

Humanoid Hand

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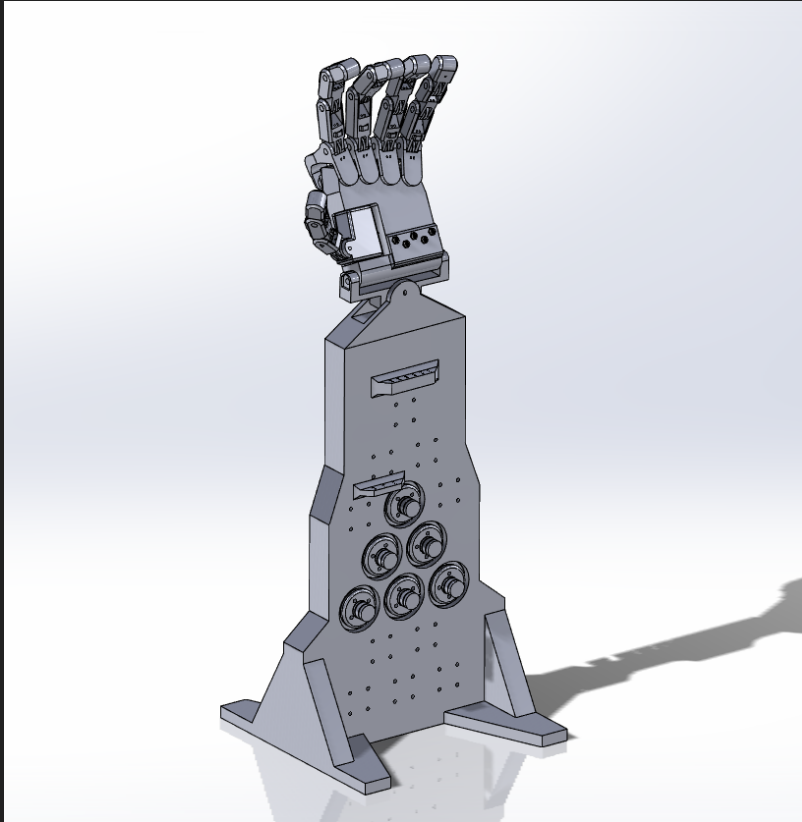
Project Description

A robotic hand that matches the capabilities of the human hand

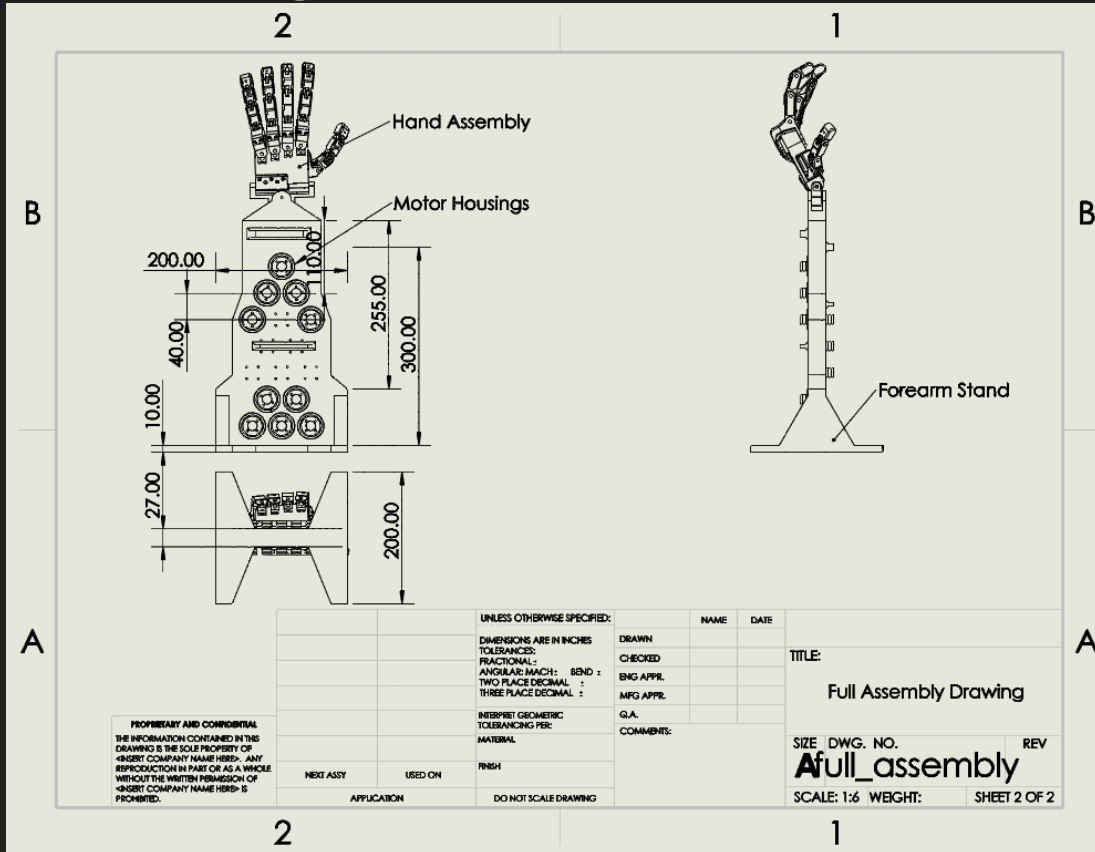
Sponsored by:
Dr. Zach Lerner
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Final CAD - Model



