

LAB-2: Object Tracking Drone.

In this assignment, we will be tracking objects using TELLO EDU with the help of OpenCV, Python built-in libraries.

Here, object detection is implemented using color detection, this color detection is based on the specific fine-tuning of Hue, Saturation, and Value of the object that needs to be tracked by the drone. These values are captured using a special script that first converts the color image to a black and white image, and then with help of the script I've set the Hue, Saturation, and value such that only the object will be highlighted.

Then we will be using a PID controller to track the displacement changes of the object being tracked. Based on the displacement change the yaw angle of the drone will be updated and that's how the object will be tracked.

In our experiment, the entire approach was followed by three-steps

1. **Getting Frame Using Tello:** Here, I've accessed the real-time camera feed from the Drone using built-in functions and reading the video as frame by frame. And resizing the image for faster telecasting using OpenCV.
2. **Detecting The Object in Live Video:** As mentioned, earlier the detection is happened using the lean approach, this approach captures the object and identifies the colored object using color contours.
3. **Tracking The Object:** Object tracking is achieved by using a PID controller, it is used in multiple industrial applications to regulate physical variables such as temperature, pressure, speed, etc., the PID controller used a control loop feedback mechanism to control process variable, and these are the most accurate and stable controller.
The speed value will be updated based on the PID equation by considering the errors, and the updated speed values will be passed to the drone control for maintaining the yaw velocity for tracking the human face.
 - The above-mentioned drone applications have been implemented using python built-in libraries which are djitellopy, cv2, NumPy, Haarcascade. [[Code](#); [Video](#)]