

LAB 1: BALL RECOGNITION

Due: Tuesday, January 24th 3pm

The objective of the first lab is to write an algorithm to detect a black ball in images that were logged by Cozmo. You are provided the following directory of files:

ball_recognition/

`find_ball.py` - this is the main file where you will enter your solution. Complete the function `find_ball()` to return the location and radius of the ball in the image (if any). You may edit any part of this file and add helper functions as needed, but make sure your code is self-contained because this is the only file you will be submitting.

`autograder.py` - this autograder is provided to help you verify your solution. We will use the same autograder with a new set of images to verify your code.

`imgs/` - directory containing images and a text file listing the true location of the ball in each image

The provided code provides images in OpenCV format to allow for easy manipulation and editing.

Lab Checkpoint [15 points]: Complete the installation of Python 3 and the Python version of OpenCV 3. [Instructions can be found here](#). Verify the installation by running the autograder. The output for all images should be `None`, with the final line reading: `score = 10`

Evaluation: By the due date, show a member of the course staff during class or office hours that you are able to execute the above code on your machine. We will record your grade at that time.

Main Lab [85 points]: Complete the code to detect the ball location. Your function should return `[x, y, rad]`, where `x` and `y` are the coordinates of the center of the ball, and `r` is the radius of the ball (all measured in pixels). If no ball is found, return `[0, 0, 0]` or `None`.

Evaluation: We will evaluate the performance of your algorithm on 100 images using the autograder. 50 of these images will be the same as the ones that you are provided with the assignment, and 50 will be new images taken under the same conditions. Your grade will be determined as the percentage of the images in which the location of the ball is correctly reported.

Submission: By 3pm on Tuesday January 24th submit `find_ball.py` on T-Square. Make sure your code is entirely contained within this file. If you relied significantly on any external resources to complete the lab, please reference these in the submission comments.