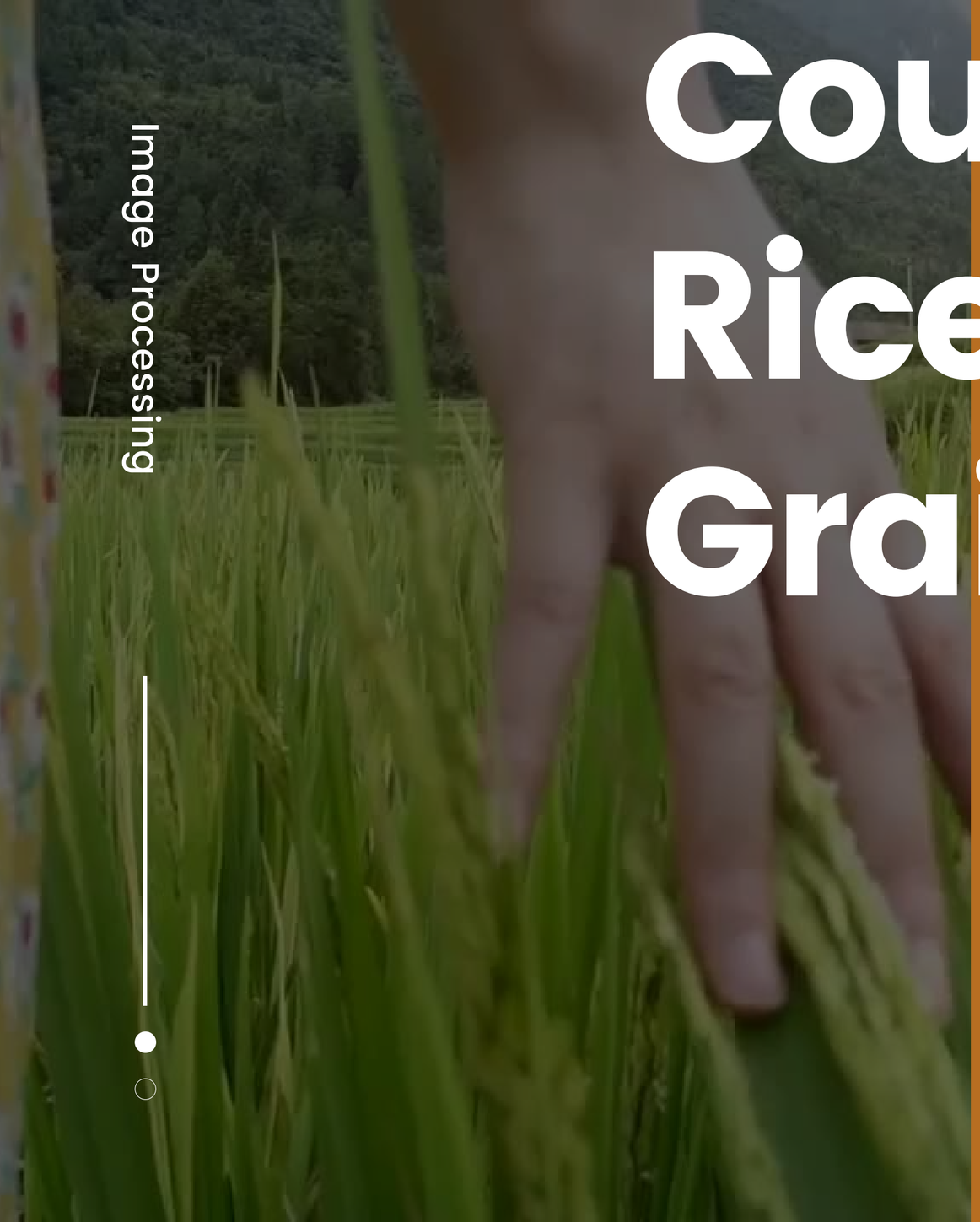

Image Processing

Counting Rice Grain

Video Link:
https://www.youtube.com/watch?v=EXtKSxcZTSY&ab_channel=NorhazifaHarum

Presented By:

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- Ain Fatihah Aiman (B032020016)
- Muhammad Aiman (B032110509)

Introduction

- Rice and wheat yields are mostly determined by thousand grain weight, which is an important metric for variety breeding and cultivation management.

