CSE3018 : Content Based Image and Video Retrieval

Lab FAT

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CODE :

```
clc

clear all

close all

D = './images';

% pattern to match filenames.

S = dir(fullfile(D,'*.jpg'));

%to get execution time

tic;



% Loading query image

query_image = imread('images/yellow16.jpg');

query_image = rgb2hsv(query_image);



% Extracting colour planes of query image

q_h = single(query_image(:,:,1));
```

```
q_s = single(query_image(:,:,2));

q_v = single(query_image(:,:,3));


% Table for storing the information for the images

info_table = cell2table(cell(0, 20), 'VariableNames',
{'file_name', 'h_mean', 'h_median','h_std', 'h_var',
'h_skewness', 'h_kurtosis','s_mean', 's_median', 's_std',
's_var', 's_skewness', 's_kurtosis', 'v_mean', 'v_median',
'v_std', 'v_var', 'v_skewness', 'v_kurtosis',
'manhattan_distance'});

% Looping through all the images in the directory

for k = 1:numel(S)

F = fullfile(D,S(k).name);

I = imread(F);

%converting to HSV

I = rgb2hsv(I);


[rows, cols] = size(I);

noof_chanl = size(I,3);

S(k).data = I; % optional, save data.
```

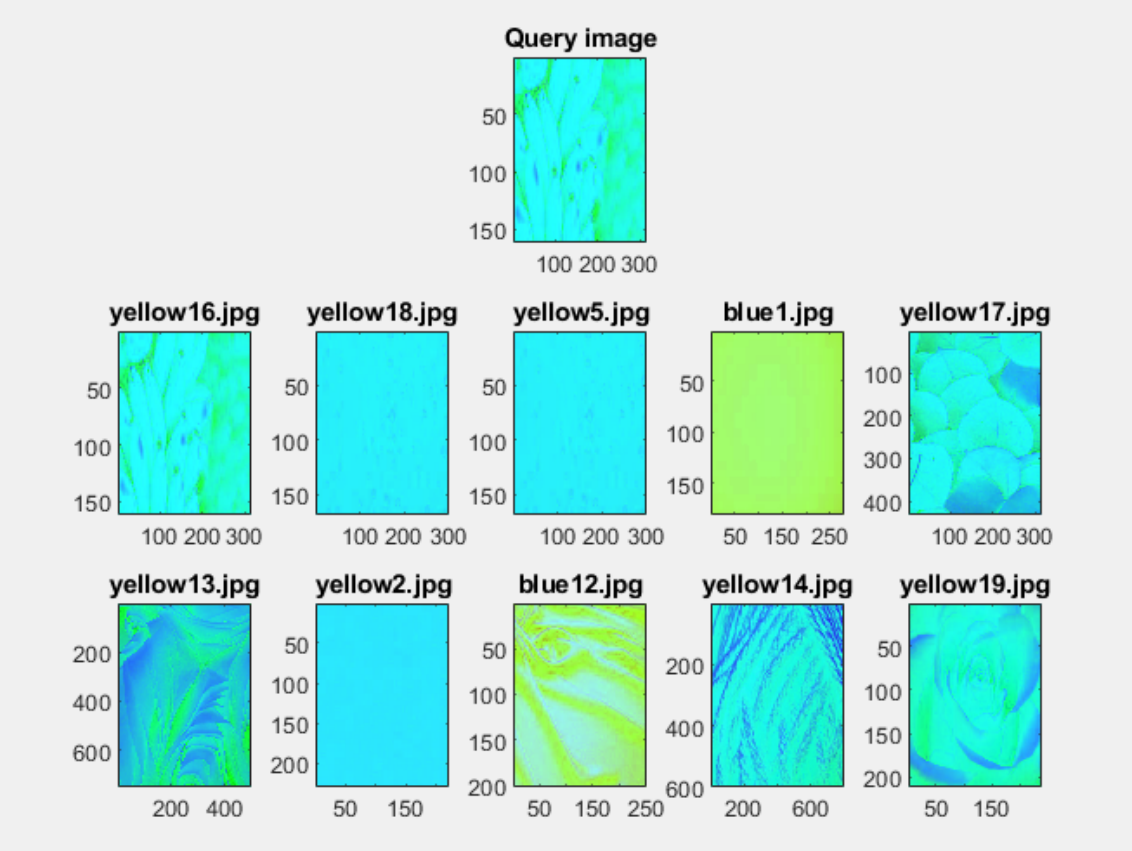
```
% Extracting the colour plane of the current image from data
base

h = single(I(:, : , 1));

s = single(I(:, :, 2));

v = single(I(:, :, 3));


% Calculating the manhattan distance between the query image and
the current image.

manhattan_distance = abs(mean(q_h(:)) - mean(h(:)))+
abs(median(q_h(:)) - median(h(:))) + abs(std(q_h(:)) - std(h(:)))
+ abs(var(q_h(:)) - var(h(:))) + abs(skewness(q_h(:)) -
