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Table of Contents

Project Granny Smith

ECE 2409

Begin program.

```
clear all;clc;close all;
```

PART 1 (QUESTIONS 1, 2, 3): TRAIN DATA, CREATE HISTOGRAMS, WRITE COLOR RULES.

Read training data

```
scale=50;
fj1=imread('training\fuji.jpg'); fj1_sz=size(fj1);
fj1_2=imresize(fj1, floor(fj1_sz(1)/scale)/100); fj1_resz=size(fj1_2);
gs1=imread('training\granny_smith.jpg'); gs1_sz=size(gs1);
hc1=imread('training\honeycrisp.jpg'); hc1_sz=size(hc1);
gl1=imread('training\gala.jpg'); gl1_sz=size(gl1);
```

Create data

```
%right-click and select "Export Data to Workspace", save figur eas
%figure;
```

```
%imshow(fj1,[]); title('Fuji');
%imshow(gs1,[]); title('Granny Smith');
%imshow(hc1,[]); title('Honeycrisp');
%imshow(gl1,[]); title('Gala');
%figure;
%im=[fj1,gs1,hc1,gl1];
%imshow(im);
```

Concatenate the 4 training images

```
apples=fj1_2; sz=size(apples);

sz(1,end+gs1_sz(2),1) = 0;
dim1=fj1_resz(2)+gs1_sz(2)-1;
apples(1:gs1_sz(1), fj1_resz(2):dim1, :) = gs1;

sz(1,end+hc1_sz(2),1) = 0;
dim2=dim1+hc1_sz(2)-1;
apples(1:hc1_sz(1), dim1:dim2, :) = hc1;

sz(1,end+gl1_sz(2),1) = 0;
dim3=dim2+gl1_sz(2)-1;
apples(1:gl1_sz(1), dim2:dim3, :) = gl1;
%imshow(apples);
```

Import previously determined dimensions of colors to be trained, then apply rules to them.

Show selected training data.

```
h1=openfig('cursor_fig2.fig');
load('cursor_info.mat');
[gl_p1,gl_p2,hc_p1,hc_p2,gs_p1,gs_p2,fj_p1,fj_p2]=cursor_info.Position;

% Fuji - Katie
r=sort([fj_p1(1),fj_p2(1)]); r=r(1):r(2);
c=sort([fj_p1(2),fj_p2(2)]); c=c(1):c(2);
rc=fj1(r,c,:); low=5000;high=30000;
fj_loc = mx_lk_weibull(rc,'Fuji',apples,low,high);

% Gala - Matt
r=sort([gl_p1(1),gl_p2(1)]); r=r(1):r(2);
c=sort([gl_p1(2),gl_p2(2)]); c=c(1):c(2);
rc=gl1(r(:),c(:),:); low=5000;high=30000;
gl_loc = mx_lk_weibull(rc,'Gala',apples,low,high);

% Honeycrisp - Katie
r=sort([hc_p1(1),hc_p2(1)]); r=r(1):r(2);
c=sort([hc_p1(2),hc_p2(2)]); c=c(1):c(2);
rc=hc1(r,c,:); low=10000;high=10^10;
hc_loc = mx_lk_weibull(rc,'Honeycrisp',apples,low,high);
```

```
% Granny Smith - Matt
r=sort([gs_p1(1),gs_p2(1)]); r=r(1):r(2);
c=sort([gs_p1(2),gs_p2(2)]); c=c(1):c(2);
rc=gs1(r,c,:); low=5000;high=30000;
gs_num = mx_lk_weibull(rc,'Granny Smith',apples,low,high);

Error using reshape
To RESHAPE the number of elements must not change.

Error in mx_lk_weibull (line 71)
    r(BW3)=255; r=reshape(r,[rows,cols]);

Error in finalproject (line 54)
fj_loc = mx_lk_weibull(rc,'Fuji',apples,low,high);
```

PART II (QUESTION 4): RANDOMLY SHUFFLE APPLES AND IDENTIFY TYPE OF APPLE IN LINEUP.

Katie wrote shuffle function & Matt did shuffling.

```
mattShuffled=apple_shuffle(fj1,gs1,hc1,gl1);
mTitle = "Matt's Shuffled Image";
figure;
imshow(mattShuffled);
title(mTitle);
katieShuffled=apple_shuffle(fj1,gs1,hc1,gl1);
kTitle = "Katie's Shuffled Image";
figure;
imshow(katieShuffled);
title(kTitle);

% Gala - Matt
r=sort([gl_p1(1),gl_p2(1)]); r=r(1):r(2);
c=sort([gl_p1(2),gl_p2(2)]); c=c(1):c(2);
rc=gl1(r(:),c(:),:); low=5000;high=30000;
gl_loc = mx_lk_weibull(rc,'Gala',mattShuffled,low,high);

% Granny Smith - Matt
r=sort([gs_p1(1),gs_p2(1)]); r=r(1):r(2);
c=sort([gs_p1(2),gs_p2(2)]); c=c(1):c(2);
rc=gs1(r,c,:); low=5000;high=30000;
fj_num = mx_lk_weibull(rc,'Granny Smith',mattShuffled,low,high);

% Fuji - Katie
r=sort([fj_p1(1),fj_p2(1)]); r=r(1):r(2);
c=sort([fj_p1(2),fj_p2(2)]); c=c(1):c(2);
rc=fj1(r,c,:); low=5000;high=30000;
fj_loc = mx_lk_weibull(rc,'Fuji',katieShuffled,low,high);

% Honeycrisp - Katie
```

```matlab
r=sort([hc_p1(1),hc_p2(1)]); r=r(1):r(2);
c=sort([hc_p1(2),hc_p2(2)]); c=c(1):c(2);
rc=hc1(r,c,:); low=10000;high=10^10;
hc_num = mx_lk_weibull(rc,'Honeycrisp',apples,low,high);
```

PART III (QUESTION 5): TEST DATA WITH RE-AL APPLES.

```matlab
% Fuji - Katie
fj2=imread('test\fuji.jpg');
numfj = mx_lk_weibull(rc,'Fuji',fj2,low,high,false);

% Gala - Matt
gl2=imread('test\gala.jpg');
numgl = mx_lk_weibull(rc,'Gala',gl2,low,high,false);

% Honeycrisp - Katie
hc2=imread('test\honeycrisp.jpg');
numhc = mx_lk_weibull(rc,'Honeycrisp',hc2,low,high,false);

% Granny Smith - Matt
gs2=imread('test\organic_mini_granny_smith.jpg');
numgs = mx_lk_weibull(rc,'Granny Smith',gs2,low,high,false);
```

End program.

```matlab
close all

% Pros: Robust implementation.
% Cons: Need better test images.  Mixed results when applied to real
 data.
```

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