



# Chappi: Autonomous Recovery Device

Students: Christopher Kobee, Angel Fabian, Juan Salgado

Supervisor: Dr. Amin Malek

## Introduction

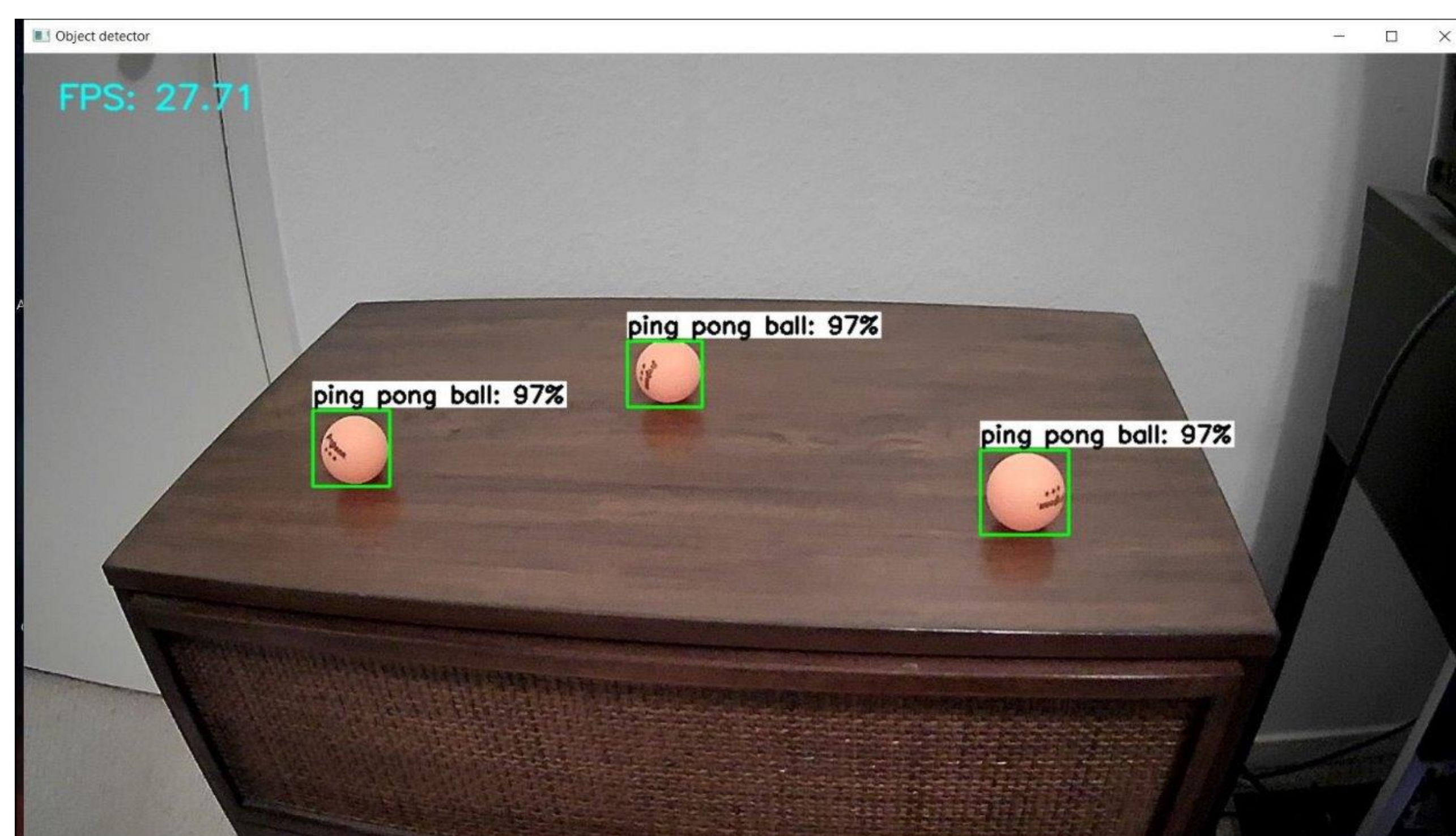
- The idea of Chappi started as we want to make a device that can be used to recover items without the need of human control. So, we decided to create the first version of this idea as a robot that retrieves ping pong balls.