- Counting grains is a necessary step in determining the weight of a thousand grain sample. Manual counting is tedious and time-consuming; electronic counting devices are costly; counting accuracy based on image segmentation processing is low; and their applications are inconvenient.

- This study attempts to develop a system for fast rice and wheat grain counting based on the image given.

Problem Statement

1. Manual counting is time consuming and tedious. Human eyes can become fatigued, resulting in errors.

2. How to recognize a common rice grain.

3. How to tell the difference between regular and not-so-regular sized grains.

Objective

1. Count each rice grain individually.

2. Determine the total number of grains required to meet the standard quantity.

3. To locate the exact normal grain size.

Technique used in the code

1. Changes in Intensity (Contrast)

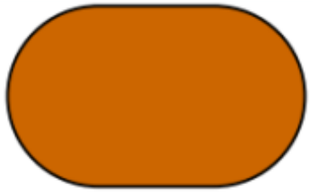
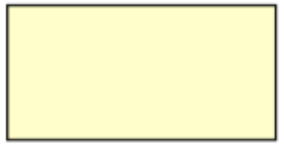
2. Separation (Edge Detection)

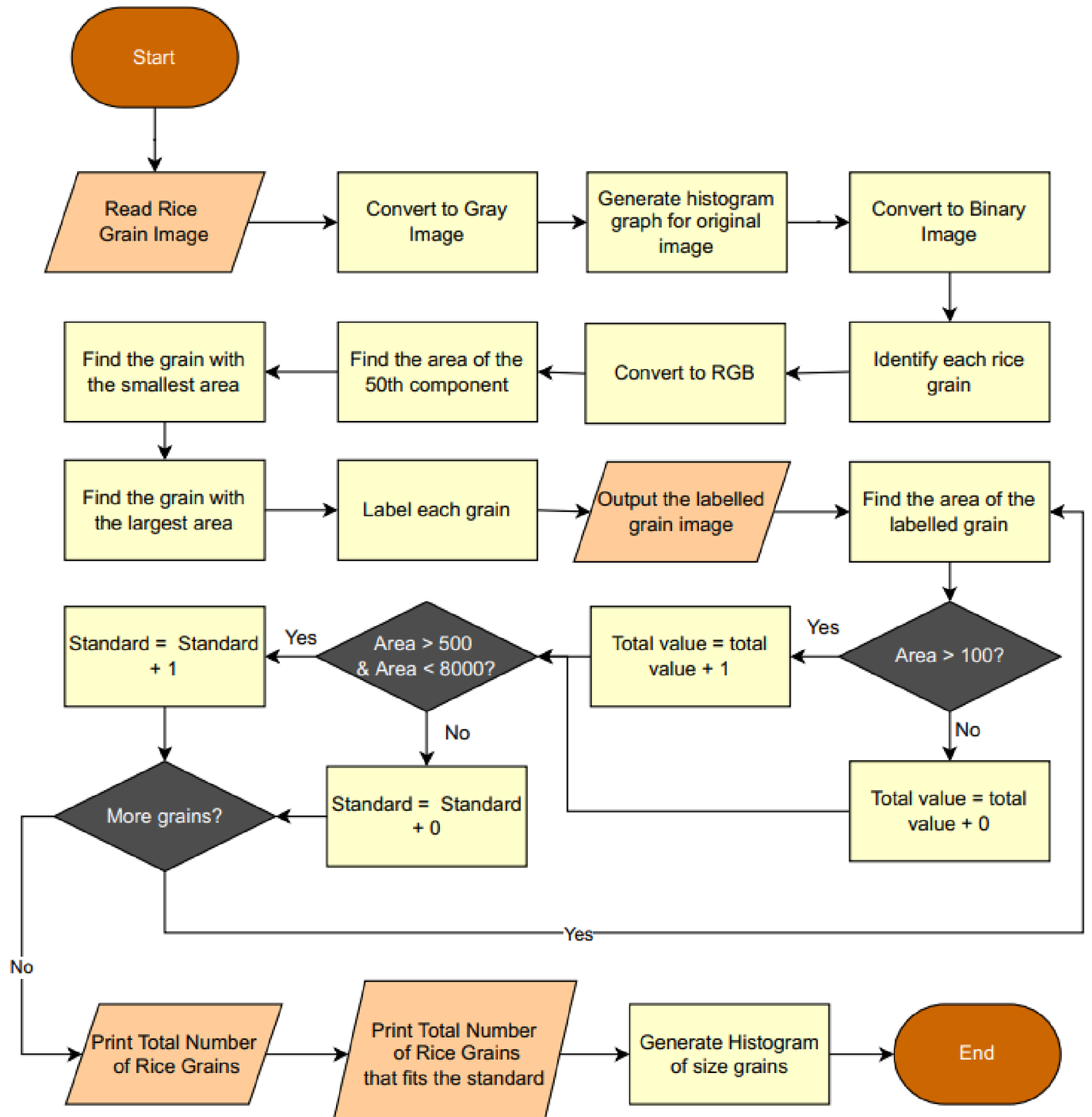
3. Image Binarization

4. Conversion of Color Space

Methodology – Flowchart

SUMMARY OF FLOWCHART SYMBOLS

SYMBOLS	NAME	FUNCTION
	Start/end	An oval represents a start or end point
	Arrows	A line is a connecter that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision



1. Read the rice grains image in a PNG format.
2. Convert to gray image since we have to make binary image later.
3. Generate histogram. To get threshold value.
4. Then, we can convert to binary image.
5. Find & identify rice grains.
6. Convert to RGB to differentiate between background and the rice grains.
7. Find the area of 50th component so that we can find the smallest and largest area of rice grains.
8. Labelled the rice grains with number then displayed them in figures.
9. After labelled, find the area of labelled rice grains.
10. If the area more than 100, total value will be added to 1 and else it will added with 0.
