



SUPERIOR UNIVERSITY

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Section : AI(4-B)

Lab Task : 05

Computer Vision Lab Report

1. Introduction

Computer vision is a field of artificial intelligence that enables machines to interpret and understand images and videos. OpenCV (Open Source Computer Vision Library) is one of the most popular libraries for image processing. This lab focuses on fundamental image processing techniques using OpenCV in Python.

2. Objectives

- Learn how to read, display, and manipulate images using OpenCV.
- Implement basic image processing techniques such as resizing, color conversion, blurring, and edge detection.
- Understand and apply face detection using Haar Cascades.
- Capture and process video streams.
- Detect objects and contours in an image.

3. Materials & Methods

3.1 Software Requirements

- Python 3.x
- OpenCV Library
- Jupyter Notebook or PyCharm/VS Code

3.2 Dataset

The lab uses a sample image file, "my pic.jpg," for image processing tasks.

4. Experimental Work

The experimental work involves various image processing tasks such as reading and displaying images, resizing images, converting images to grayscale, splitting color channels, blurring images, detecting edges, and recognizing objects and faces. Additionally, real-time video capturing and object detection using contours were explored.

5. Results & Observations

- Successfully read and displayed images using OpenCV.
- Converted images to grayscale and resized them efficiently.
- Extracted individual color channels from images.
- Applied Gaussian blur for noise reduction.
- Detected edges using the Canny algorithm.
- Identified faces in images using Haar cascades.
- Drew shapes on images to highlight features.
- Detected objects and contours.
- Captured and displayed video using a webcam.

6. Conclusion

This lab introduced fundamental image processing techniques using OpenCV. It demonstrated how to read, process, and analyze images using various methods, including color manipulation, edge detection, and object recognition. Face detection using Haar cascades and real-time video processing was also explored, highlighting OpenCV's powerful capabilities in computer vision applications.

7. Future Work

- Implement real-time face recognition using deep learning.
- Explore object detection using YOLO or SSD models.
- Develop applications for real-world scenarios like traffic monitoring or medical imaging.