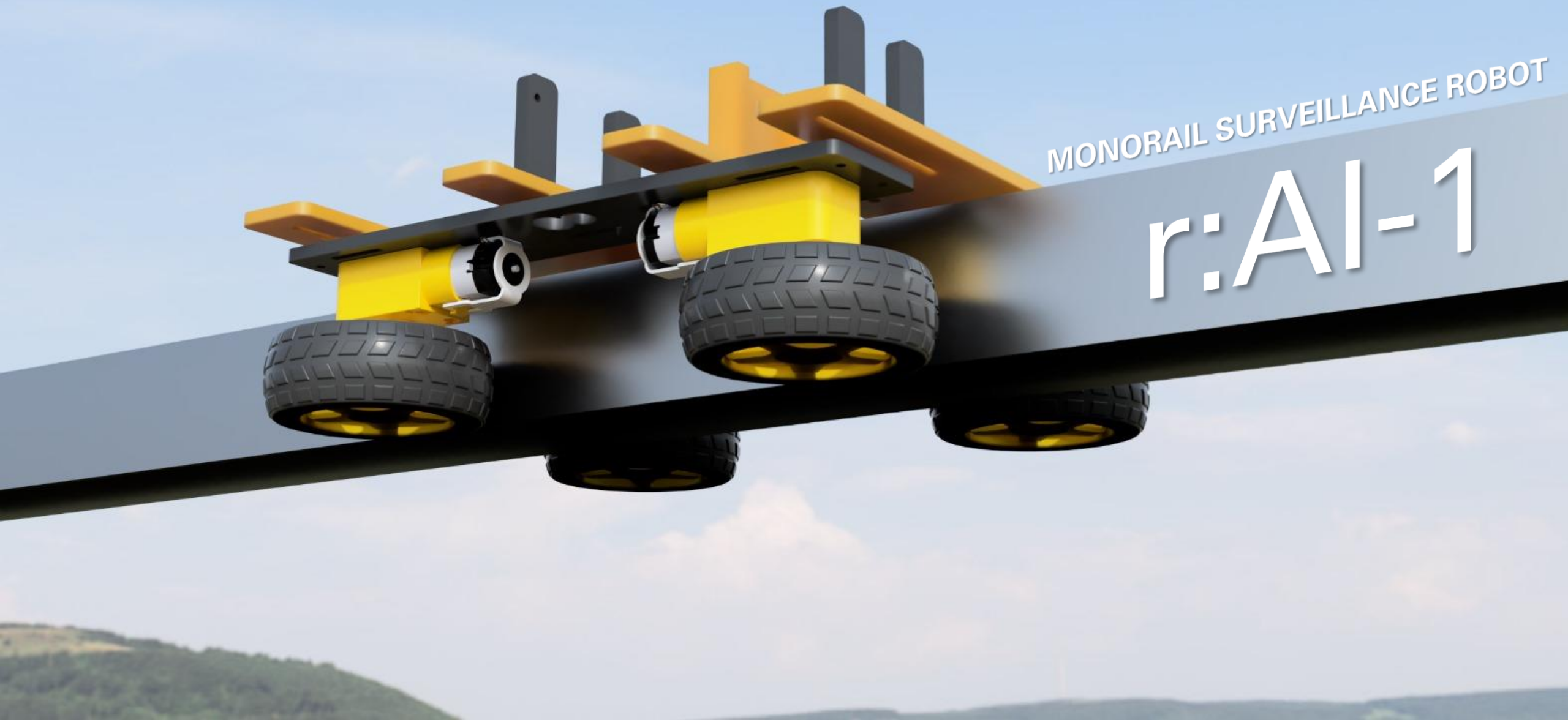


MONORAIL SURVEILLANCE ROBOT

r:AI-1



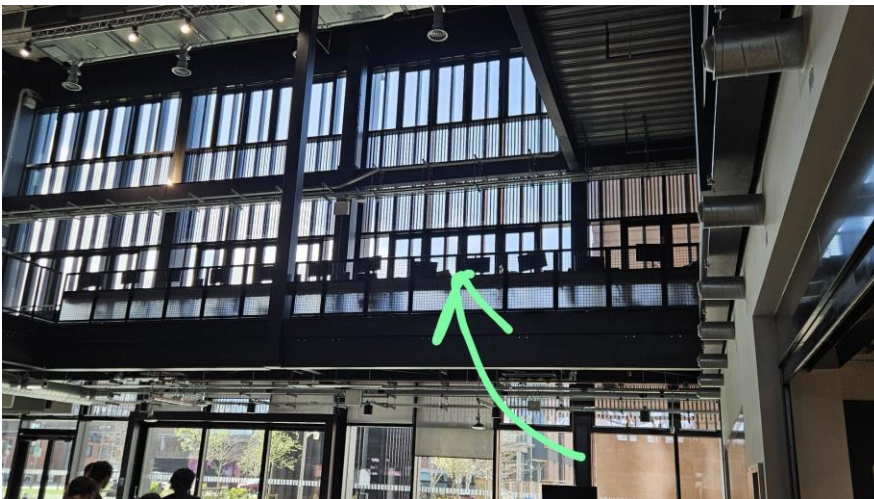
# FEATURES

- Server-based remote surveillance
  - Server-based remote control
- Automatic AI Object Detection
  - Wall Detector
  - Variable Rail Diameter
- Custom Hardware Design

# The possibilities are endless

Engineering Building - Interior:

