

```
% figure
```

```
% imshow (c2)
```

```
% title('Green')
```

```

% figure
% imshow (c3)
% title('Blue')

##### RED [c1] #####
for l=1:size(c1,1)
    for j=1:size(c1,2)
        if(c1(l,j)>thr_R_min && c1(l,j)<=thr_R_max )
            RED(i)=RED(i)+1;
        end
    end
end

##### GREEN [c2] #####
for l=1:size(c2,1)
    for j=1:size(c2,2)
        if(c2(l,j)>thr_G_min && c2(l,j)<=thr_G_max )
            GREEN(i)=GREEN(i)+1;
        end
    end
end

##### BLUE [c3] #####
for l=1:size(c3,1)
    for j=1:size(c3,2)
        if(c3(l,j)>thr_B_min && c3(l,j)<=thr_B_max )
            BLUE(i)=BLUE(i)+1;
        end
    end
end

##### BLUE & GREEN overlab #####
for l=1:size(c2,1)
    for j=1:size(c2,2)
        if(c2(l,j)>thr_G_min && c2(l,j)<=thr_G_max )
            if(c3(l,j)>thr_B_min && c3(l,j)<=thr_B_max )
                BLUEGREEN(i)=BLUEGREEN(i)+1;
            end
        end
    end
end

##### GREEN & RED overlab #####
for l=1:size(c2,1)
    for j=1:size(c2,2)
        if(c2(l,j)>thr_G_min && c2(l,j)<=thr_G_max )
            if(c1(l,j)>thr_R_min && c1(l,j)<=thr_R_max )

```

```

        GREENRED(i)=GREENRED(i)+1;

    end
end
end
end
%%%%% BLUE & RED overlab          %%%%%%%%%
for l=1:size(c2,1)
    for j=1:size(c2,2)

        if(c1(l,j)>thr_R_min && c1(l,j)<=thr_R_max )
            if(c3(l,j)>thr_B_min && c3(l,j)<=thr_B_max )
                BLUERED(i)=BLUERED(i)+1;
            end
        end
    end
end

%%%%% BLUE & GREEN & RED overlab          %%%%%%%%%
for l=1:size(c2,1)
    for j=1:size(c2,2)
        if(c2(l,j)>thr_G_min && c2(l,j)<=thr_G_max )
            if(c1(l,j)>thr_R_min && c1(l,j)<=thr_R_max )
                if(c3(l,j)>thr_B_min && c3(l,j)<=thr_B_max )
                    BLUEGREENRED(i)=BLUEGREENRED(i)+1;
                end
            end
        end
    end
end

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
total_image_resolousio=size(c2,1)*size(c2,2);
timr=total_image_resolousio;
BLUE_area_timr(i)=BLUE(i)/timr;
GREEN_area_BLUE(i)=GREEN(i)/BLUE(i);
BLUE_area_BLUE(i)=BLUE(i)/BLUE(i);
RED_area_BLUE(i)=RED(i)/BLUE(i);
% GREEN(i)=GREEN_are_BLUE(i)/BLUE_area_timr(i);
RED_area_timr(i)=RED(i)/timr;
GREEN_area_timr(i)=GREEN(i)/timr;
% HA_COLL(i)=RED_area_timr(i)/GREEN_area_BLUE(i);
REDGREEN_area_GREEN(i)=GREENRED(i)/GREEN(i);
REDGREEN_area_BLUE(i)=(RED(i)-REDGREEN(i))/BLUE(i);
BLUERED_area_BLUE(i)=BLUERED(i)/BLUE(i);
BLUEGREEN_area_BLUE(i)=BLUEGREEN(i)/BLUE(i);
BLUEGREENRED_area_BLUEGREEN(i)=BLUEGREENRED(i)/BLUEGREEN(i);
% pri_g(i)=GREEN(i);%/(GREEN_30_255(i)+RED_30_255(i));

```

```
% pri_r(i)=RED(i);%/(GREEN_30_255(i)+RED_30_255(i));  
%%% \t --> Horizontal tab, %% \r --> Carriage return, %% \n --> New line  
fprintf(fid, '%6s\t %6.5f\r\n', fig_name, REDGREEN_area_GREEN(i));
```

```
% end
```

```
end
```

```
data1=REDGREEN_area_GREEN';
```

```
out=data1;
```

```
end
```