Final CAD - Drawing



Final BOM

Part	Quantity	Price	Total Price	
Motor				
iPower GM2804 Gimbal Motor w/ AS5048A Encoder	15	42.97	644.55	
Servo Motor	6	8.99	53.94	
3D Printed Parts				
PLA Prototyping Filament	1	14.99	14.99	
Onyx Filament	1	209.00	209.00	
50cc Carbon Fiber Spool	1	150.00	150.00	
Hardware - Computation				
Raspberry Pi	1	0.00	0.00	
Teensy 4.1	2	31.50	63.00	
Breadboard	1	6.49	6.49	
Wire	1	19.13	19.13	
Hardware - Actuation				
Dyneema Cord	1	32.99	32.99	
Bearings	25	1.05	26.25	
Potentiometer	11	1.08	11.88	
Bowden Tube (1m/piece)	2	6.83	13.66	
Hardware - Fasteners				
Lock Nuts (Pack of 25)	1	9.50	9.50	
M3x30 Screw (Pack of 50)	1	7.85	7.85	
M3x14 Screw (Pack of 50)	1	7.90	7.90	
M3x8 Screw (Pack of 100)	1	8.00	8.00	
M3x6 Screw (Pack of 50)	1	8.45	8.45	
ESTIMATED PRICE				
	\$		1,287.58	

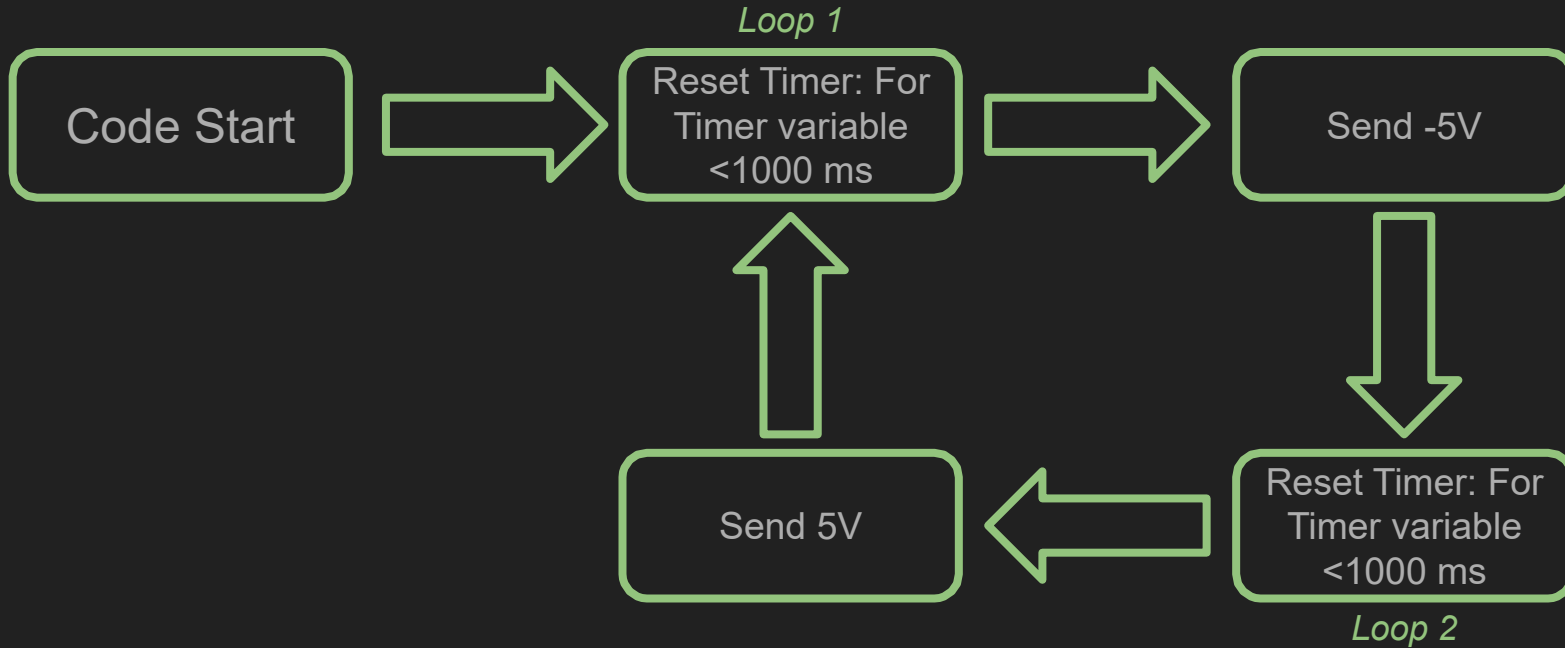
Virtual Prototype - Code Breakdown

> Void loop sets up constant loop

- First loop controls closing motion
 - For timer variable is less than 1000 milliseconds
 - Send negative voltage signal
- Second loop controls opening motion
 - For timer variable is less than 1000 milliseconds
 - Send positive voltage signal

```
98 void loop() {  
99  
100     // main FOC algorithm function  
101     //motor1.loopFOC();  
102     //motor2.loopFOC();  
103  
104     // Motion control function  
105     for (int timer; timer < 1000; timer++) {  
106         motor1.loopFOC();  
107         motor1.move(-5);  
108         delay(1);  
109         //motor2.move(-5);  
110     }  
111  
112     for (int timer; timer < 1000; timer++) {  
113         motor1.loopFOC();  
114         motor1.move(5);  
115         delay(1);  
116         //motor2.move(5);  
117     }  
118 }
```

Virtual Prototype - Flow Chart



Physical Prototype



Thank You