skewness(h(:))) + abs(kurtosis(q_h(:)) - kurtosis(h(:))) +
abs(mean(q_s(:)) - mean(s(:))) + abs(median(q_s(:)) -
median(s(:))) + abs(std(q_s(:)) - std(s(:))) + abs(var(q_s(:)) -
var(s(:))) + abs(skewness(q_s(:)) - skewness(s(:))) +
abs(kurtosis(q_s(:)) - kurtosis(s(:))) + abs(mean(q_v(:)) -
mean(v(:))) + abs(median(q_v(:)) - median(v(:))) +
abs(std(q_v(:)) - std(v(:))) + abs(var(q_v(:)) - var(v(:))) +
abs(skewness(q_v(:)) - skewness(v(:))) + abs(kurtosis(q_v(:)) -
kurtosis(v(:)));


% Inserting features of current image in table

new_row = {S(k).name, mean(h(:)), median(h(:)), std(h(:)),
var(h(:)), skewness(h(:)), kurtosis(h(:)), mean(s(:)),
median(s(:)), std(s(:)), var(s(:)), skewness(s(:)),
```

```
kurtosis(s(:)), mean(v(:)), median(v(:)), std(v(:)),
var(v(:)),skewness(v(:)), kurtosis(v(:)), manhattan_distance};


% Appending the entry in the table

info_table = [info_table;new_row];

end


% Replacing the NaN with values in the previous cell and sorting
the rows in the table in the ascending order of
manhattan_distance

info_table = sortrows(fillmissing(info_table, 'previous'),
'manhattan_distance');

%writing the table to excel sheet

writetable(info_table, 'LABFAT.xls')


% Displaying the top 10 images

subplot(3, 5, 3);

imagesc(query_image);

title('Query image');

file_names = info_table(:, 'file_name').file_name; % Extracting
the filenames of the images

for i = 1:10
```

```
F = fullfile(D,char(file_names(i)));

I = imread(F);

subplot(3, 5, i+5);

imagesc(rgb2hsv(I));

title(char(file_names(i)));

end

Toc;
```

