Proof of Concept using low-cost camera

A Braload Mini Camera was purchase from Amazon

ORDER PLACED	TOTAL	SHIP TO	ORDERED BY
March 3, 2026	$21.72	BENJAMIN BACHRACH	BenBachrach@gmail.com

Delivered March 4

Your package was delivered. It was handed directly to a resident.

Braload Mini Camera, Nanny Cam for Home | Free Cloud & SD Storage, Works with/Without WiFi for Baby/Pet/Nanny Monitoring (Black)

Initial tests were done in my backyard.

The camera was positioned at the top of a 12 ft pole and connected by Wi-Fi to an iPhone 16e. One pallino, 1 red, and 2 dark green balls were placed inside a 3 ft square area.

The iPhone app O-KAM Pro was used to capture images.

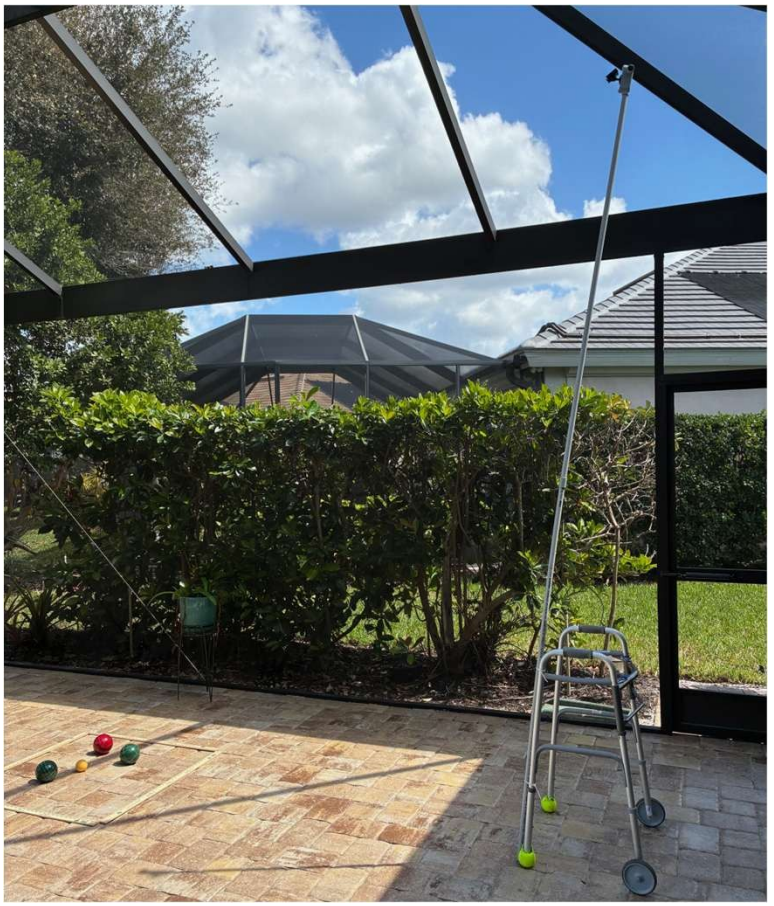


Image as received

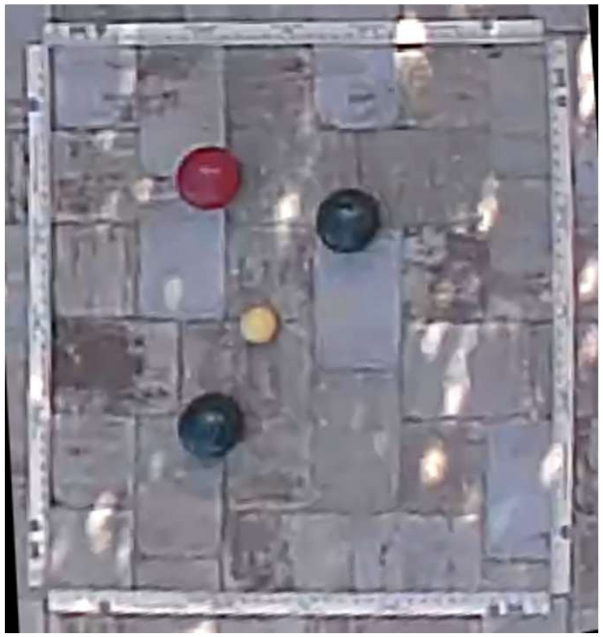
1920 x 1080 px

Cropped image
submitted to python