## Benefits/Application

- Recover items with no need of human control.
- Saves you time and energy.
- Can be scaled up to retrieve larger items.
- Modified to pick up dangerous objects.

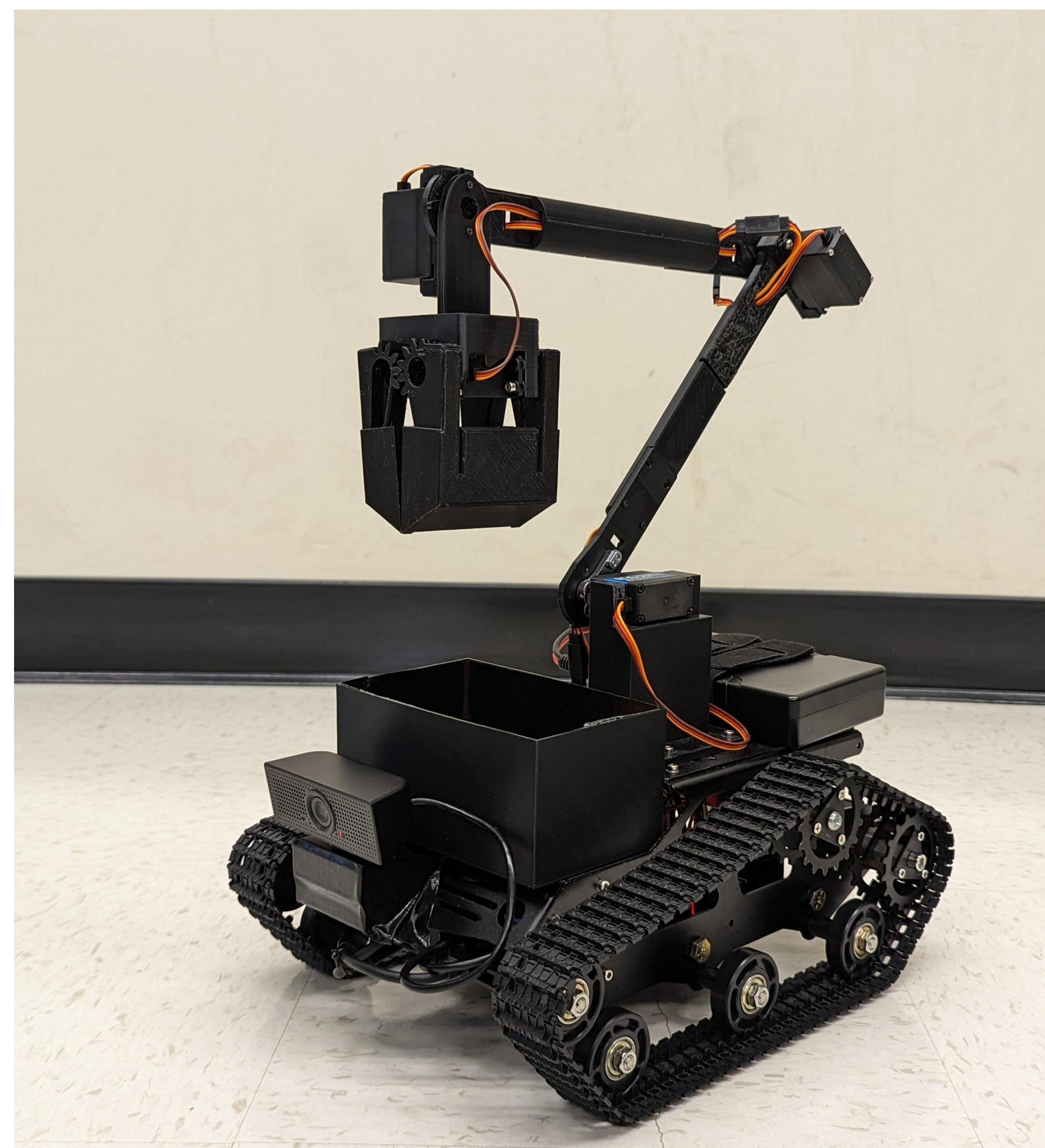
## AI Vision

- We trained a Tensorflow model on a ping pong ball dataset containing 700 pictures. We chose to use Tensorflow as it has a lite version of its runtime that can be used on single board computers like Raspberry Pi.
- The Raspberry Pi draws a bounding box around the detected ball, then grabs the x and y coordinates of the center of the bounding boxes and sends those coordinates to the Arduino.



