

The Superior University

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**Lab 5**

# **OpenCV**

## **Introduction**

This document explains the purpose and functionality of the provided Python script, which utilizes OpenCV to process images. The script demonstrates how to load, display, and analyze images using OpenCV functions.

## **What the Code Does**

1. **Import Necessary Libraries**
   1. The script imports cv2 for image processing, numpy for numerical operations, and matplotlib.pyplot for visualization.
2. **Load and Display an Image**
   1. The script reads an image using cv2.imread() and displays it using OpenCV’s imshow() and Matplotlib’s imshow().
3. **Face Detection and Feature Marking**
   1. The code detects faces in an image using Haar cascades and estimates the locations of facial features (eyes, nose, mouth) by drawing bounding boxes.
4. **Error Handling**
   1. The script includes error handling for missing images or failed face detection.
5. **Display Results**
   1. The processed image is converted to RGB and displayed using Matplotlib.

## **Why This Code is Useful**

This script is beneficial for several reasons:

* **Facial Recognition Applications**: Used in security and biometric authentication.
* **Computer Vision Projects**: Helps in automated image analysis.
* **Educational Purposes**: Demonstrates fundamental OpenCV functionalities.
* **Error Handling Mechanisms**: Ensures robustness by managing missing files and invalid detections.

## **OUTPUTS:**

