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INFO C262

Lab 9: Output Simple Mechanics

Description

Instead of the regular “Cuckoo Clock” mechanics of a bird having move in and out of a door, we chose to build a garage door mechanism with a car moving out as the door would open. While the garage door was directly connected and synchronous in motion of the servo meter, a 3D-printed gear was attached to the servo meter to have additional linear motion. As the servo motor rotates, the garage door opens vertically, while the tooth of the gear rotations to create linear motion.

Construction

We followed the tutorial “Rotary to linear drive” to build the rotary piston-like mechanism to push and pull the car out of the door.

- We 3D printed the 2 gears, a smaller gear that would rotate inside of the larger gear.
- We 3D printed a holder for the two gears and a wheel with four spokes that would attach to the smaller gear.
- As the smaller gear would rotate inside the larger gear, a piston would be attached to gear inside. The piston would move linearly and convert the rotational motion of the gear and the wheel (that supports the gear) to linear motion.
- The linear motion of the piston would power the in-out motion of the frame to which the car would be attached.
- The rotational motion of the inner gear would ensure that coordinates of the point at which the gear is attached to the piston, would only increase/decrease along one axis (horizontal) while it would remain constant along the vertical axis.
- The servo motor would drive the wheel which would in-turn drive the inner gear and push the car ahead and pull it back.
- The motion of the servo motor would be from 0-90 degrees and back.
- This would be attached to a shaft that would control the motion of the door.
- As the servo motor goes to 90 and pushes the door up, it also pushed the car out and this ensures synchronicity between the two.

Reflection

- As we could not use the laser cutters because they were not functioning, we had to resort to using 3D printing for the gears. However, the material of the 3D printed parts was granular and did not allow smooth movement.
- In hindsight, it would’ve been more appropriate to use laser cut gears.

Components
1 Arduino Board
1 Bread Board
Jumper Wires
1 Servo motor
2 3D printed gears
1 3D printed wheel holder
1 3D printed wheel
1 Shaft
1 Piston
1 Rectangular cut wood-piece

Arduino Code

```
/* Servo Sweep

 just makes the servo sweep back and forth repeatedly

#include <Servo.h>

int servoPin = 7; // pin for the servo motor

Servo myservo;  // create servo object to control a servo
// twelve servo objects can be created on most boards

int pos = 0;    // variable to store the servo position

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

void loop() {
  for (pos = 0; pos <= 180; pos += 1) { // goes from 0 degrees to 180
degrees
    // in steps of 1 degree
    myservo.write(pos);              // tell servo to go to position
in variable 'pos'
    delay(15);                       // waits 15ms for the servo to
reach the position
  }
  for (pos = 180; pos >= 0; pos -= 1) { // goes from 180 degrees to 0
degrees
```

```
    myservo.write(pos);                 // tell servo to go to position
in variable 'pos'
    delay(15);                          // waits 15ms for the servo to
reach the position
  }
}
```

Photographs