- Works on the any of the black rails
- Monitor empty seats & computer usage
- Monitor number of people on Spanish steps / Event Space

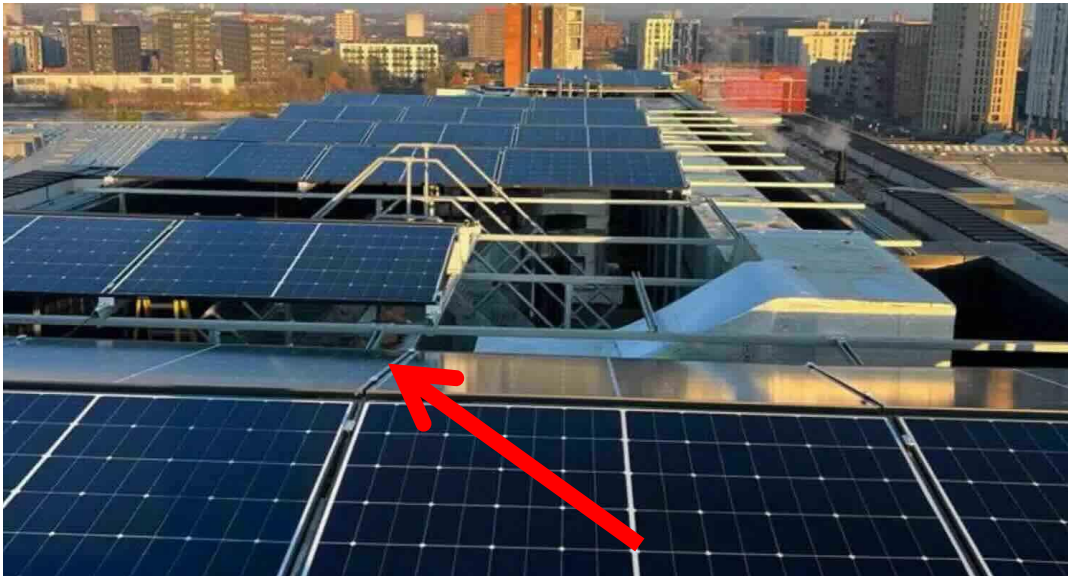




# Other Use-cases

## Engineering Building - Exterior:

- Monitors solar panel condition with custom model
- Remotely alert maintenance if faults detected