OUTPUT

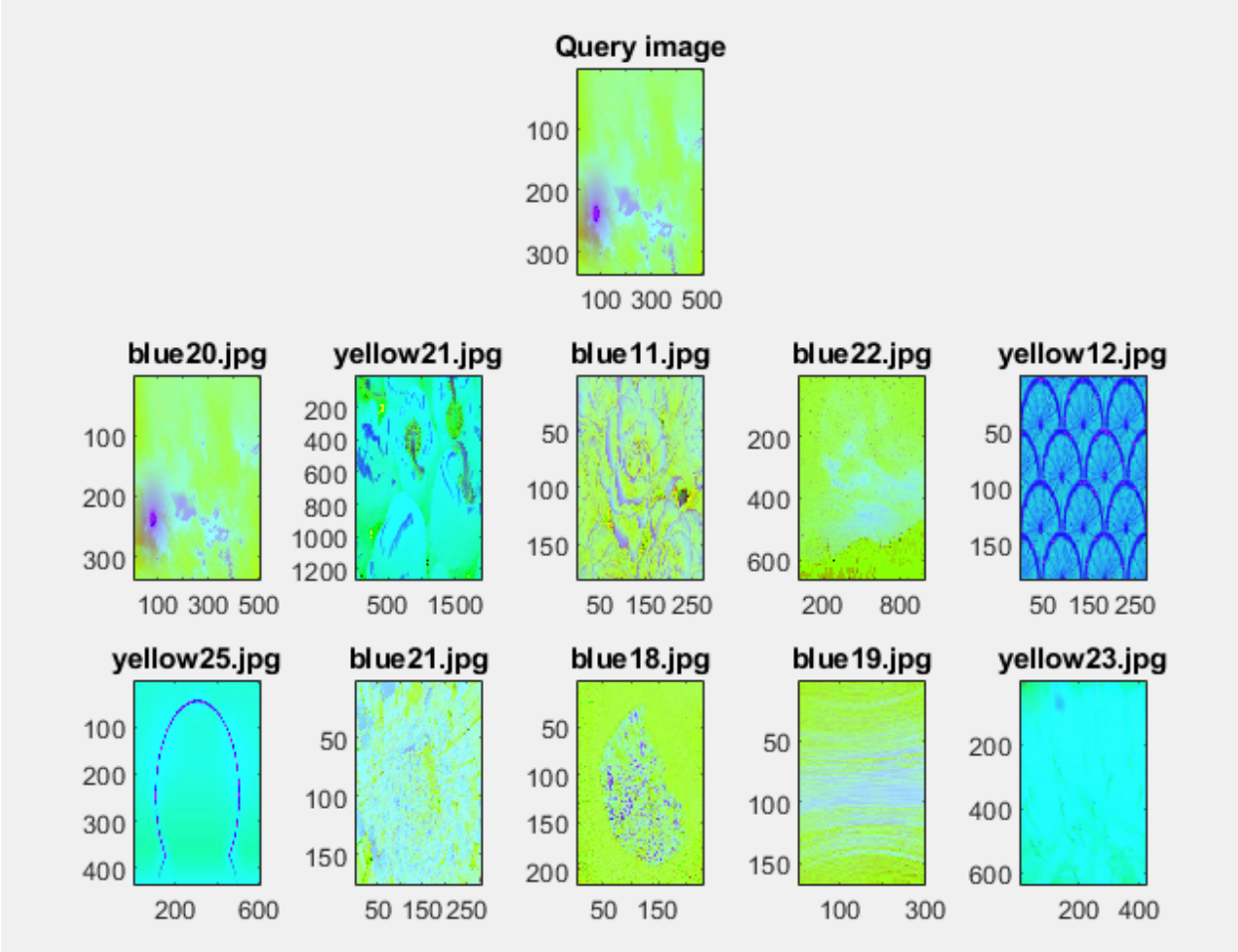
1. **Query image - yellow16.jpg**



Precision = 8/(8+2) = 0.2

Recall = 8/25 = 0.32

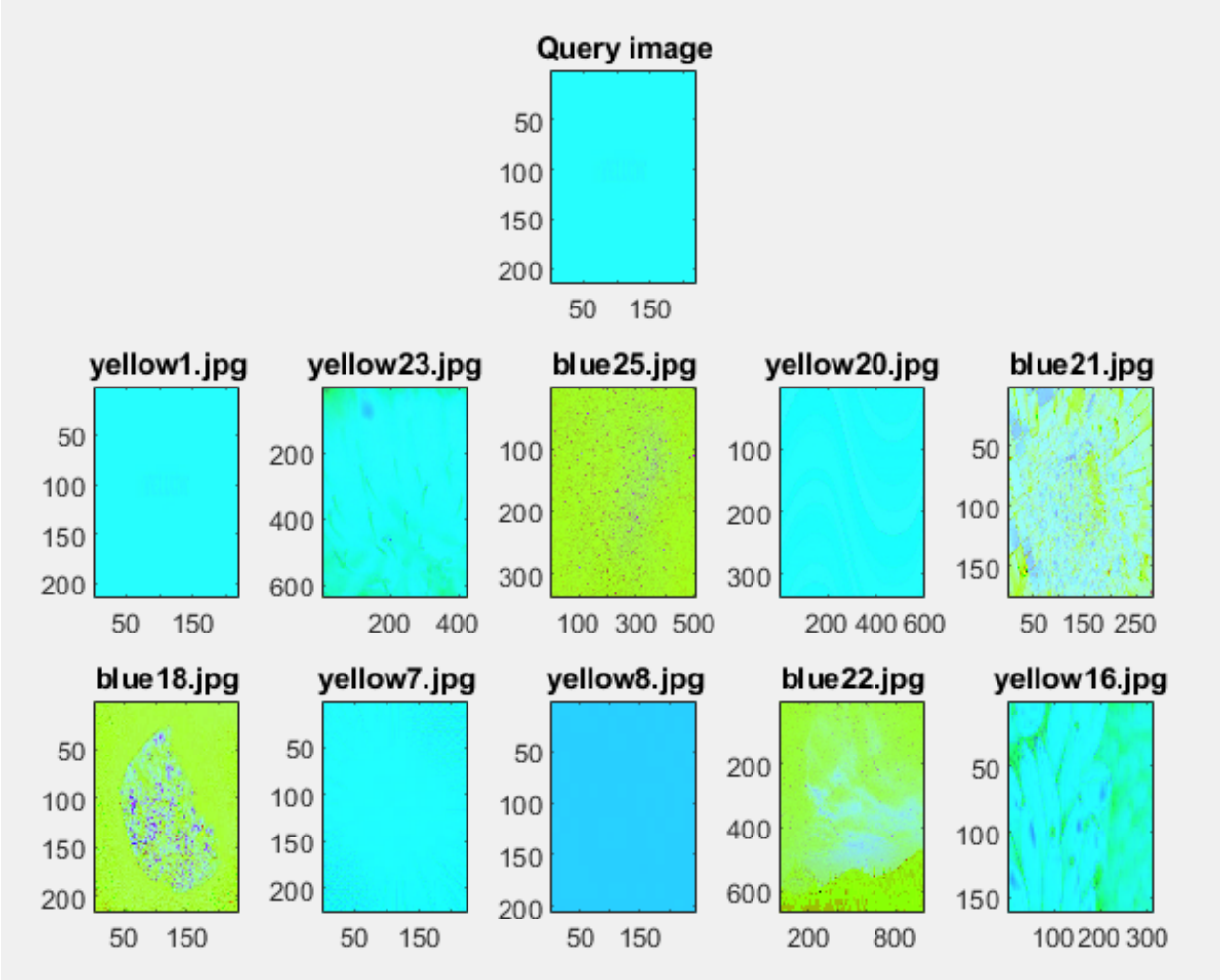
2. **Query image - blue20.jpg**



Precision = 6/(6+4) = 0.6

Recall = 6/25 = 0.24

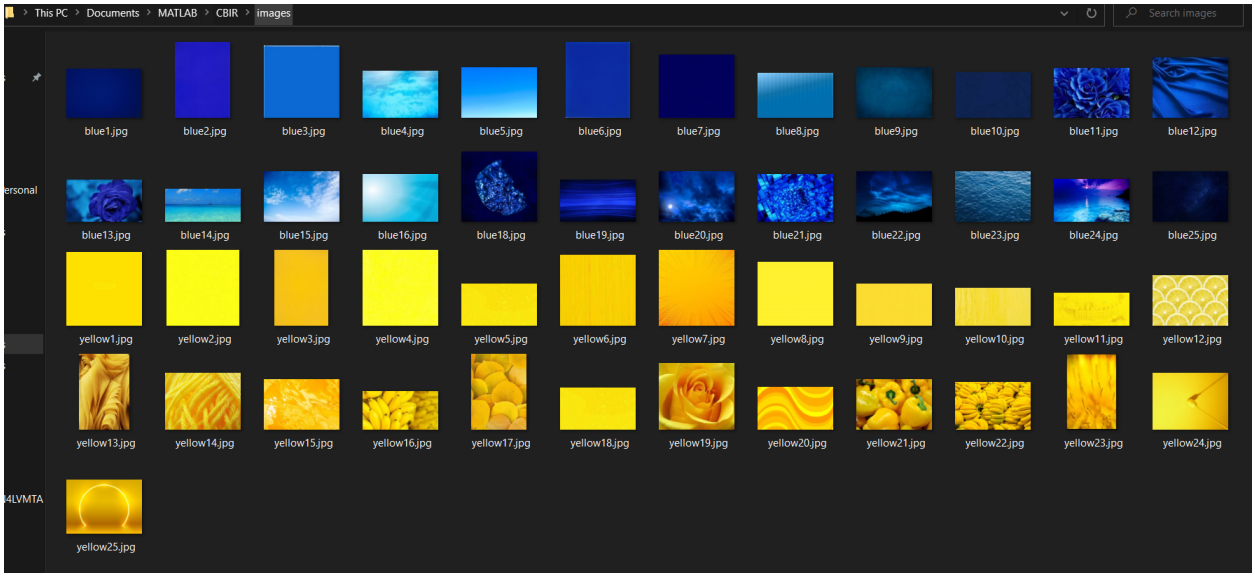
3. **Query image - Yellow1.jgp**



Precision = 6/(6+4) = 0.6

Recall = 6/25 = 0.24

Database


This PC
Documents
MATLAB
CBIR
images
Search images
blue1.jpg
blue2.jpg
blue3.jpg
blue4.jpg
blue5.jpg
blue6.jpg
blue7.jpg
blue8.jpg
blue9.jpg
blue10.jpg
blue11.jpg
blue12.jpg
blue13.jpg
blue14.jpg
blue15.jpg
blue16.jpg
