

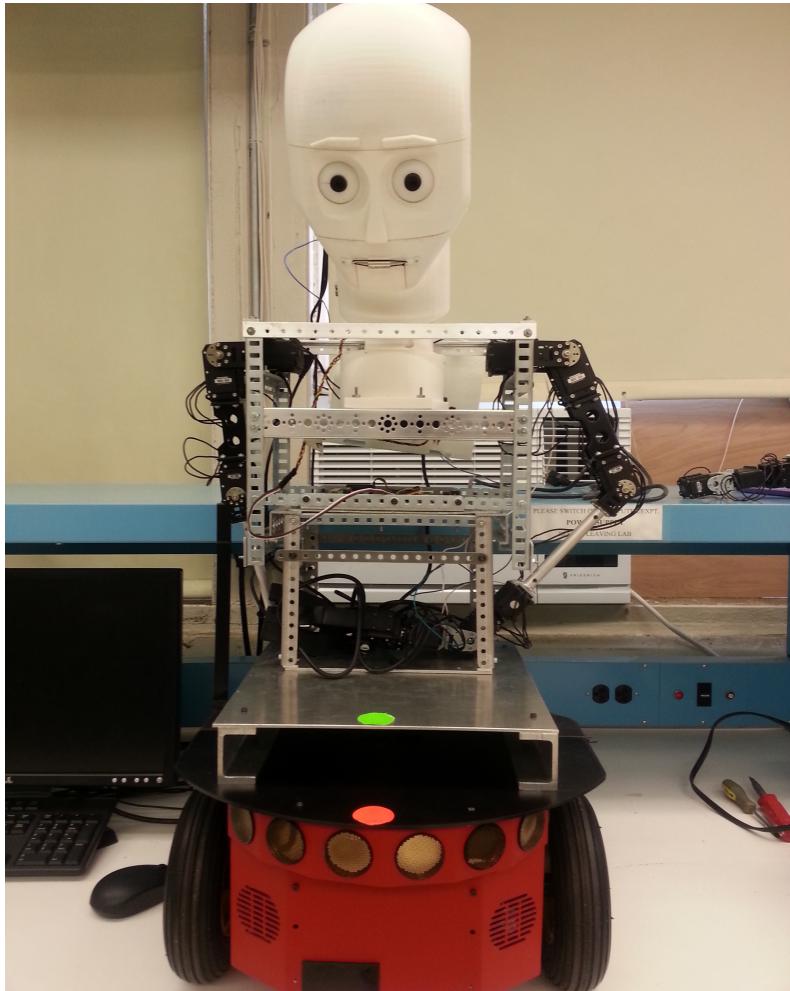
## Tracking and Distance Detection Methods for a Humanoid Robot

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### Research

#### **Title:** Tracking and Distance Detection Methods for a Humanoid Robot

Humanoid robots are robots with resemblance to qualities/features of the human body. These robots have two arms, two legs, a torso, etc. Some humanoid robots even have facial features resembling that of a human. Cellularly Accessible Expressive Semi-Autonomous Robot (CAESAR) is a humanoid robot in development at NYU-Polytechnic School of Engineering's Mechatronics and Controls lab. Currently, CAESAR's eyes consist of two cameras that are being used for tracking and distance detection of various objects. Open Source Computer Vision (OpenCV) is being used to design a program that allows CAESAR to find and track an object of a certain color and shape in its field of view, based on the user's request. The computer processes images that it collects from the camera; it then communicates that information to an Arduino. The Arduino Mega 2560 then communicates with the Arbotix-M to drive the motors to its desired location.



## Lesson Plan

### Title:Introduction to Physical Computing using Arduinos

Arduinos are an easy hook to engage students in STEM. Through the course of this lesson, students will apply a basic understanding of computer science and circuitry to develop simple “robotic” systems of actuators and sensors controlled by the Arduino board, a process known as physical computing. The students will first build simple setups and type up programs provided to them with clear instructions. Once they observe how the system functions, they then extend this basic understanding by modifying the original program and setup to accomplish new tasks. This 3-day lesson culminates in a design project where students build and present a novel simple robotic system using a variety of components, such as LEDs and photo-resistors.

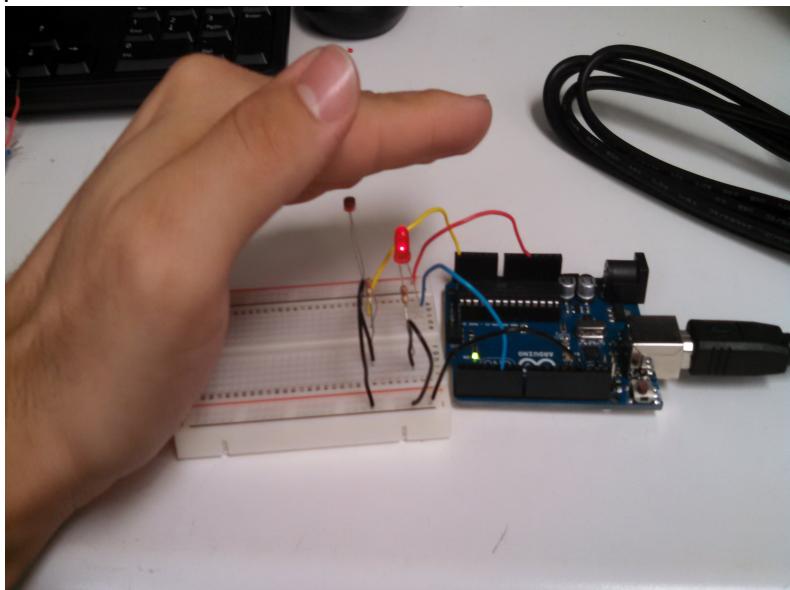


Figure: When the photo-resistor is covered, the Arduino lights the LED