# DIP Assignment 3

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## 1. Identifying Color Variations in Fabric Images

**Problem Statement:** The task involves creating a program to identify color variations in fabric images and highlighting them. This can be useful in quality control and pattern matching applications.

**Proposed Solution:** The solution utilizes Python and the OpenCV library for image processing. The program reads two fabric images, converts them to the Lab color space for better color representation, calculates the absolute difference between the images, thresholds the differences to highlight color variations, and finally displays the original image and the highlighted color differences. Adjustments to the threshold and other parameters can be made based on the specific characteristics of the fabric images.

**Relevance:** This solution demonstrates the application of image processing techniques to identify and highlight color variations in fabric images. The use of the Lab color space enhances the accuracy of color representation, making it relevant for quality assessment in the textile industry.

## 2. Identifying Red Dots and Measuring Horizontal Distance

**Problem Statement:** The task involves creating a program to identify red dots in an image, measure the horizontal distance between opposite pairs, and draw lines between those pairs.

**Proposed Solution:** The solution, implemented in Python with OpenCV, reads an image, converts it to the HSV color space to better identify red color, and uses the Canny edge detector and contour detection to find red dots. It then calculates the horizontal distance between opposite pairs of red dots, draws lines between them, and displays the original image with the lines drawn. Adjustments can be made to threshold values and other parameters based on the characteristics of the images.

**Relevance:** This solution showcases the use of computer vision techniques to identify and measure distances between objects in an image. It is applicable in various scenarios, such as object tracking and spatial analysis.

## 3. Identifying Skipped Stitching in Fabric Images

**Problem Statement:** The task involves creating a program to identify skipped stitching in fabric images and draw a box around the detected area.

**Proposed Solution:** The solution uses Python and OpenCV to read fabric images, convert them to grayscale, apply GaussianBlur to reduce noise, and use the Canny edge detector to detect edges. It then finds contours, filters them based on area, and draws bounding boxes around the identified skipped stitching areas. Adjustments to parameters such as minimum contour area can be made to suit different images.

**Relevance:** This solution demonstrates the application of image processing techniques to identify and highlight anomalies in fabric images, which is crucial for quality control in the textile industry.

## 4. Monitoring Fabric Width Variation in Videos

**Problem Statement:** The task involves creating a program to monitor fabric width variation in videos, identify when the width falls below a threshold, and record the frame number and width.

**Proposed Solution:** The solution, implemented in Python with OpenCV, reads video frames, defines a region of interest (ROI) for width measurement, applies background subtraction to highlight

moving objects, and uses contour detection to identify the fabric width. It records frame numbers and widths when the width falls below a user-defined threshold. Dynamic thresholds and adjustments to ROI can be made based on video characteristics.

**Relevance:** This solution addresses the real-world need to monitor and analyze fabric width variations in videos, crucial for quality control and process optimization in the textile industry.

## 5. Identifying No-Ball in Cricket Videos

**Problem Statement:** The task involves creating a dynamic solution to identify if a bowler has bowled a no-ball in cricket videos, considering variations in side angles.

**Proposed Solution:** The proposed solution uses Python and OpenCV to read cricket videos, define a region of interest (ROI) for the bowler's front foot, apply background subtraction to highlight moving objects, and use object detection to identify and track the bowler's front foot. It checks the foot position relative to the stumps and dynamically adjusts thresholds based on the video's characteristics.

**Relevance:** This solution addresses the need for automated detection of no-balls in cricket, showcasing the application of computer vision techniques in sports analytics and officiating. The dynamic thresholding approach makes the solution adaptable to videos with varying conditions.