Prototype Testing Plan #2

RoboSaw

By

Team 35

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<u>Required Materials:</u>

Hardware:

- Metabo HPT 10-Inch Compound Miter Saw

- Torsion Spring

- RoboSaw Intake Mechanism

- RoboSaw Turn Table Mechanism

- RoboSaw Wood Stock Clamping Mechanism

- Nema 11 Dual Shaft Stepper Motor

- Nema 17 Dual Shaft Stepper Motor

- Raspberry Pi 4

- DRV8825 Stepper Motor Driver

- 24V 5A DC Power Supply

- 1000 CPR Optical Rotary Encoder

Software:

- Stepper motor control script

- Computer vision software

- Camera calibration software

Goals:

For this round of testing we plan to demonstrate that the motor control works, the computer vision works, the device functions as intended, and hopefully we will demonstrate that the control loop works to some degree of accuracy.

Set up:

1. Place the robosaw on a sturdy surface.

2. Clear the workspace of obstructions.

3. Connect the motor drivers, raspberry-pi, camera, and light.

4. Power on the device.

Testing procedure:

1. Demonstrate that all the motors work.

2. Demonstrate that the camera is detecting the desired lines.

3. Demonstrate the calibration scripts if time allows.

4. Finally demonstrate the feeding mechanism and blade lowering mechanism with:

   a. First a 2x4 piece of wood measuring about 4 feet in length.

   b. A 2x6 piece of wood 8ft. Long.

   c. Finally the behemoth 4x4 8ft. Stock of prime fir.

5. For each piece we will move the wood over, stop when the line is under the camera, then move it so the line is under the blade and lower the saw.

For safety and cleanliness we will not demonstrate the cutting action with a spinning blade. The blade has been removed in order to demonstrate the complete range of motion.

Measurable criteria:

- Everything powers on correctly.

- The wheels are able to move each size of wood without too much slippage. Some slippage is expected and unavoidable.

- The CV program identifies the intended line and only the intended line. False positives should be considered an error. Missed detections are expected and are easily accounted for with the PID motor control loop.