

Abstract

Pen Plotters (also known as XY plotters) are specialized 2D CNC graphic plotting machines. This project focuses on the development of an Image Visualizing Pen Plotter that can take an image in any format and convert it into drawable shapes using advanced image processing techniques. The system processes the image through a comprehensive software pipeline employing modern technologies compatible with both mobile and web interfaces, and is powered by a Raspberry Pi.

The hardware component of the plotter includes two stepper motors and one servo motor connected to an Arduino Uno. These motors control the movement of a gondola mounted on stainless steel rods, enabling precise movements along the X and Y axes. The drawing device is affixed at one end of the Y axis.

The system's software pipeline involves several stages: capturing the image, converting it to a vectorized line drawing, transforming the vector drawing into G-code, and transmitting the G-code to the plotter. The pipeline is accessible via a user-friendly web/mobile interface, which allows users to upload images, crop them as needed, and preview the resulting drawable shapes before initiating the plotting process.

Overall, this project demonstrates the effective integration of hardware and software to automate the process of transforming digital images into physical drawings, showcasing the practical application of CNC technology in creative and technical fields.