Introduction to Vision and Robotics Coursework

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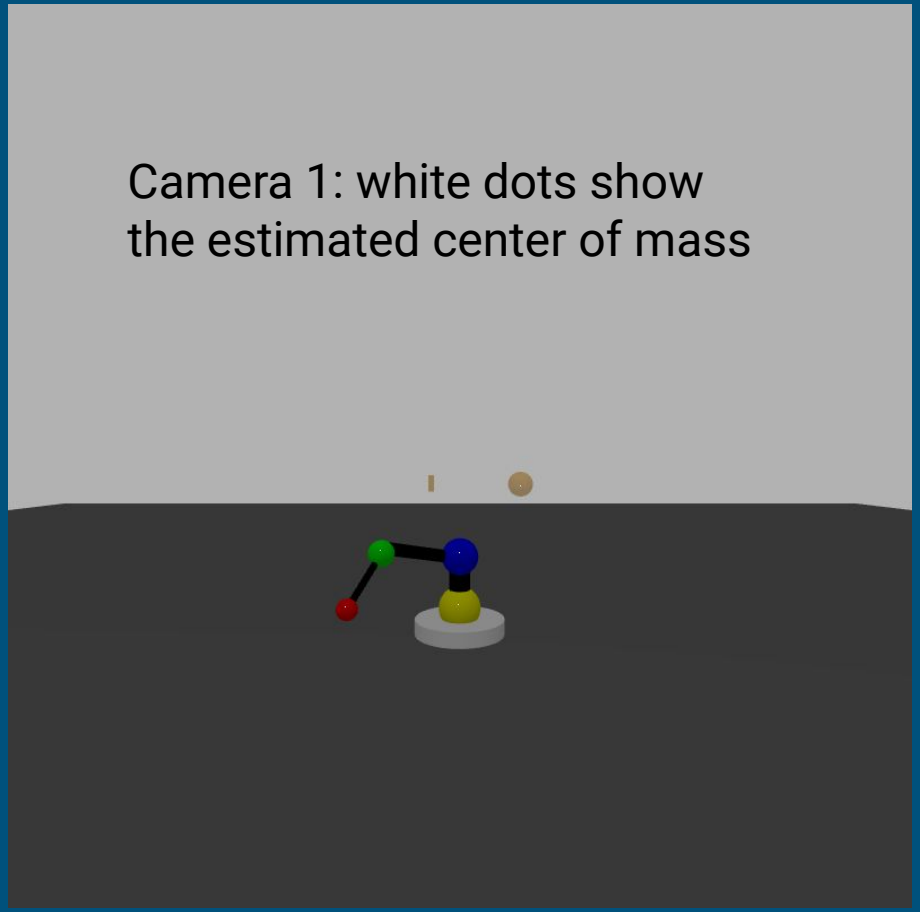
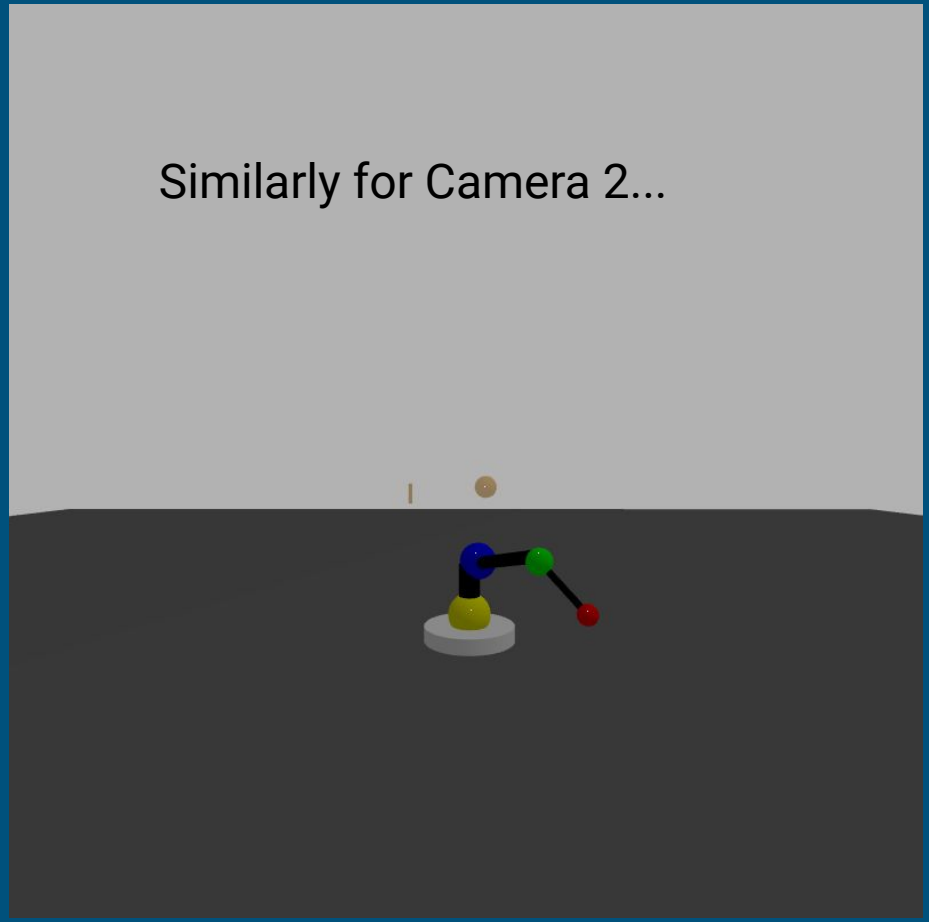
Processing Image from Cameras 1 and 2

Camera 1: white dots show the estimated center of mass



Similarly for Camera 2...

