# Identification of Artificially Ripened Fruits using MATLAB

## Miss. Nikita S. Hatmode, Prof. Mangeshwar. N. Thakare

Department of Electronics & Telecommunication Engineering,
Bapurao Deshmukh College of Engineering, Sevagram, Wardha, Maharashtra, India

## ABSTRACT

Better health is central to human happiness and well-being. Eating ripened fruits gives the good health. People intake a lot of fruits to remain fit. Fruits contain important vitamin, minerals and also fibre. Ripening is the process in fruits that causes them to become more palatable and sweeter. Nowadays, fruits available in the market are mostly artificially ripened. Various types of chemicals are used to ripen the fruits artificially like calcium carbide, which is extremely hazardous to health. It causes health issues like diarrhea, general weakness, vomiting. But with human eye observation, it is difficult to find out artificially ripened fruits. To identify the artificially ripened fruits, we have design a software using MATLAB. It gets an input image of fruit under test and compares the features (histogram values) with naturally ripened one and detects fruits which are ripened artificially. In this method, the image processing is executed to detect the artificially ripened fruits. Captured images are inputs to an image processing unit. The image is processed and compared with a standard image to display whether the fruit is artificially ripened or not.

KEYWORDS: Artificial ripening, Histogram, MATLAB, Image processing

## INTRODUCTION

Fruits are an essential component of our food. They are assumed to protect us from diseases and increase our immunity. Most of the times we consume fruits when they get ripened. When seed grows up completely fruit gets ripened and is consumed. Seed is thrown away for germination.

Ripening is a natural physiological process that makes the fruit sweeter, more palatable, edible, nutritious, softer and attractive. Ripening is also associated with color change due to the pigments that are already present or are produced during ripening [1]

As ethylene is the main natural ripening agent, artificial ripening agents are used to produce ethylene. These agents accelerate the process of ripening [2]. Fruits are placed in wooden boxes lined with hay. The crates are placed one over the other and wood fire is lit below it. The smoke produced so contains ethylene which inducing ripening.

In some cases generators are used to produce ethylene gas. The sensors help in regulating the gas supply. 1 ppm of ethylene in air is sufficient to induce ripening. A number of fruits can be ripened by placing them in plastic bags. Sometimes fruits and vegetables are placed in big rooms, in which ethylene or acetylene gas is introduced. For example: bananas are picked up when they are hard and green. They are transported in this stage to avoid damage during shipping and transportation. After reaching the destination they are exposed to ethylene gas to ripen. Calcium Carbide

(CaC2) is the most common and widely used artificial ripening agent in various parts of the country especially South Asia including India. The commonly available grade in market is grey or brown and contains 80-85% calcium carbide. It produces garlic smell in the presence of moisture. Acetylene acts like ethylene and ripens the fruits and vegetables by the similar process. Industrial grade calcium carbide generally contains impurities of arsenic and phosphorus that pose a number of health problems. This is the reason its use is banned in most of the countries. But because of cheap prices and easy availability, it is still in use. Although mainly used as an insecticide, Ethephon is another commonly used artificial agent and is assumed as better than calcium carbide. Fruits and vegetables ripened with Ethephon need less time to ripen, have stronger shelf life and are more attractive on decomposition; it also releases ethylene that fastens the ripening process. In addition to these, ethanol, methanol, ethylene glycol are also used for the same purpose. Sometimes fruit vendors use burning kerosene stoves and incense sticks to fasten ripening. Although these agents increase the rate of ripening and impart attractive and colorful look/ appearance to fruits, but organoleptic properties are lost considerably. It does not give the natural aroma and flavor to the fruits. These fruits have uniform color than when ripened naturally. Artificially ripened fruits are not very tasty and are difficult to cut, have recorded weight loss and have comparatively short shelf life. One can easily distinguish artificially ripened mangoes by careful examination.

## Methodology

Categories banana samples using image processing. The image processing based method to differentiate between naturally and artificially ripened fruits involve feature extraction from segmented grey image of bananas followed by feature analysis of the coefficients of KNN Algorithm. Banana that were manually ripened were taken as the input data for the image processing code in MATLAB [3]. The image was read and taken as input through the respective functions in MATLAB. The histogram for a specific image helps the viewer to have an understanding about the complete tonal spreading at a scan [4]. Photographers makes use of histogram to show the captured tone's distribution and to analyses any lose in blacked-out shadows or blown-out highlights [5]. Figure 1 provides a complete block diagram.
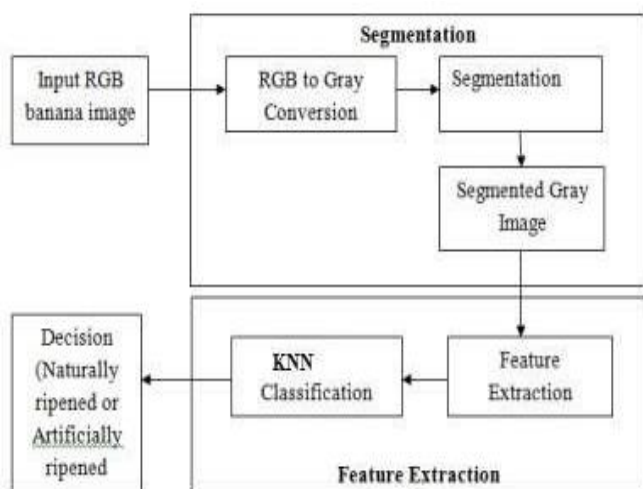