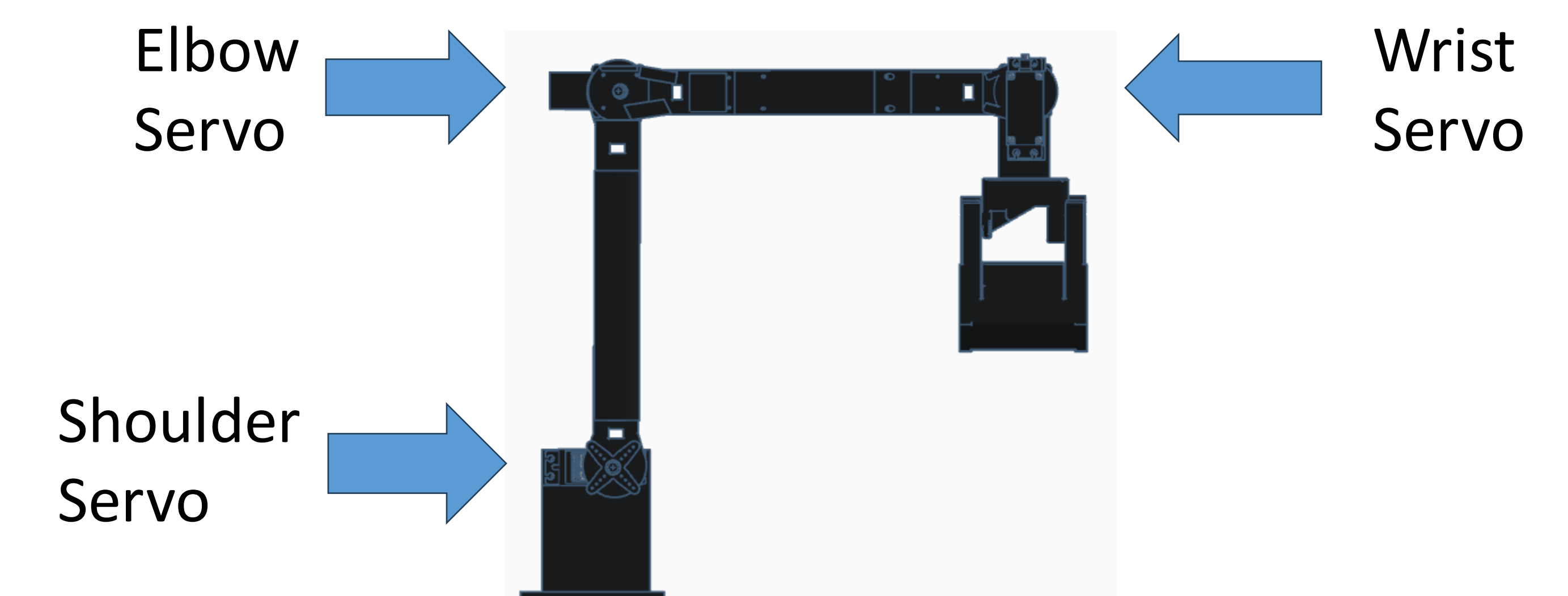
## Setup

- The tank chassis is the home of all the components.
- The movement of the Chassis and Robotic Arm is controlled by an Arduino Mega.
- The Arduino receives coordinates from the Raspberry Pi when a ping pong ball is detected and starts its approach. The Arduino constantly reads new coordinates to correct its course towards the ball.
- After arriving to a certain distance in front of the ball, the robotic arm begins to move.
- The robot arm will pick up the ball, then drop the ball in a basket located in the front of the chassis.

