Ant Bot

Task 1.1 - To Generate ArUco markers for specified IDs

Goal:

To learn Python and OpenCV to:

1. Implement Image Processing applications using Python
2. Use open source Image Processing library OpenCV and its associated modules
3. Use ArUco library of OpenCV to create markers

Please find the **Task1.1.py** file in the folder named **"2.Code"**. Modify the sections of **Task1.1.py** marked for the same, to accomplish the following:

Given:

A total of 4 ArUco IDs (a pair of IDs from a dictionary of 4x4 Bit size with 50 combinations and another pair of IDs from a dictionary of 5x5 Bit size with 250 combinations).

You have to create 4 ArUco images of the specified dictionaries mentioned in the table below and save them as **.jpg** for your submission.

Problem Description:

The ArUco marker is a square monochrome image in Black and White. An ArUco ID is a decimal number and has a particular pattern associated with it; which is in an ArUco marker.

It is required for the teams to use the ArUco library APIs of the specified **OpenCV3.4.2** and **Python3** to create these images, overlay the ID text above them and save the images. Since there are 4 ArUco IDs, the output should be 4 different ArUco marker images in .jpg format in a folder named **"Images"** within a submission zip folder named **"<TeamID>_Task1.1.zip"** i.e. if your team ID is 1001, the folder should be named as **"1001_Task1.1.zip".**

Note: Keep the image **resolution** of the ArUco marker: **400x400 pixels**.

The ArUco ID markers whose jpg images have to be generated are enlisted in the table below with their corresponding dictionary details:

Table 1: ArUco Dictionary Specification and Mapping Table

Image Name	ArUco ID	Bit Size	Combinations
ArUco13.jpg	13	4x4	50
ArUco25.jpg	25	4x4	50
ArUco206.jpg	206	5x5	250
ArUco185.jpg	185	5x5	250

Embed a white border of 25 pixels on all sides of the images and save it with **JPEG** format. Name the images as per ID: ArUco<#ID>.jpg; for the example image below it should be saved as ArUco26.jpg.

Within the white border, embed the ID of the ArUco marker in the Red font as shown in the example image below (refer to Figure 1).

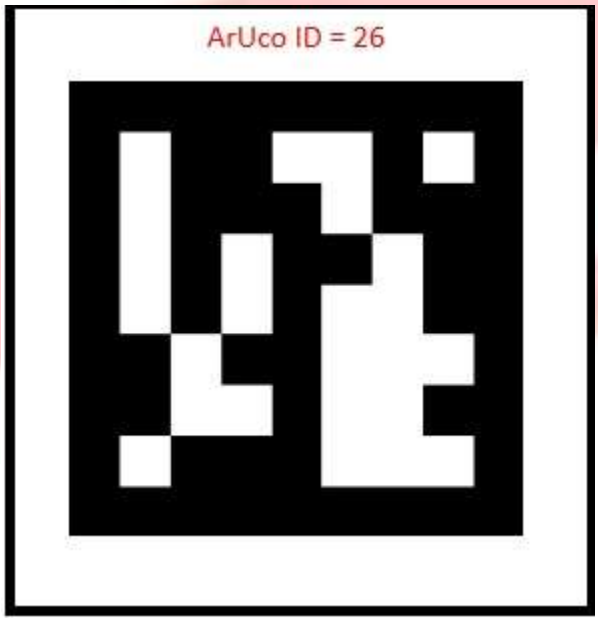

Figure 1: ArUco26.jpg

The example shown in the above figure is an ArUco marker of ID = 26 belonging to a Dictionary of Bit size 7x7 with 250 combinations.

Required Output:

1. A jpg image per ArUco ID with its ID in the border at the top-centre of the image in the Red font.

Note: Save the images in a folder named **"Images"** within a submission zip folder named **"<TeamID>_Task1.1.zip"** i.e. If your team ID is 1001, the folder should be named as **"1001_Task1.1.zip"**

2. Code file that contains the algorithm to solve this problem.

Note: Save the python code in a folder named **"Code"** within a submission zip folder named **"<TeamID>_Task1.1.zip"** i.e. If your team ID is 1001, the folder should be named as **"1001_Task1.1.zip"**

Thus your resulting submission folder named "<TeamID>_Task1.1.zip" should contain 2 subfolders -

1. Images
2. Code

To do:

Open **Task1.1.py** located in the folder named **"Code"**. It has two functions:

- **main():** which calls the function to generate or create ArUco markers by specified Ids.
- **aruco_gen():** This function expects two parameters as arguments-ID and the number of pixels in resolution. Both these inputs are whole decimal numbers.

Edit these functions as per your generalised algorithmic code.

Save this modified code with your TeamId in the name of the code file as **<TeamID>_Task1.1.py**. Please use your eYRC team id while actually naming the file i.e. if your TeamID is 1001, then the name of the code file should be 1001_Task1.1.py.

IMPORTANT: Do not change names of any of these functions.

Rules:

1. You need to write a generic program. Your code should be able to generate an ArUco marker of any ID. Your code will be tested for creating a marker set of undisclosed ArUco IDs when you submit your code.
2. Use the resources provided in the folder for the same.
3. Do not rotate or orient the ArUcos created in any other angle than its original.

Happy Learning

All The Best!!!