11. Then, this phase must satisfied with both condition which if area is more than 5000 and less than 8000, standard size will be added to 1. If not, it will added with 0.
12. Lastly, if there are more grains found, the processes will be repeated, if no grains found, it will print all the figures.

Code & Demostration

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FILE NAVIGATE CODE ANALYZE SECTION RUN

C: ▸ 3BITI SEM 2 ▸ IMAGE PROCESSING ▸ project

Current Fol...

Name
- rice.jpeg
- read.m
- note.txt
- main.m
- main.asv
- labelObj...
- identifyO...

Details

Select a file to vi

Editor - C:\3BITI SEM 2\IMAGE PROCESSING\project\main.m

read.m | identifyObject.m | labelObject.m | main.m

```
clc       % this clear the screen
close all % this closes all figures
clear all % this clears the workspace

% Assign image into variable
img='rice.jpeg'

% Function: read.m file - AIN FATIHAH AIMAN BINTI MOHD YUSSUF
% read image, convert to greyscale, covert to binary
[a, I, bw ]=read(img)

% Function: identifyObject.m - MUHAMMAD AIMAN BIN REDUAN
[cc,grain,labeled, RGB_label]=identifyObject(bw)


%Computer Area-Based Statistic - NORHAZIFA BINTI HARUM
graindata = regionprops(cc,'basic') %display basic properties
grain_areas = [graindata.Area]; %holds the area measurement for each grain.
grain_areas(50) %Find the area of the 50th component.
[min_area, idx] = min(grain_areas) % the grain with the smallest area.
[max_area, idx] = max(grain_areas) % the grain with the largest area.
grain = false(size(bw));
grain(cc.PixelIdxList{idx}) = true;

L = bwlabel(I); % label each object
%Step 2: see the label of each object

%Function: labelObject.m
[s,k,c]=labelObject(L,I)

% Step 3: find the area of the object you want using its label
Total_value=0;
Standard=0;
Area_1=0;G
```

Workspace

Name | Value

Command Window

Ready

Zoom: 100% UTF-8 CRLF script Ln 8 Col 62

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Run all sections (F5)