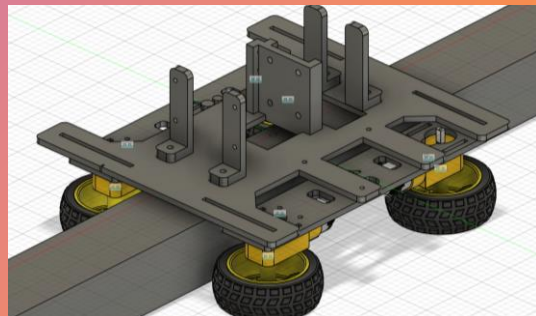
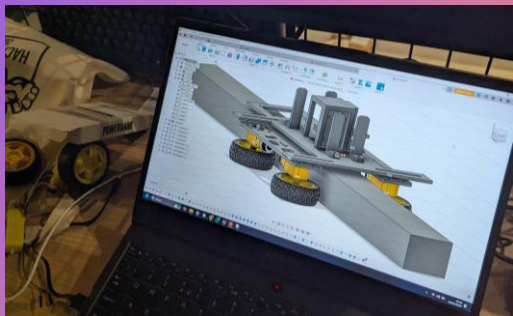
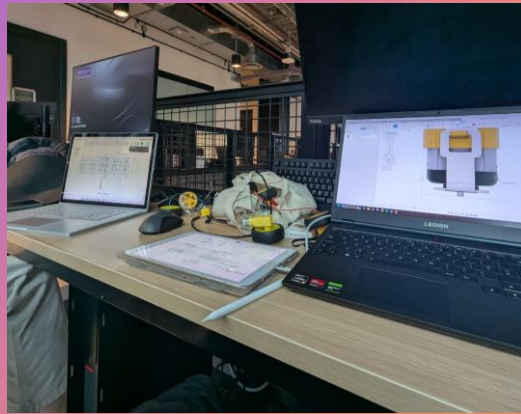
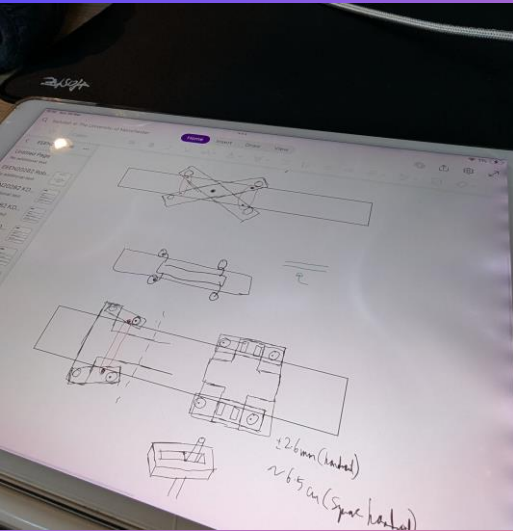
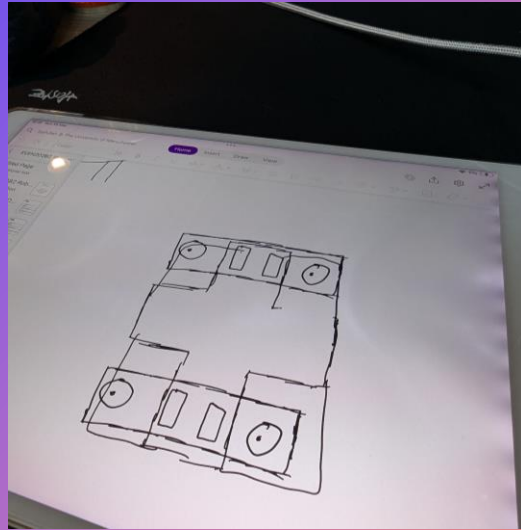
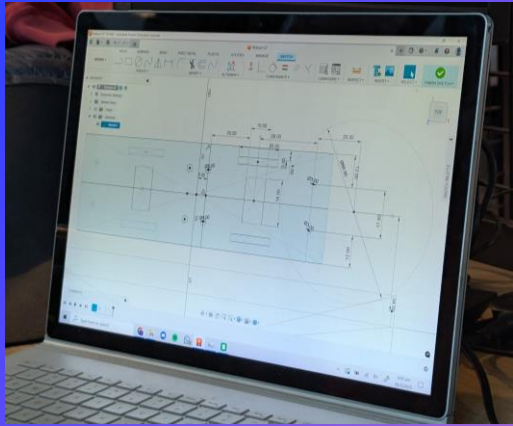
DEMO