**Fig 1: Block Diagram**

Then given image input was processed and its histogram value was calculated. The maximum histogram value was identified using a function [7]. The threshold of histogram value was set after taking up several trials using different input images. The threshold fixed on constant value. It was determined that if the histogram value calculated was greater than this value it was considered to be a banana ripened artificially and if it was lesser it was considered to be naturally ripened banana. Then finally it was capable of identifying the mode of ripened banana. The ultimate aim of this project is to help in distinguishing between artificial and naturally ripened fruits.

## Overall analysis of Reported Work

Fruits nowadays are ripened through some artificial means like usage of chemicals like calcium carbide as ripening agent which might even cause cancer. According to health officials, the consumption of fruits ripened using calcium carbide leads to various harmful effects like vomiting, diarrhea, ulcers of throat and abdomen, general weakness and sometimes damage of eye permanently and breathing shortness.

Finding out the artificially ripened fruits is difficult with human eye observation. To aid the detection we will develop a software which uses image processing to find the artificially ripened fruits. It gets an input image of fruit under test compares the features (histogram values) with a naturally ripened one and detects fruits which are ripened artificially. This method makes usage of the matlab and the

image processing is executed to detect artificially ripened fruits.
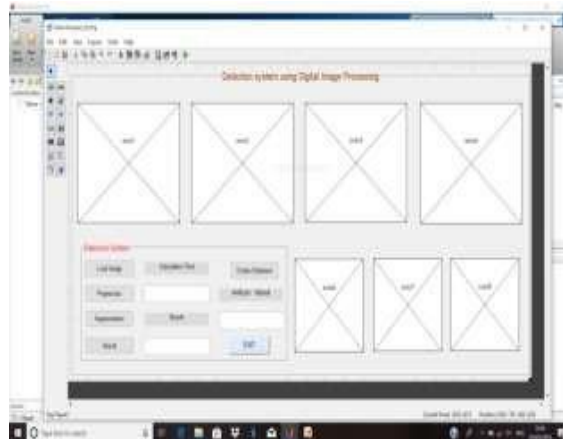
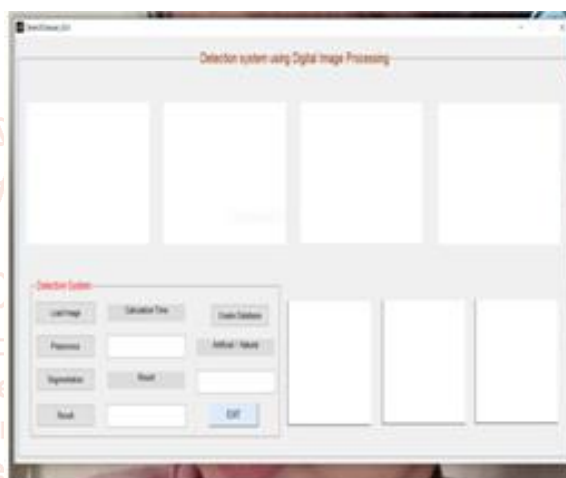## Result


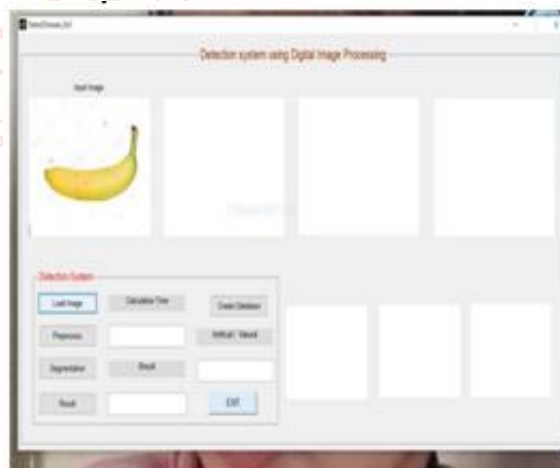**Fig 2: Develop GUI (Graphical User Interface)**


