Flag Detection using OpenCV

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1. Objective

The objective of this task is to build a program using OpenCV that identifies whether an input flag image belongs to **Indonesia** or **Poland**.

2. Approach and Logic Used

Since the input image might include background and surroundings, it is important to segment and crop the actual flag part from the image. Both the Indonesian and Polish flags contain only two colors: **Red** and **White**, arranged in two horizontal stripes but in opposite orders.

- The image is first segmented to isolate the flag.
- The segmented image is split into two equal horizontal halves.
- Each half is checked for red and white colors using the HSV color space.
- Based on the detected order of colors, the flag is classified as either Indonesian or Polish.

3. Code Explanation

1. Flag Segmentation

This module involves:

1. Reading the input image.
2. Converting the image to the HSV color space.
3. Creating color masks using predefined HSV ranges for red and white.
4. Combining the masks and locating contours.
5. Identifying the largest contour, assuming it is the flag.
6. Cropping the image using the bounding rectangle of the largest contour.

2. Image Classification

With the cropped image, the following steps are performed:

1. Convert the image to RGB format.
2. Split the image into two horizontal halves.
3. Use HSV masking to detect red and white regions in both halves.
4. Determine which color appears in which half.
5. Print the result as either `Indonesia` or `Poland`.

4. Conclusion

This solution demonstrates a simple computer vision approach using OpenCV to classify flags with a two-color horizontal layout. It leverages color segmentation in the HSV color space, followed by logical comparison. While effective for clean or primitive images, the method may not generalize to complex or real-world scenarios without enhancements.