C: ▸ 3BITI SEM 2 ▸ IMAGE PROCESSING ▸ project

Current Folder

Name
- rice.jpeg
- read.m
- note.txt
- main.m
- labelObject.m
- identifyObject.m

labelObject.m (Function)

NORHAZIFA BINTI HARUM

labelObject(L, I)

Editor - C:\3BITI SEM 2\IMAGE PROCESSING\project\main.m

read.m | identifyObject.m | labelObject.m | main.m

```
clc       % this clear the screen
close all % this closes all figures
clear all % this clears the workspace

% Assign image into variable
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[cc,grain,labeled, RGB_label]=identifyObject(bw)


%Computer Area-Based Statistic - NORHAZIFA BINTI HARUM
graindata = regionprops(cc,'basic') %display basic properties
grain_areas = [graindata.Area]; %holds the area measurement for each grain.
grain_areas(50) %Find the area of the 50th component.
[min_area, idx] = min(grain_areas) % the grain with the smallest area.
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grain = false(size(bw));
grain(cc.PixelIdxList{idx}) = true;

L = bwlabel(I); % label each object
%Step 2: see the label of each object

%Function: labelObject.m
```

Command Window

```
    Units: 'points'

  Show all properties

fx >>
```

Workspace

Name	Value
a	750x1000x3 uint8
ans	652
Area_1	1x1 struct
bw	750x1000 logical
c	[832.5813,489.45
cc	1x1 struct
grain	750x1000 logical
grain_areas	1x50 double
graindata	50x1 struct
h	1x1 Figure
I	750x1000 logical
idx	49
img	'rice.jpeg'
k	1
L	750x1000 double
labeled	750x1000 uint8
max_area	825
min_area	349
Obj	750x1000 logical
RGB_label	750x1000x3 uint8
s	50x1 struct
Standard	40
Total_value	50

