Robotic Arms

Professor Smith
PDS300 Production Studios
University of Advancing Technology
Tempe, Az

Designed by Koch V1
Built By Robotic Arms PDS Team
Led by Alexa Tuchtenhagen

What is *Robotic Arms?*

Project Overview

Robotic Arms is a project I led through Production Studios where my team and I designed, built, and programmed a pair of robotic arms — one acting as the “leader” and the other as the “follower.” Programmed in Python, the system allows one arm to be trained to complete tasks by mirroring the movements of the other. We 3D-printed parts, assembled the hardware, and followed the Koch V1 platform as our entry point into AI-driven robotics. Along the way, we fundraised (yes, aggressively — baked goods were harmed), learned new fabrication and programming skills, and presented the system at Nerdtoberfest at PADT after a chaotic yet hilarious final-day including hardware malfunction.

Goal

Our goal with this project is to step into the future of AI in robotics one arm at a time. Robotic companies like REVOBOTS are starting to make robots that learn from being shown how to do something instead of being hard coded. We want to take the first steps into learning how these robots work by building one ourselves.

Team

Lead: Alexa Tuchtenhagen
Programmer/Fabricator: Sean Johnson
Fabricator: Eloy Fernandez
Baked Sale coordinator: Ethan Nguyen
Programmer: Alexander Garcia

Bill of Materials

Lead Arm

- Yellow PLA
- 6 Dynamixel XL330-M077-T
- 1 XL330 Frame and Idler Wheel 4pcs set
- 1 Waveshare Serial Bus Servo Driver Board
- 5V Power Supply
- Jumper Wires
- Table Clamps
- USBC-C

Follow Arm

- Red PLA
- 2 Dynamixel XL430-W250-T
- 4 Dynamixel XL330-M288-T
- 1 XL330 Frame and Idler Wheel 4pcs set
- 1 XL430 Idler wheel set
- 1 Waveshare Serial Bus Servo Driver Board
- 1 Voltage Reducer
- 12V Power Supply
- Jumper Wires
- Table Clamps
- USBC

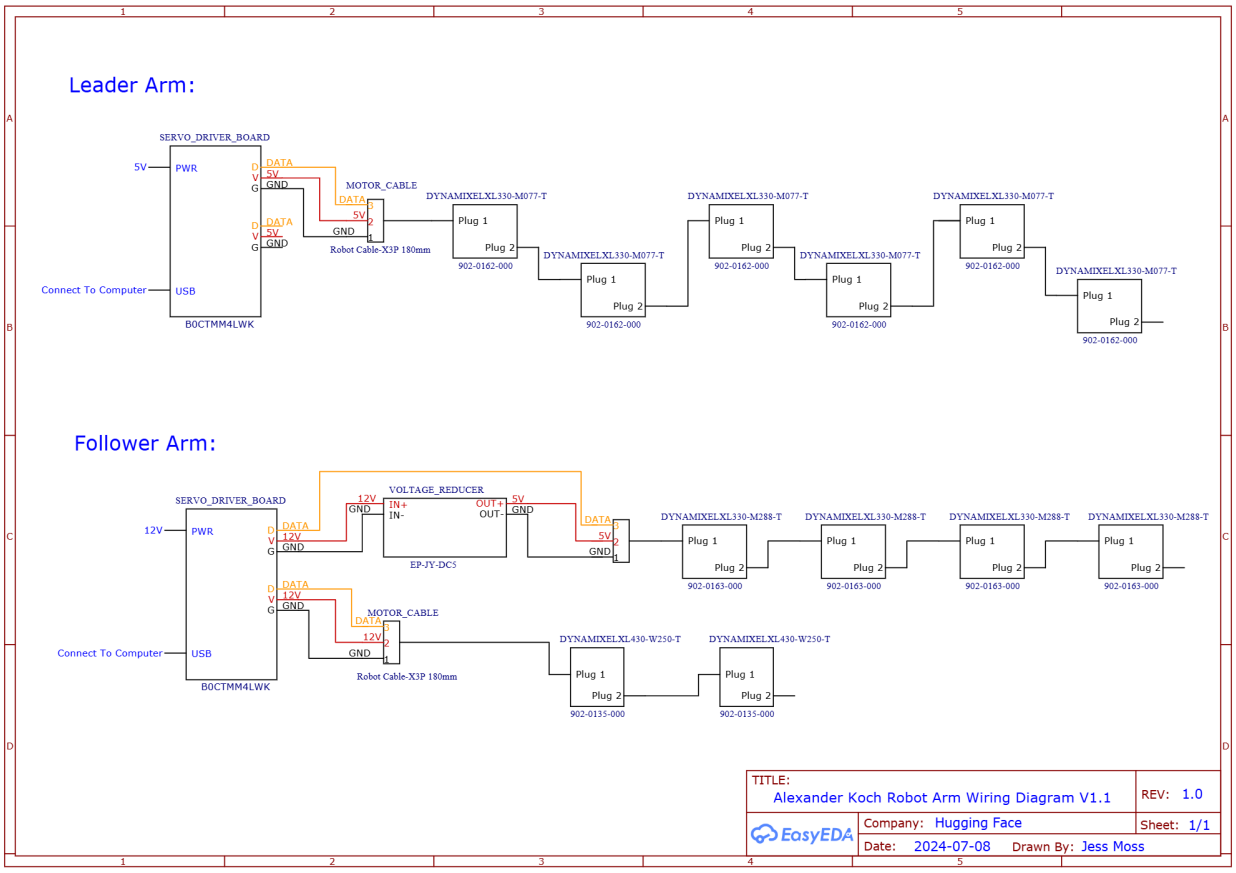
What went well?

Although this project came with challenges, our team created our own path forward. When external support was limited, we built our own momentum — organizing three fundraisers that successfully covered over half of the project costs and establishing funding resources for future Production Studio teams. Through the hands-on process of building, printing, coding, and troubleshooting, we grew not only in technical skills but also as a team. We became a tight-knit group that still supports each other beyond the project. Despite the stress and late nights (and questionable amounts of sugar consumption), we had fun, learned a ton, and created something we're proud of.

What could be changed?

Time management was the biggest challenge for this project. Since we had to fundraise for our own project, we ended up running out of time toward the end. In hindsight, it would have been better to dedicate the first five weeks to building and the remaining ten weeks to programming and testing. We also experienced hardware setbacks, burning out multiple motors—including right before Nerdtoberfest and just a week before our Production Studios presentation. Despite a last-second mishap during the presentation, we pulled through. Additionally, a few team members temporarily "fell off the side of the planet," but don't worry—we found them.

Schematic



Other Documentation

[Koch V1 Github]

[Pitch]

[Milestone 1]

[Milestone 2]

[Milestone 3]

[Robotic Arms Test Video]

[Robotic Arms Program Video]

[Robotic Arms]