ModuGrip

Final Demonstration

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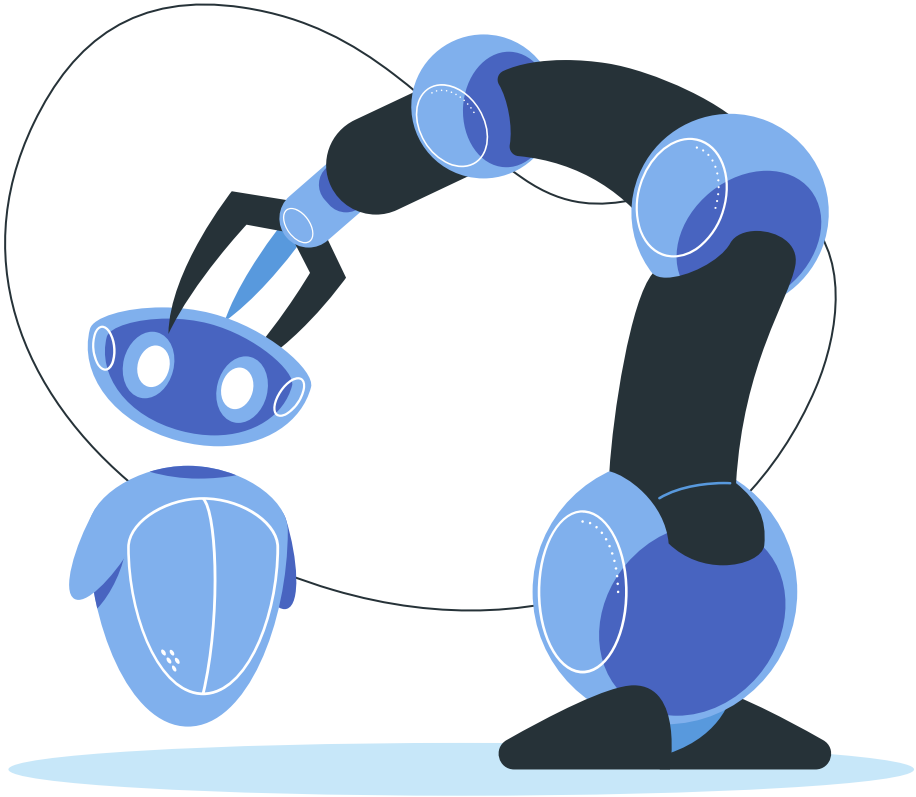


What is ModuGrip?

ModuGrip is a 3-DOF robotic arm with a modular end-effector system.