Zoom: 100% | UTF-8 | CRLF | script | Ln 11 | Col 1

Type here to search | 28°C Light rain | ENG | 11:47 AM 11/6/2022

NH

NORHAZIFA BINTI HARUM

Result & Analysis

RESULTS

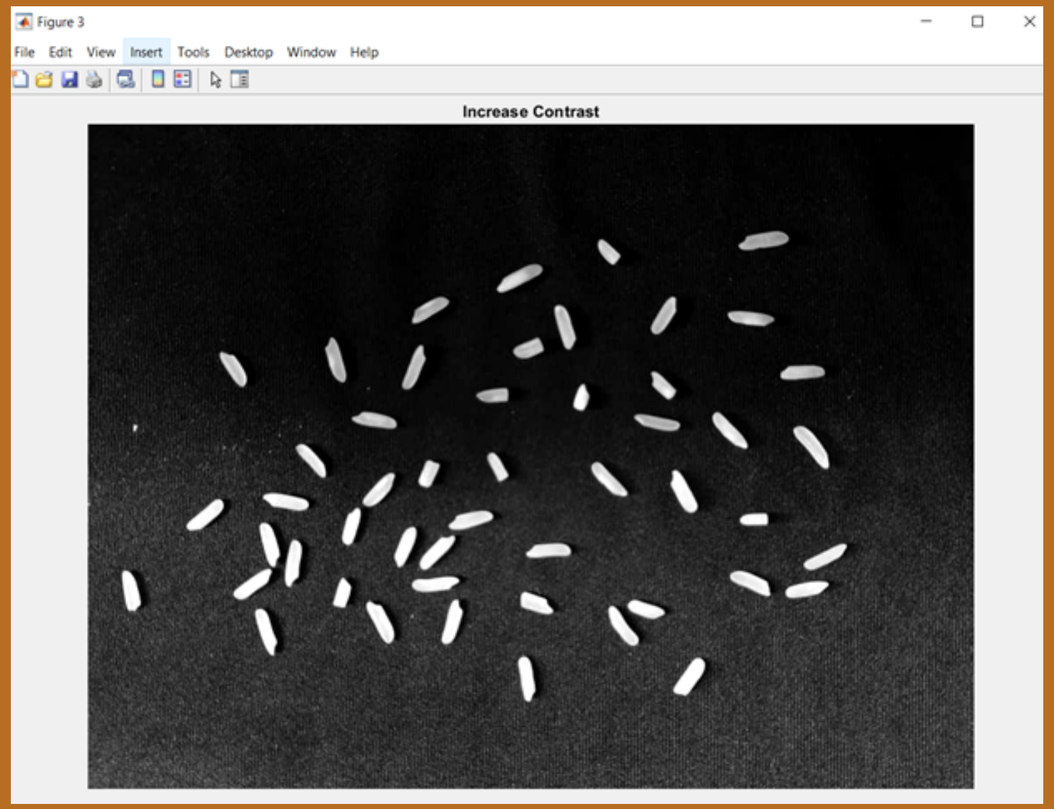


Figure 3
File Edit View Insert Tools Desktop Window Help
Increase Contrast

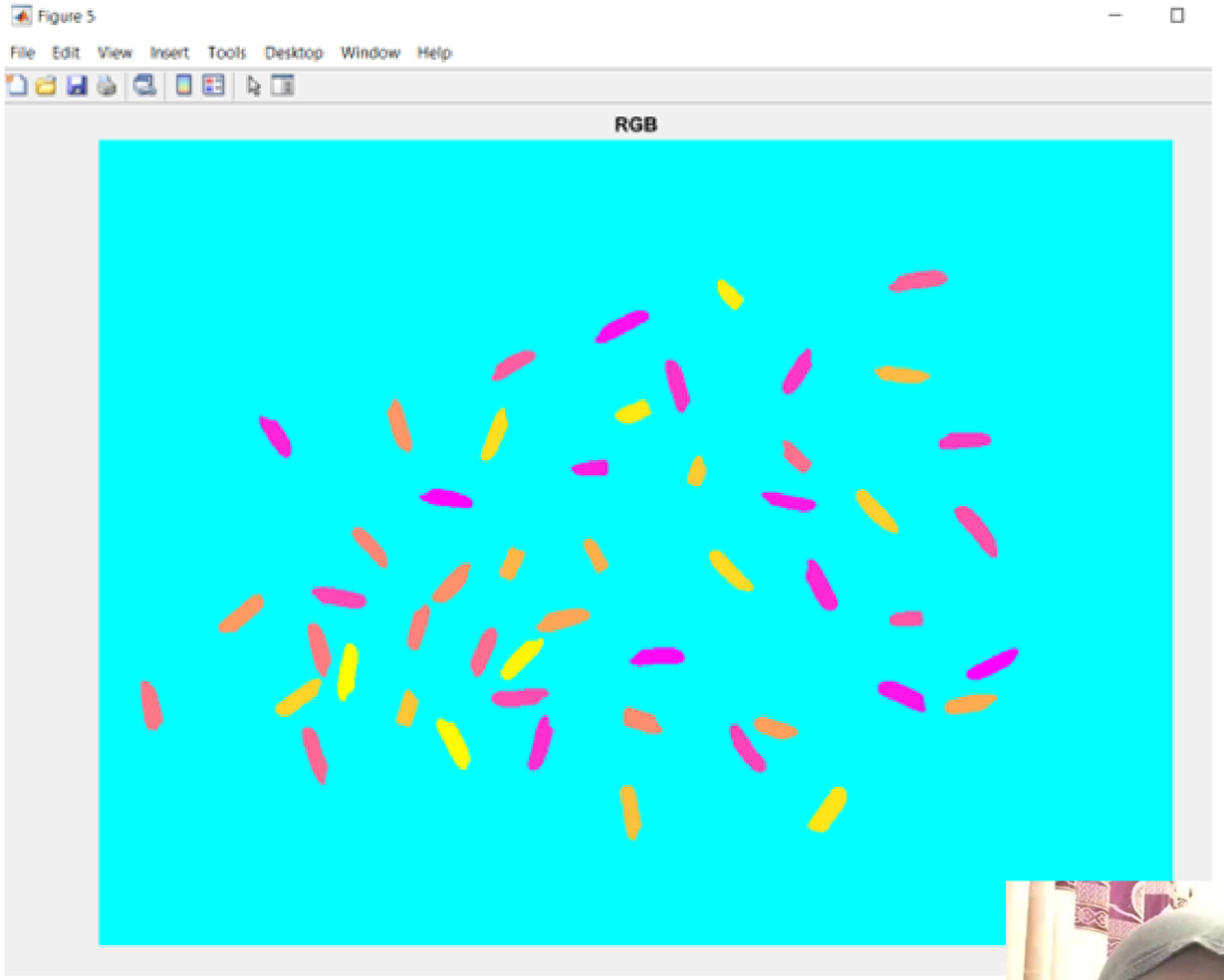
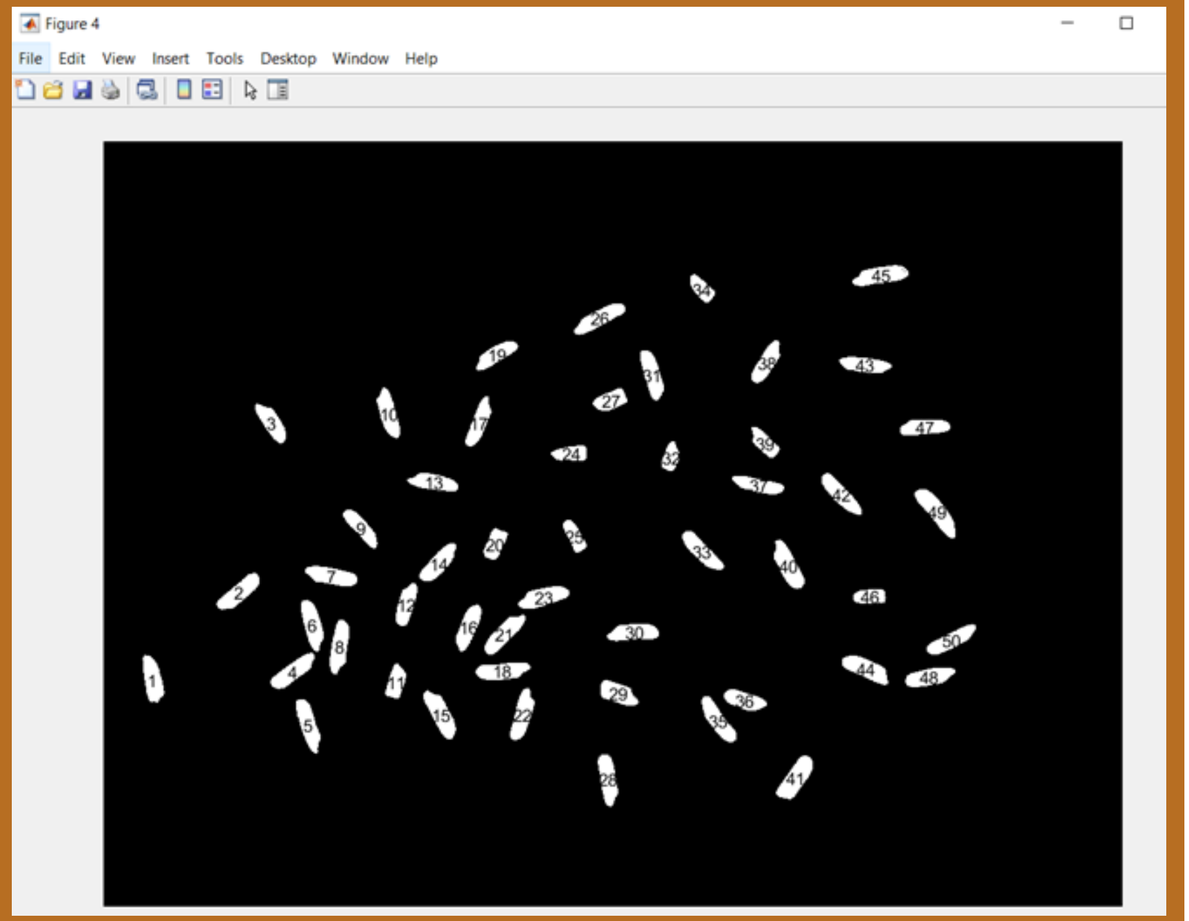


