

# RIPE FRUIT DETECTOR

## I) Introduction:

This is a basic Python based GUI app which aims at determining the ripeness of 5 different fruits on a scale of 1-5 where 1 means raw and 5 means fully ripe.

The 5 fruits chosen are-

a) Apple      b) Banana      c) Mango      d) Orange      e) Papaya

The scaling of the fruits is done as follows:

- 1 - Raw
- 2 - Unripe
- 3 - Ripe
- 4 - Very Ripe
- 5 - Over Ripe

## II) Implementation Details:

### Installation:

- 1) Clone the project from git using 'git clone' command.
- 2) Install all the necessary dependencies. This is a python-based app hence the first and foremost dependency for running this app is the installation of **Python 3.0** in the system. It can be downloaded from <https://www.python.org/downloads/>

Other major dependencies include:

- 1) **OpenCV**: Python Library for Computer Vision. It can be installed using command **pip install opencv-python**
- 2) **tkinter**: Python GUI library.
- 3) **Pillow**: Python Imaging Library. It can be installed using command **pip install Pillow**
- 4) **NumPy** can be installed using command **pip install numpy**

## **Explanation:**

The main concept used to predict the ripeness of the fruits is 'Masking'. The flow of the project is as follows:

- a) Initially, the user selects the name of the fruit with the help of a dropdown.
- b) Then the user selects an image for ripeness prediction using the 'Open Image' button.
- c) The selected image appears in the tkinter window and along with it appears a 'Show Result' button.
- d) When the user clicks on that button, the processing is done on the selected image and the result gets displayed on the screen.

## **Processing Part:**

- a) Initially the image is converted to HSV format.
- b) For every fruit, different masks of different colors are calculated separately. Every fruit has its own combined mask of different colors.
- c) Using this final mask, contours are drawn on the original image which shows how much area has been detected. This enables to track the % of that particular color in the image.
- d) On the basis of the percentage of each color obtained in the image, the scale of ripeness of fruit is determined.

## **III) Results & Discussions:**

The main task in this project was to find accurate masking values for each required color so that it detects appropriate color and its percentage. The masking technique used for determination of the ripeness of the fruit yields 80% correct results.

## **IV) Conclusion:**

Masking is a good technique for the fruit ripeness detection. But more accurate results can be achieved with the help of advanced Image Processing algorithms and using CNNs.