Machine-Vision

Machine Vision – Week 1 Assignment

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Git Hub link = https://github.com/sabiha906030/Machine-Vision/tree/main/Machine_vision_as_1

Overview

This repository contains my solutions for **Machine Vision – Week 1**, which focuses on basic image processing using **OpenCV** and **Python**.
The assignment is divided into two main parts:

- **Task A:** OpenCV basics and RGB channel visualization
- **Task B:** Manual annotation of objects in a RoboDK camera snapshot

Task A – OpenCV Basics

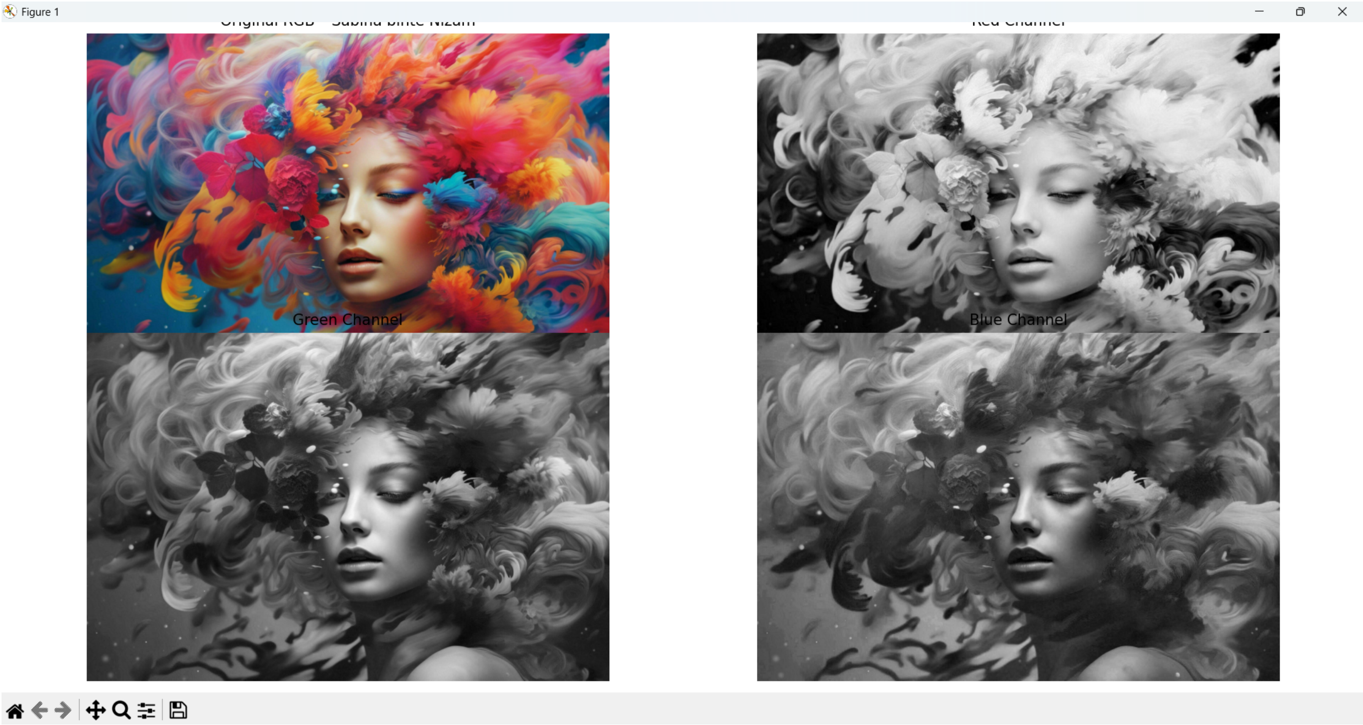
Description

In Task A, I worked with a color image and explored how OpenCV handles RGB channels.

Steps performed:

1. Loaded a colorful image from disk
2. Converted the image from BGR to RGB
3. Split the image into **Red**, **Green**, and **Blue** channels
4. Displayed the original image and the three channels in a 2×2 grid using `matplotlib`
5. Added my name to the title of the original image
6. Saved the final grid as an image file

Result



Task B – RoboDK Snapshot Annotation

Description

In Task B, I manually annotated objects visible in a RoboDK camera snapshot.
The goal was **not automatic detection**, but **accurate manual marking using pixel coordinates**.