blue18.jpg
blue19.jpg
blue20.jpg
blue21.jpg
blue22.jpg
blue23.jpg
blue24.jpg
blue25.jpg
yellow1.jpg
yellow2.jpg
yellow3.jpg
yellow4.jpg
yellow5.jpg
yellow6.jpg
yellow7.jpg
yellow8.jpg
yellow9.jpg
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yellow19.jpg
yellow20.jpg
yellow21.jpg
yellow22.jpg
yellow23.jpg
yellow24.jpg
yellow25.jpg

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ALGORITHM:

1. Get Query image
2. Convert to RGB HSP
3. Extract each color plane.
4. Create a table with column names hue mean, hue median, ...
5. Get image from Database.
6. Convert to HSV
7. Extract color plance.
8. Find absolute difference between mean, median, standard deviation, variance, skewness and kurtosis for each color plane.
9. Sum above differences to get manhattan distance.
10. store all values in table along with manhattan distance.
11. Repeate step 5 to 10 for all images in database
12. Store all values in excel sheet
13. Print/show the top 10 images.

EQUATIONS

① Manhattan distance:

$$|x_1 - x_2| + |y_1 - y_2| + \cdots\cdots$$

② Mean :

$$\mathcal{E}_i = \sum_{N}^{j=1} \frac{1}{N} P_{ij}$$

⑤ SD

$$\sigma_i = \sqrt{\frac{1}{N}\left(\sum_{N}^{i} (P_{ij} - E_i)^2\right)}$$

$$\text{Variance} = \sigma^2$$