

PROJECT SUMMARY

INTRODUCTION

The system operates as a two-axis robotic arm which draws a variety of different shapes based on user input from a Python GUI. The robotic arm is able to move at a speed of at least 4 inches per second while drawing a variety of different shapes including a horizontal line, a vertical line, a triangle, and finally a quadrilateral. When testing the horizontal line, the robotic arm can draw a 10 inch line (+/- 0.25 inches).

SPECIFICS

The robotic arm has two rotating joints to control the arm movement, which is most similarly related to SCARA Topology. The arm rotates via pulleys and belts and is held together with acrylic. The custom PCB acts as a CNC shield to interface the Arduino Uno and the stepper motors. The two axis robotic arm is controlled, as stated before, using G-code commands. The user input, which determines the shape to be drawn, sends pre-built G-code commands to the driver and moves the arm according to the input. The system is also capable of testing out a variety of different writing tools including a crayon, marker, pen, and a pencil. Once the robot completes its movement and the drawing, the coordinates that the robotic arm moved is output on an E-INK as a visual confirmation that the arm moved that amount of inches in either the X or Y direction. The original system only required the testing of a line, but the robotic arm is also able to draw either a triangle or a quadrilateral (square) if prompted from the Python GUI. The system is also able to reset the E-INK display as well as any other garbage data that is provided from the robot by pressing the 'RESET' option on the Python GUI.