Annotated objects:

- Box
- Cube
- Sphere
- Cylinder

My Approach

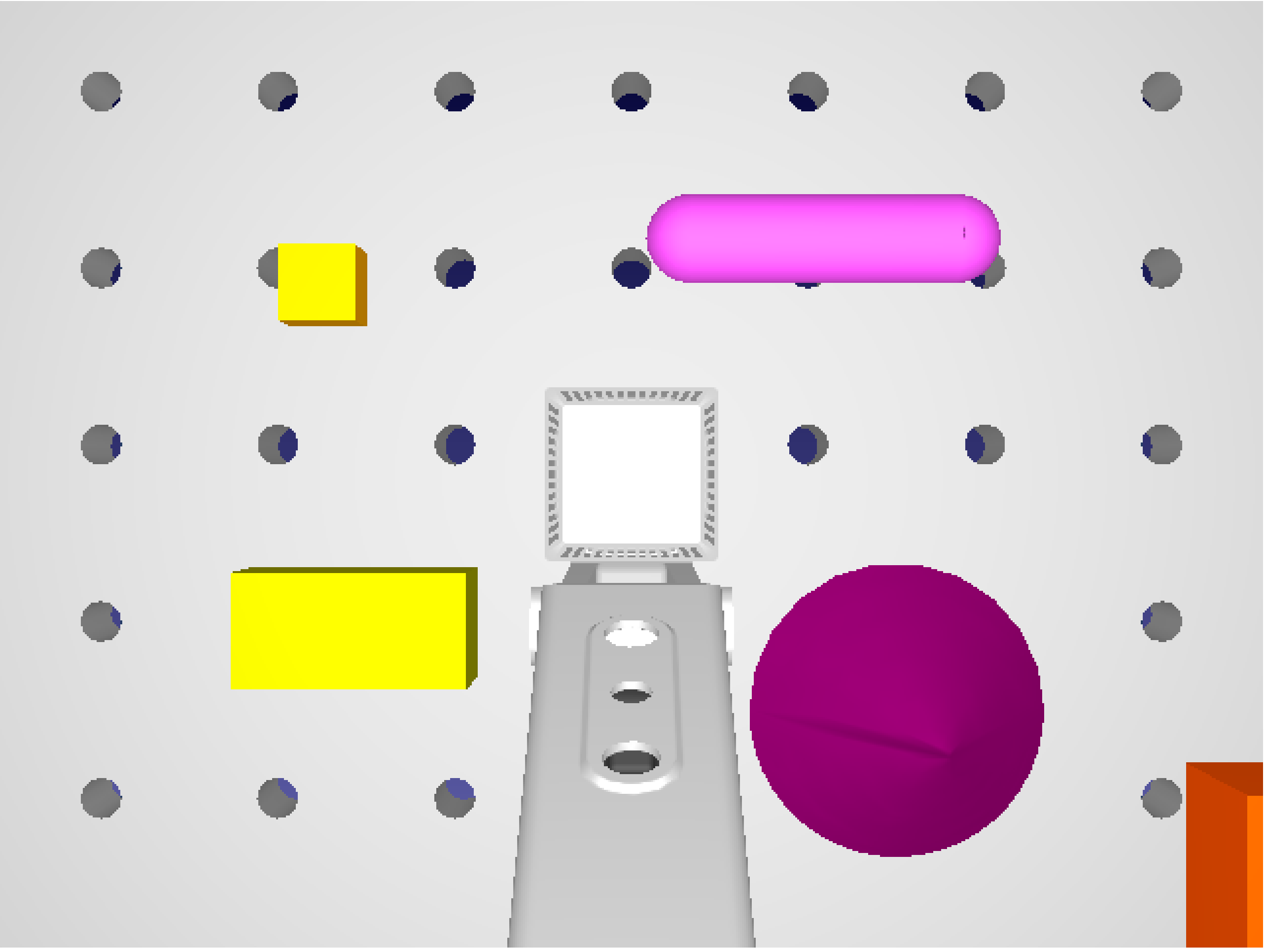
Instead of guessing coordinates, I used a **mouse-click coordinate tool** to get exact pixel values from the image.
This allowed me to place shapes accurately over each object.