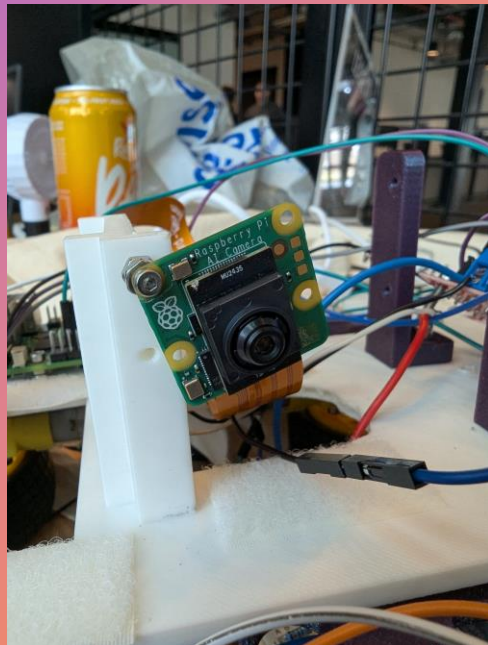
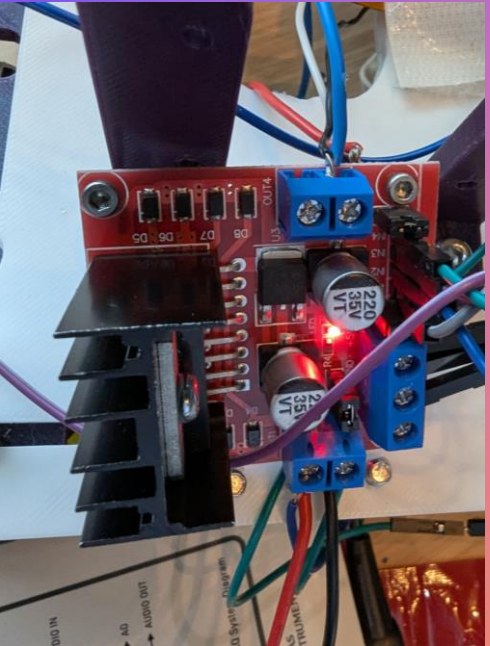
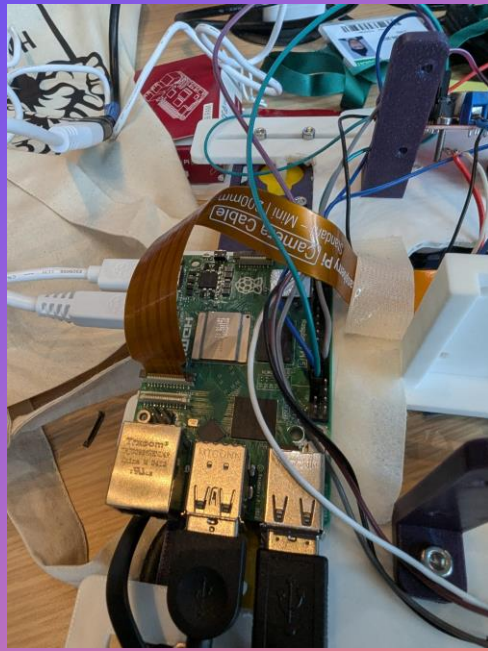
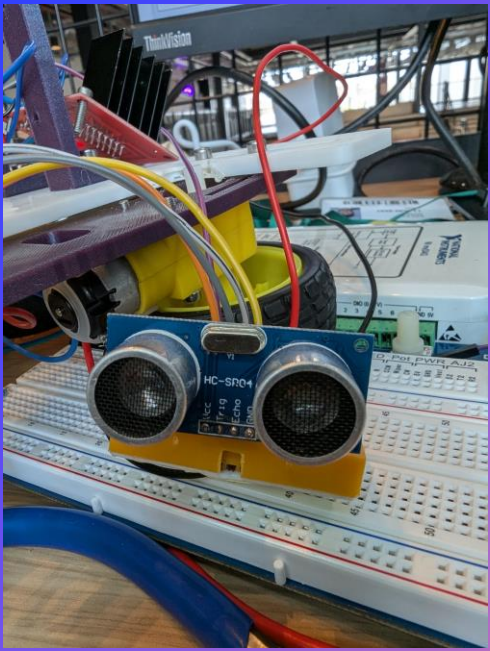




# CAD design

- Sketched initial ideas on iPad — scissor mechanism rejected due to lack of space for components.
- Chose a slot-based design for stability and simplicity.
- Added nuts and bolts to make the slots adjustable for different rail widths.
- Modelled in Fusion 360, iterated to fit components and reduce material.
- Split design into parts to meet the 4-hour print time limit.
- Printed in sections and assembled after testing fit and function.