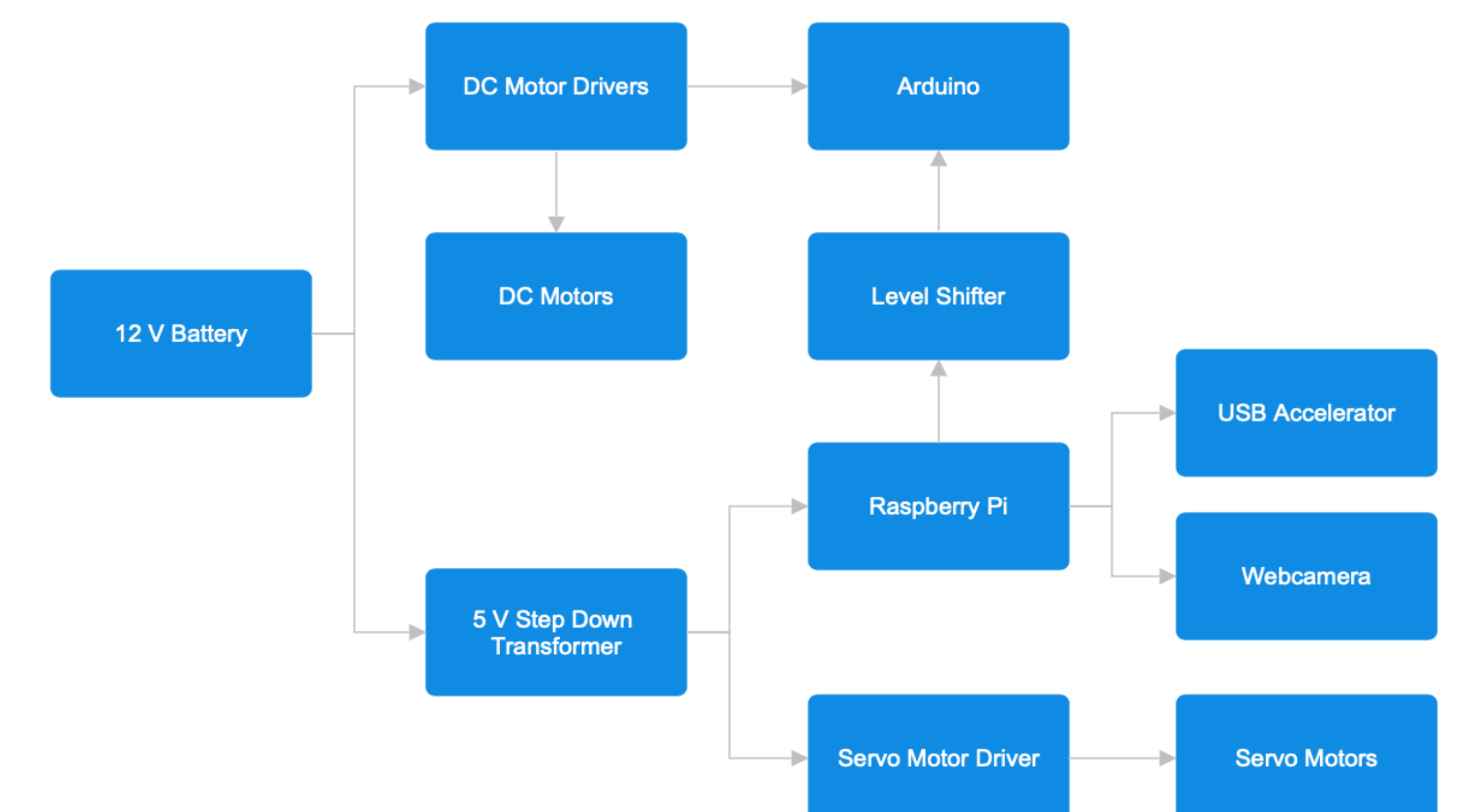


## Robotic Arm

- 3D printed using PLA Filament
- Four 180 Degree Servos
- Activates when in range
- Collect and Store
- Returns to Original Position



## Circuitry of Chappi



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