How it works

1

Web App

The user interacts with my NextJS web app to control the robot

2

Ubidots

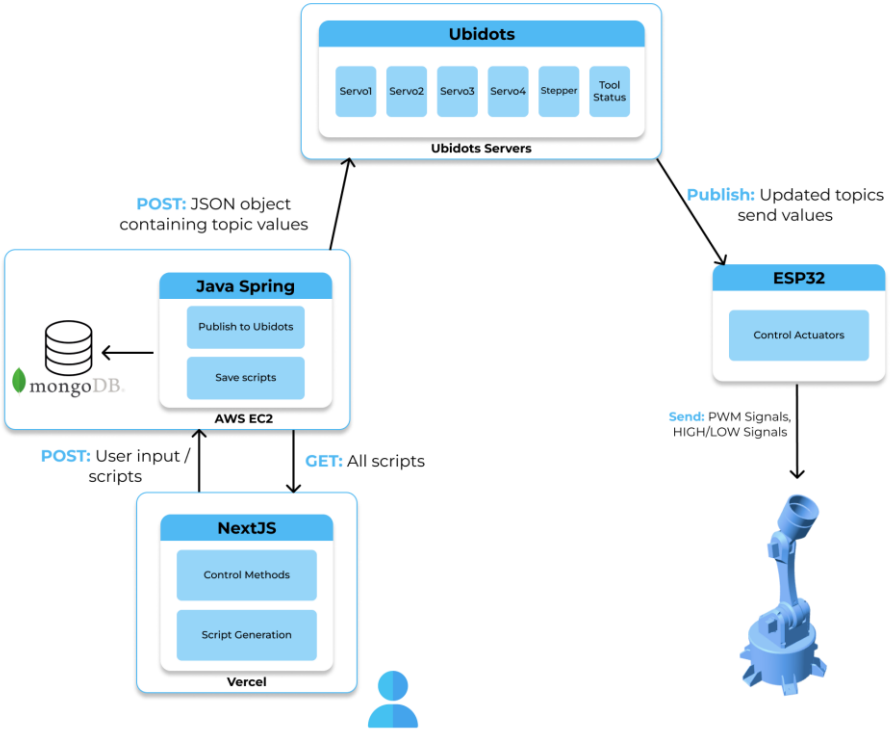
Topic values are published to Ubidots

3

ESP32

Subscribes to Ubidots topics and updates actuators

Project Architecture



Technologies Used

Software

NextJS

React Three Fiber

Java Spring Boot

MongoDB

Hardware

ESP32

3x High Torque Servos

2x Low Torque Servos

1x Electromagnet

1x Unipolar Stepper Motor

1x Geared DC Motor

Tools

Fusion 360

Sovol SV06 Plus

Sovol3D Cura

AWS EC2

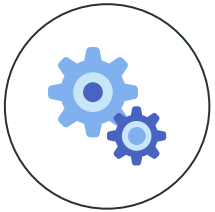
Vercel

Ubidots

Organisation

Daily Logs

I filled in my log template to set my intention and keep track of problems



Jira Kanban

Dynamically switch between tasks.
I always know what the next step is.

Interesting Areas

Inverse Kinematics

Maths to convert coordinates to joint angles.

R3F Virtual Model

Rendering and animating the virtual robot.

UI Design Choices

Floating buttons, script timeline, virtual model.

End Effectors

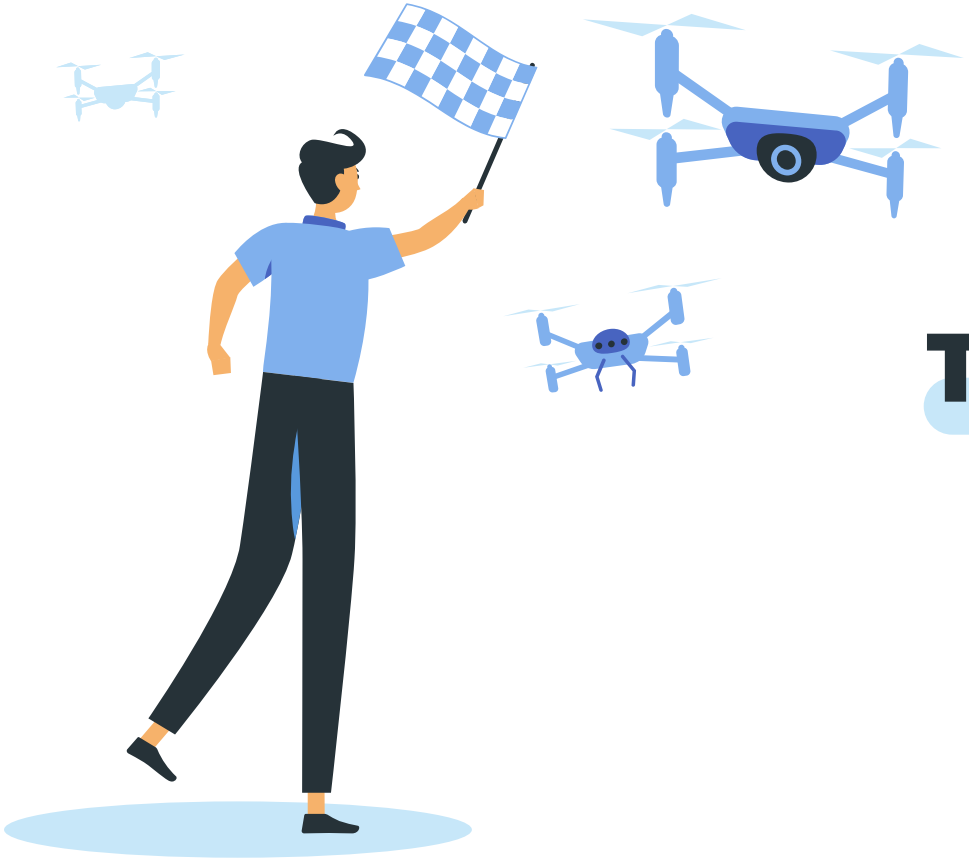
Quick release mechanism, circuit design.

Torque Problems

How did I ensure the shoulder joint was strong enough?

Disasters

3D printer malfunction, dropping robot, current limiter.



Time to Demo