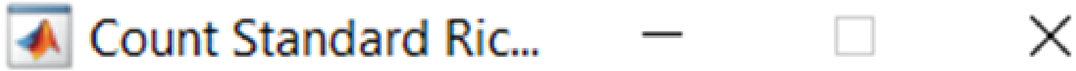
Figure 5
File Edit View Insert Tools Desktop Window Help
RGB

RESULTS



The total number of rice grains 50

OK



The total number of rice grains that fits the standards 40

OK

ANALYSIS

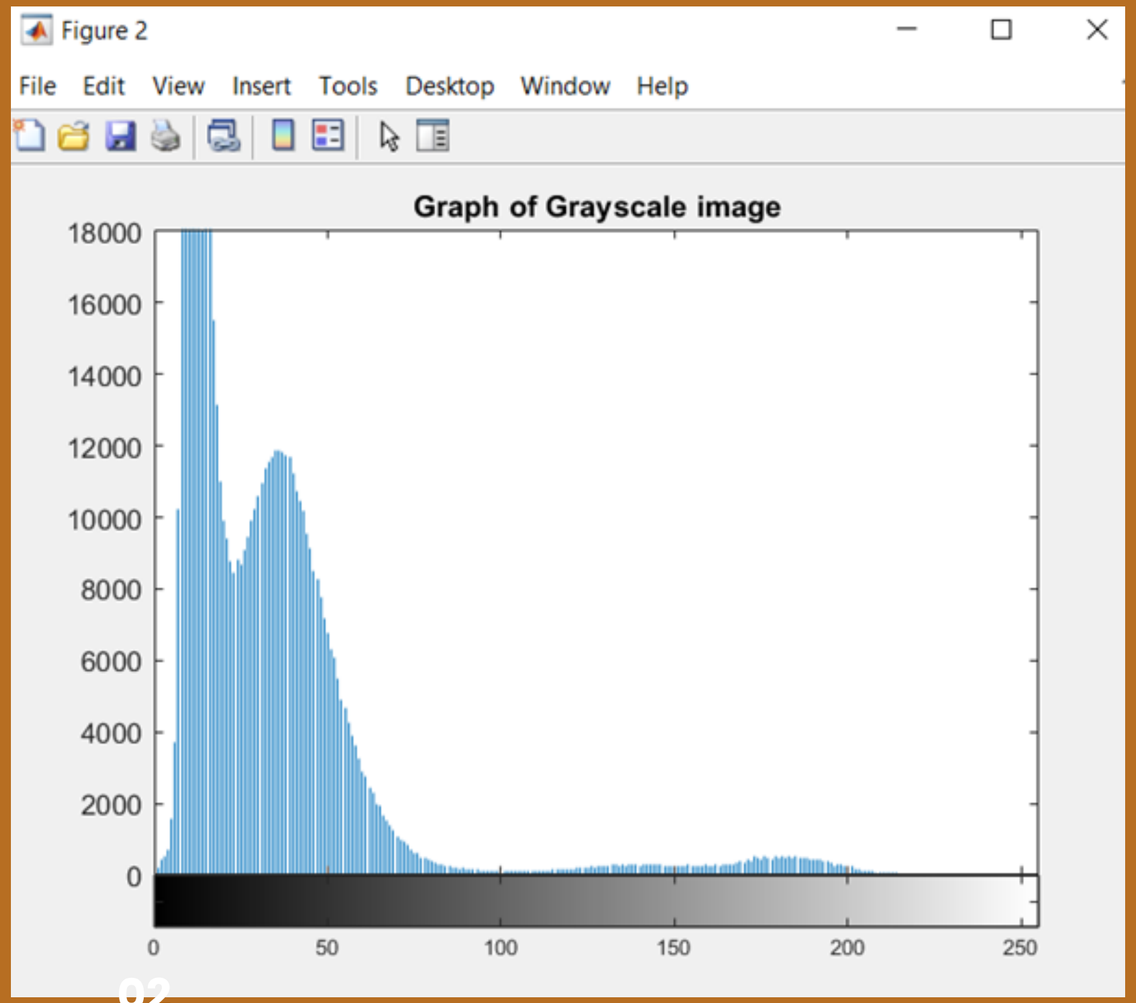


Figure 2
File Edit View Insert Tools Desktop Window Help
Graph of Grayscale image
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
0
50
100
150
200
250