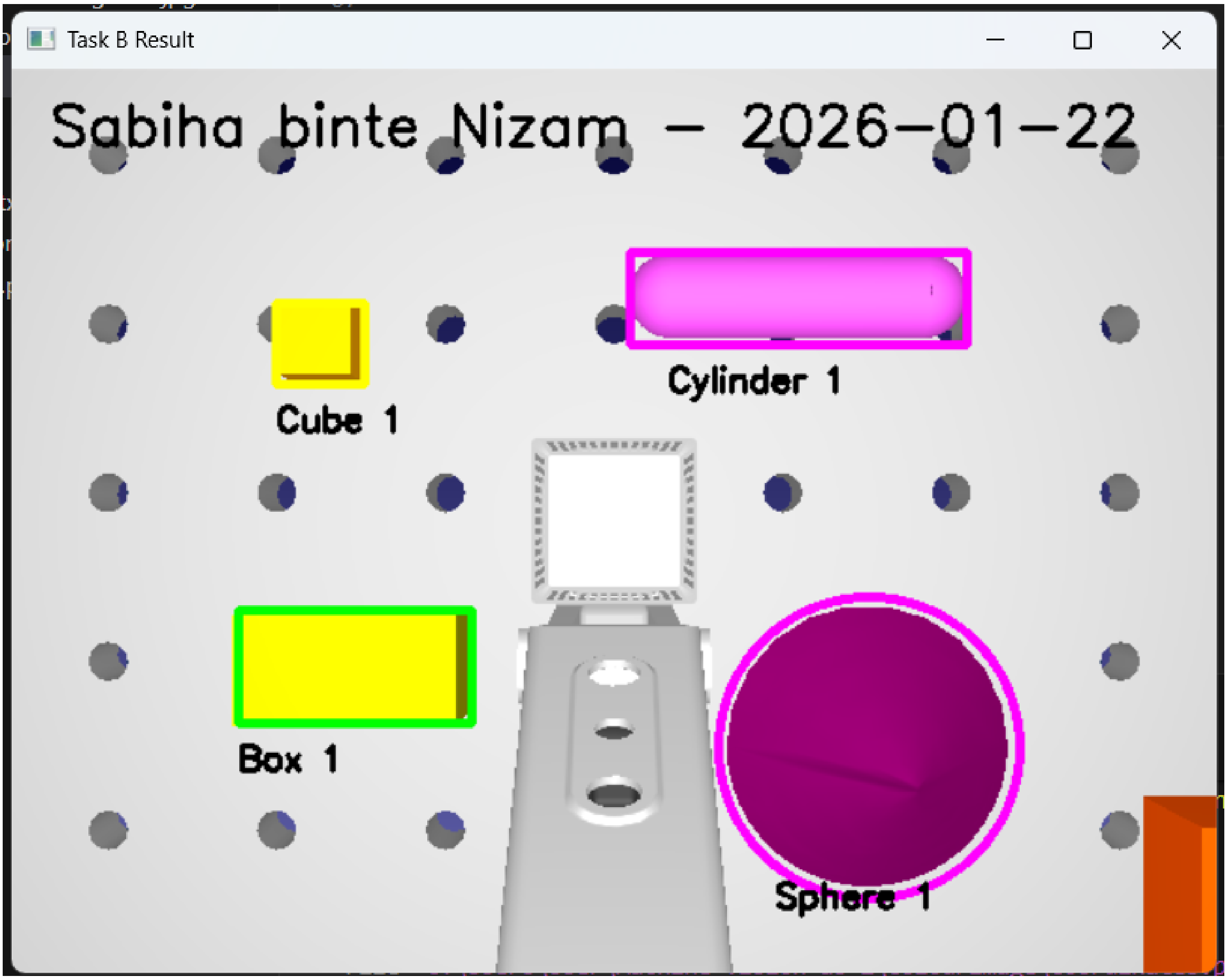
Different shapes were used based on the object geometry:

- **Rectangles** → Box and Cube
- **Circle** → Sphere
- **Rectangle (not circle)** → Cylinder (because it is horizontal)

Each object was labeled clearly, and the final annotated image was saved and displayed.

Result





Problems I Faced and How I Solved Them

1. Wrong object shape for the cylinder

Initially, I marked the cylinder using a circle, which only covered one end of the object.

Solution:
I realized the cylinder is a horizontal object, so I replaced the circle with a **rectangle**, which correctly represents its shape.

2. Incorrect object positioning

Some annotations were slightly misaligned at first.

Solution:
I used a custom script to click on the image and read exact `(x, y)` coordinates from the terminal.
By adjusting only the top-left and bottom-right points, I was able to fix the alignment precisely.

Performance and Speed

- The scripts execute almost instantly

- Manual annotation is fast once correct coordinates are known