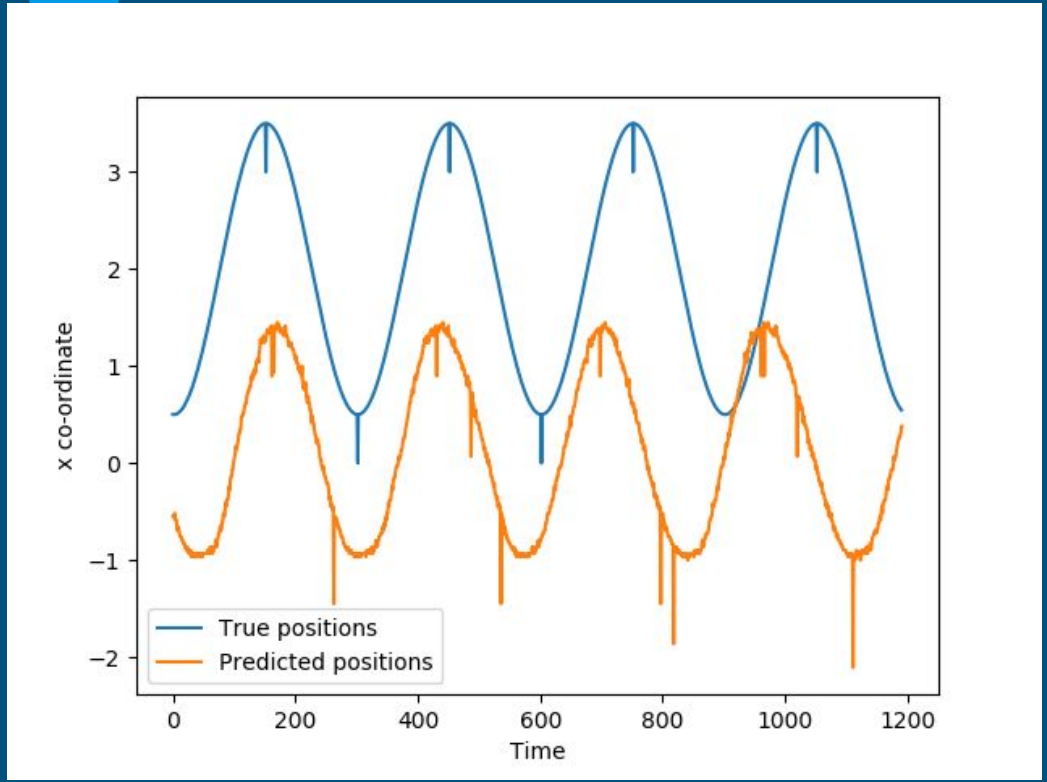


Algorithm for center of mass estimation:

The estimation of the position of the center of mass of the target sphere was done as follows:

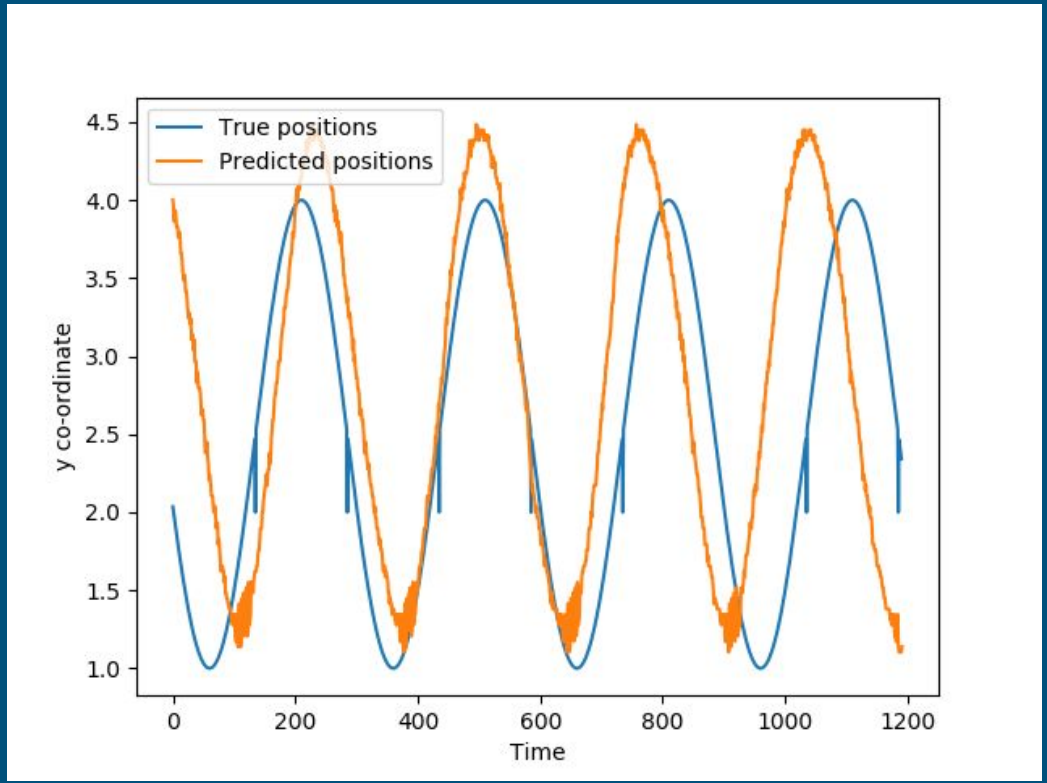
1) Find the rgb value of the target sphere (and the box) in the upper (grey) region.
2) Use the cv2.findContours() method to ignore the box and generate a binary image with just the sphere.
3) Repeat steps 1 and 2 for the lower (dark grey) region
4) Do bitwise or of the two binary images, and then calculate the position of the mean pixel.

