

Lab 8: Output Servo Motors

Description

Using a single servo motor, I built a crawler that can move forward mainly using the force from liquid momentum. Because I first thought of testing my work to racing, my primary goal was achieving efficiency and speed. As I thought of achieving efficiency, I thought it would be interesting to use natural force converted to the forward movement, and thought of using liquid momentum that is created when a water in a container is moved back and forth. If the servo motor provides general forward movement and the water container can accelerate the speed, I thought I could win the race.



First mockup failure

I first struggled to create the forward movement by having the servo motor vertically set up. Having a fork attached vertically, it did not quite create the forward movement that I expected and rather kept rambling in the same spot.

I then realized I can change the rotational movement to forward motion even with the servo motor placed horizontally. I used a clipper to hold the wooden chopstick to hold it to motor. I then attached a small plastic container filled with water on each end of the chopstick. With the rotation that servo motor creates, the liquid momentum moves the motor forward.

The result was not as ideal as I thought because it is not as smooth or fast as I thought. Instead of having servo motor move automatically, I need to deliberately control the rotation using potentiometer to make the motor move forward. I tested it on smooth wooden surface and towel as well. I also used clippers to shift the weight balance.



Side view



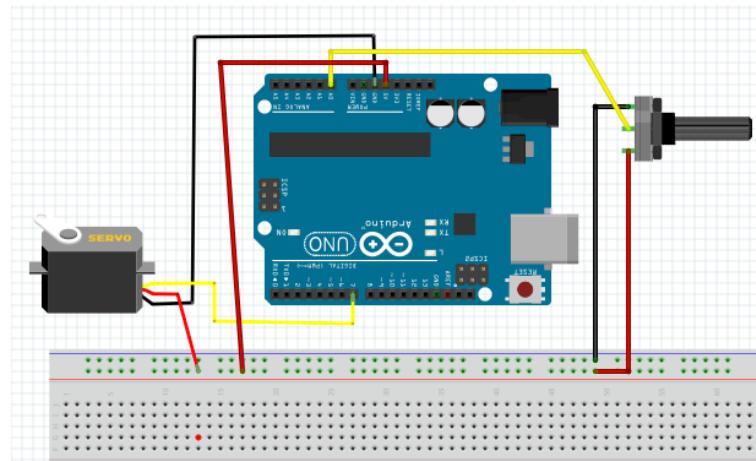
Front view



Testing on towel surface did not go well

Components

- 1 Arduino
- 1 Breadboard
- 1 Servo motor
- 1 Potentiometer
- 1 Wooden chopstick
- 2 Clippers
- 2 Plastic containers and water



Arduino Code

```
Servo myservo; // create servo object to control a servo

int potpin = 0; // analog pin used to connect the potentiometer
int val; // variable to read the value from the analog pin

void setup() {
    myservo.attach(9); // attaches the servo on pin 9 to the servo object
}

void loop() {
    val = analogRead(potpins); // reads the value of the
    potentiometer (value between 0 and 1023)
    val = map(val, 0, 1023, 0, 180); // scale it to use it with the servo
    (value between 0 and 180)
    myservo.write(val); // sets the servo position according
    to the scaled value
    delay(15); // waits for the servo to get there
}
```