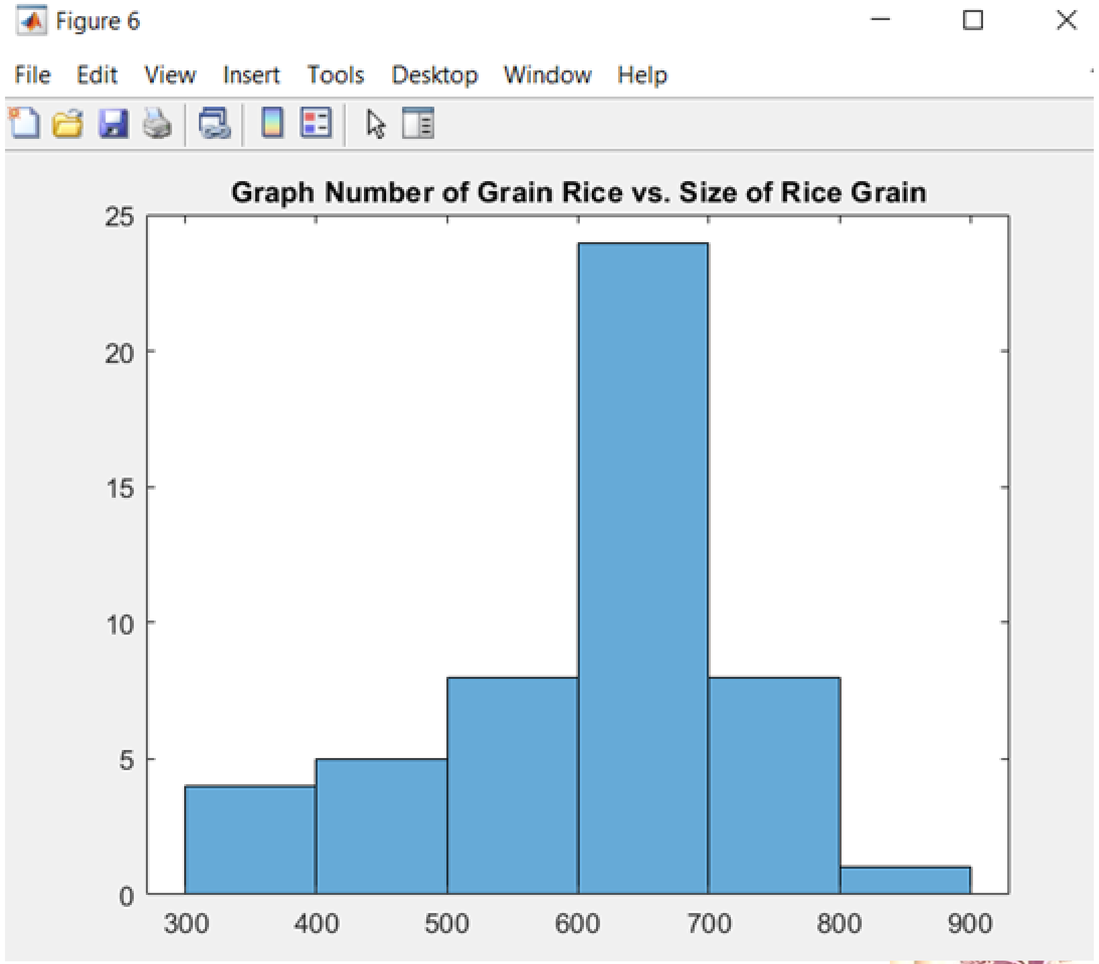


Figure 6
File Edit View Insert Tools Desktop Window Help
Graph Number of Grain Rice vs. Size of Rice Grain
25
20
15
10
5
0
300
400
500
600
700
800
900

Advantages Of System

1. System is easy to use.
2. Reduces time used counting.
3. To determine the quality of grain

Disadvantages Of System

1. Sometimes the results are not accurate
2. Rice grain cannot be close to one another
3. Cannot get results if given video