x coordinates: predicted vs actual



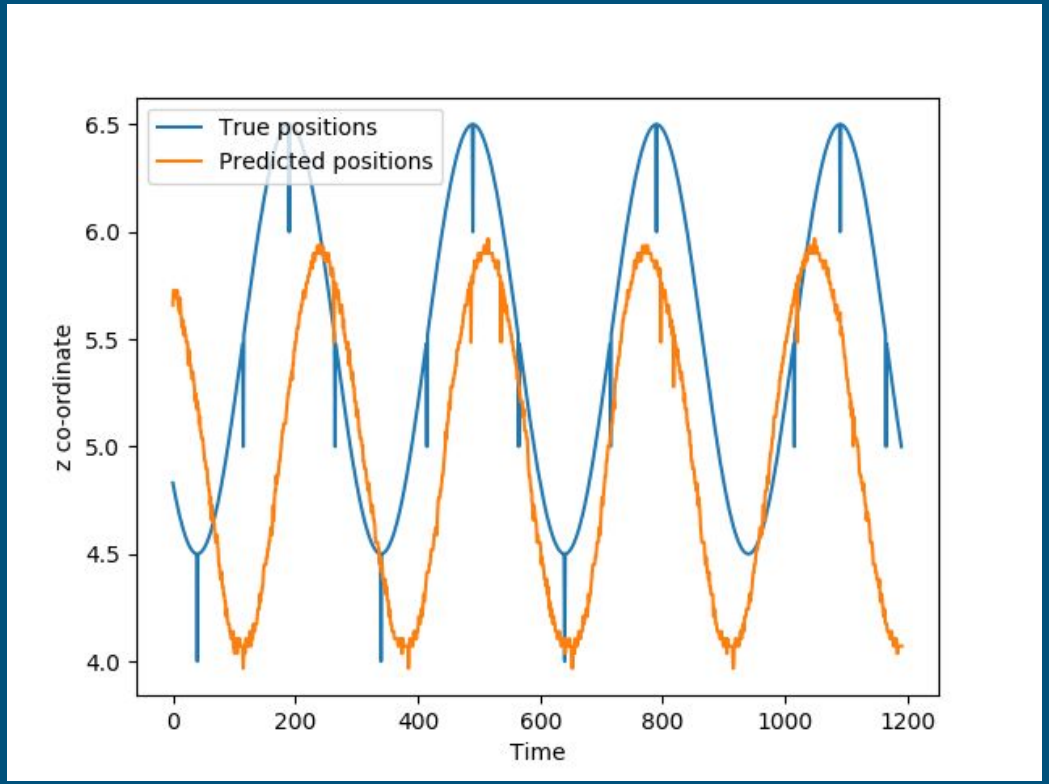
- The mean of the predicted x-coordinates is lower than that of the given values.
- The range of the predicted, (-1,1.5) is smaller than [0.5,3.5]. As of yet, we do not know why that could be happening.
- The time period of the actual values is around 300 while that of the predicted values is around 250 (measured in deciseconds).

y coordinates: predicted vs actual



- The mean of the predicted values is close to that of the given values.
- The time period of the actual values is around 300 while that of the predicted values is around 250 (deciseconds).

z coordinates: predicted vs actual



- The mean of the predicted is close to that of the given values. We initially had a problem since program was considering the center of the yellow sphere as the center of the workspace rather than the base of the yellow sphere. Now we taken the center of the base, which is still higher than the origin, thus the vertical misalignment.

- The time period of the actual values is around 300 while that of the predicted values is around 250 (deciseconds).

When the target is not detected...

In the case that the target is not visible to one camera, the robot will continue to move towards the new target position that is updated with the values visible to the other camera.

In the case that the target is not visible to either camera, the robot will move towards the old target positions.

If given more time, we could predict the target's movements by calculating its velocity and for the time that it is not visible, assume the values given by the velocity.

Thank You