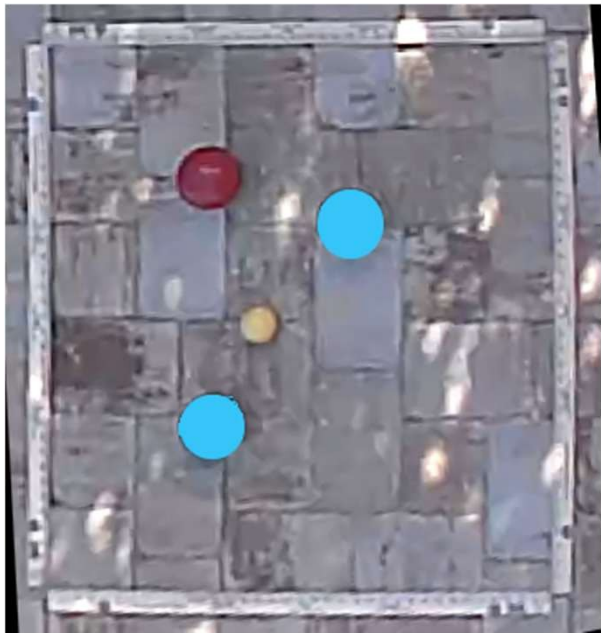
363 x 411 px

Using OpenCV in python, I could have cropped the image, but I saved a step and used GIMP.

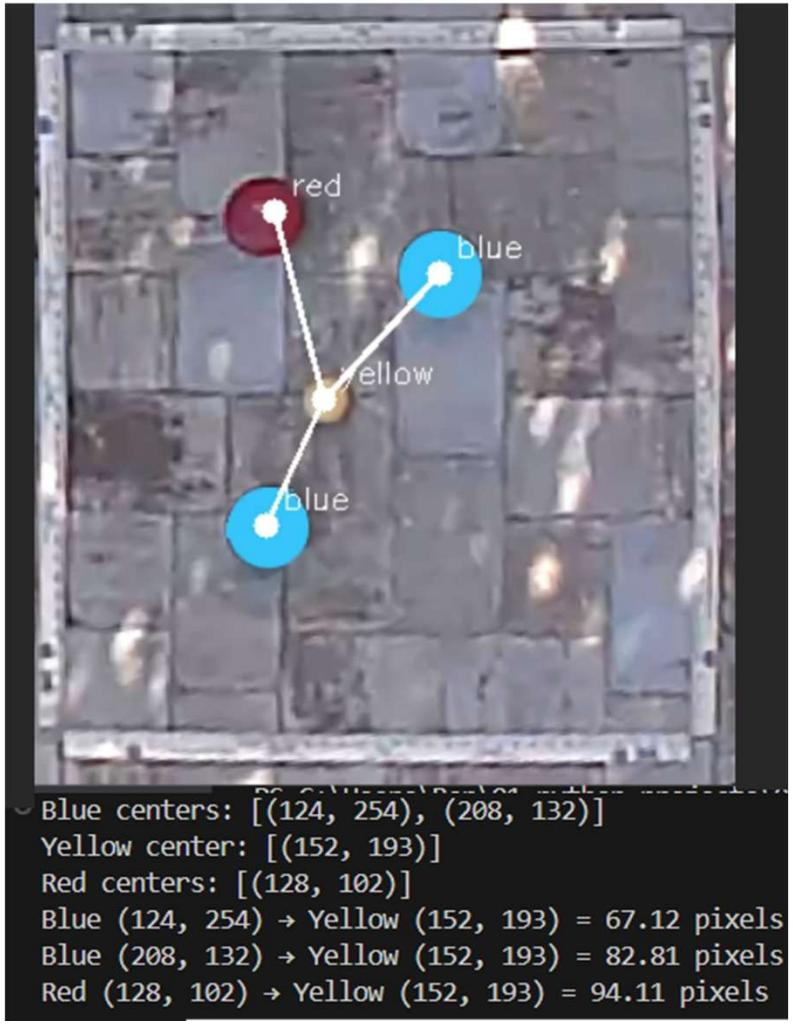
Using OpenCV, a homographic transformation was used to create a bird's-eye view. The dark green balls were too close to matching the background for OpenCV to easily identify them. Using GIMP, I changed their color before proceeding.



bird's-eye view from OpenCV



After color change



OpenCV was then used to identify the balls, and calculate the distances to the pallino.

Conclusion – Low cost cameras are all that is needed.
OpenCV on a laptop provides the necessary processing speed.

Next step – perform tests at bocce court to determine how many cameras may be needed, and if the color contract is sufficient for OpenCV