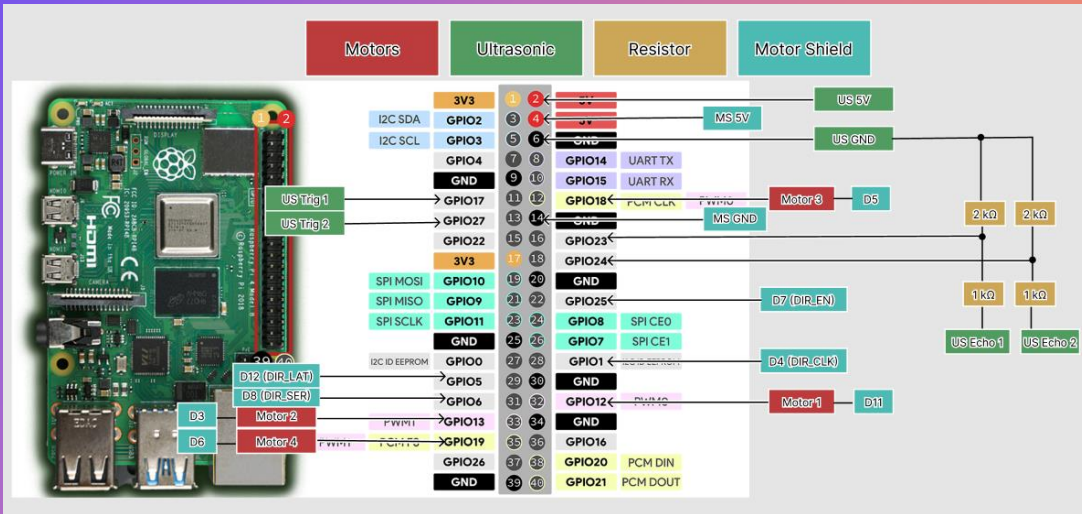
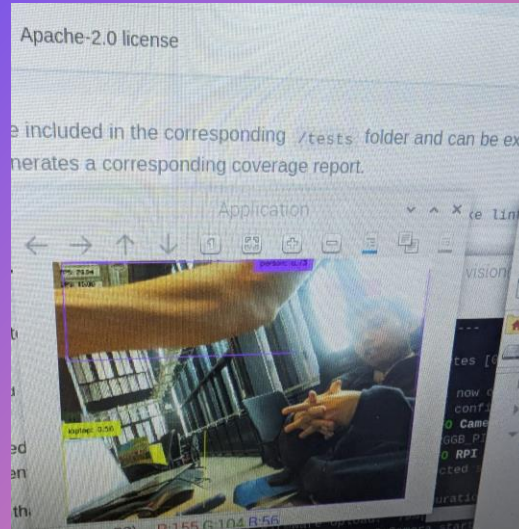
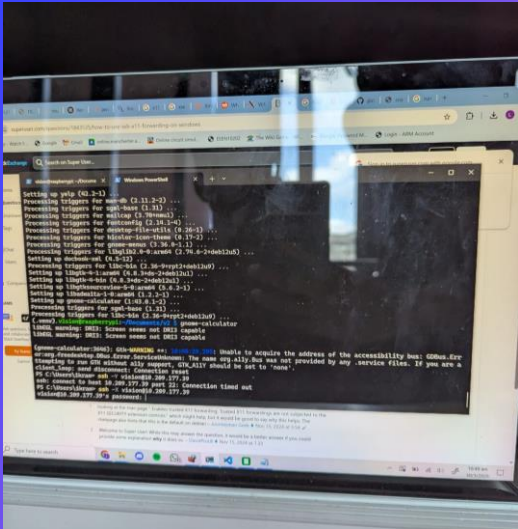
# Hardware

- Raspberry pi 5 + AI Camera with the IMX500
- Ultrasonic HC-SR04 sensor
- 12,000 mAh power bank
- L298N Motor Driver Module
- 4 DC motors
- 2 wheel castors



# Programming

- Web server code – Flask + Websocket Python App
- AI camera code – OpenCV + Sony API
- Client-side code: JS data parsing and image streaming
- File storage functionality





# IMPROVEMENTS

- Full Components Utilised
- Quick-Release Mechanism
  - Weight Reduction
  - Phone App Control
- Weather & Tamper-Proofing

**THANKS FOR  
LISTENING**