**Fig 3: Generate GUI**


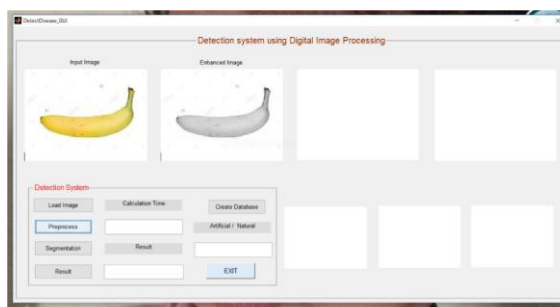**Fig 4: Upload RGB Image**
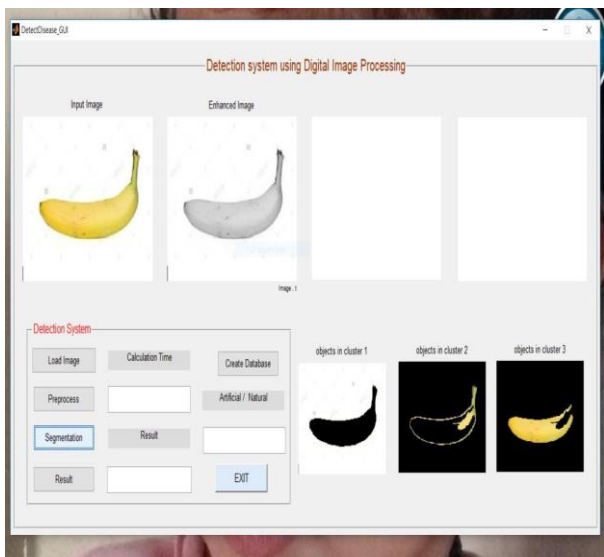

**Fig 5: Convert RGB Image into Gray Image**
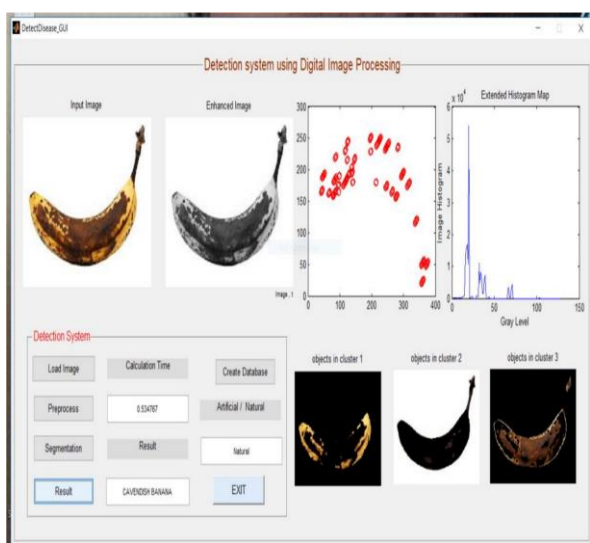
**Fig 6: Segmentation of Banana Image**



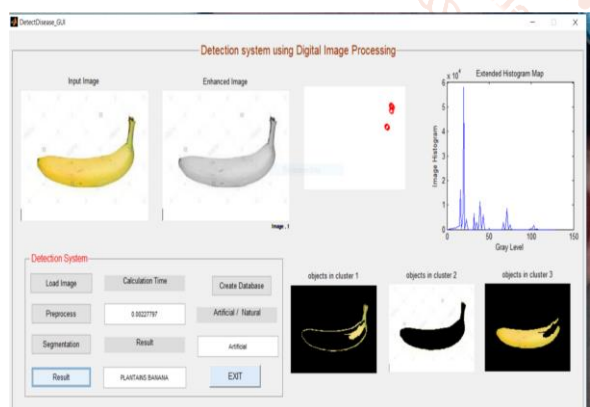**Fig 7: Finally Detect and Identify Ripened Fruit**



**Fig 8: Finally Detect and Identify Ripened Fruit.**

## Conclusion

The proposed method thus identifies the fruits ripened by artificial means and keep people healthy by intake of these healthy fruits. The proposed method aims in developing an application for detecting the artificially ripened and naturally ripened fruits. The image of the fruit processes the image by calculating the histogram value and then classifies the image with the threshold as natural and artificially ripened fruits. The basic aim of this project is that the artificial ripening fruits are extremely harmful to human being and continuous consumption of these kinds of fruits will even lead to extremely harmful diseases like cancer. Thus, this method helps out the users to stay healthy and consume fruits which are nutritious by avoiding the intake of artificially ripened fruits which are ripened with the chemical like calcium carbide.

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