



SDP Group 14 Demo 3

06/04/2022

WHAT IS RECYCLED?

WHAT IS RECYCLED?

RecyclEd is a robot that takes recyclable materials from users, sorting them into their respective category bins using image recognition



Glass bottles



Plastic bottles



Aluminum Cans

WHY US?

Current garbage disposal system in Edinburgh



At present, only **46%** of household waste is recycled in Britain.

This is significantly lower than other European countries (eg. Germany has a recycling rate of 67%)

Value Proposition

We Support the Scotland Zero Waste Initiative

The Scottish Government is targeting a 90% collection rate for eligible items (plastic bottles/ aluminium cans/ glass bottles...) by 2024

The adoption of our efficient and easy to use RecyclEd robots will help in achieving this goal



Our system

In addition to the current system:

Recyclable bottles/cans



Normal bins



Vending machine like
smart robots

Our advantages

A local product

Less costly than our competitors

On the ground maintenance

Coupons to reinforce the user behaviour

Robot can be embedded in the walls/ground to minimise the use of floorspace

Deploying 101
RECYCLING ROBOTS
in the city of
Edinburgh
By the end of 2025

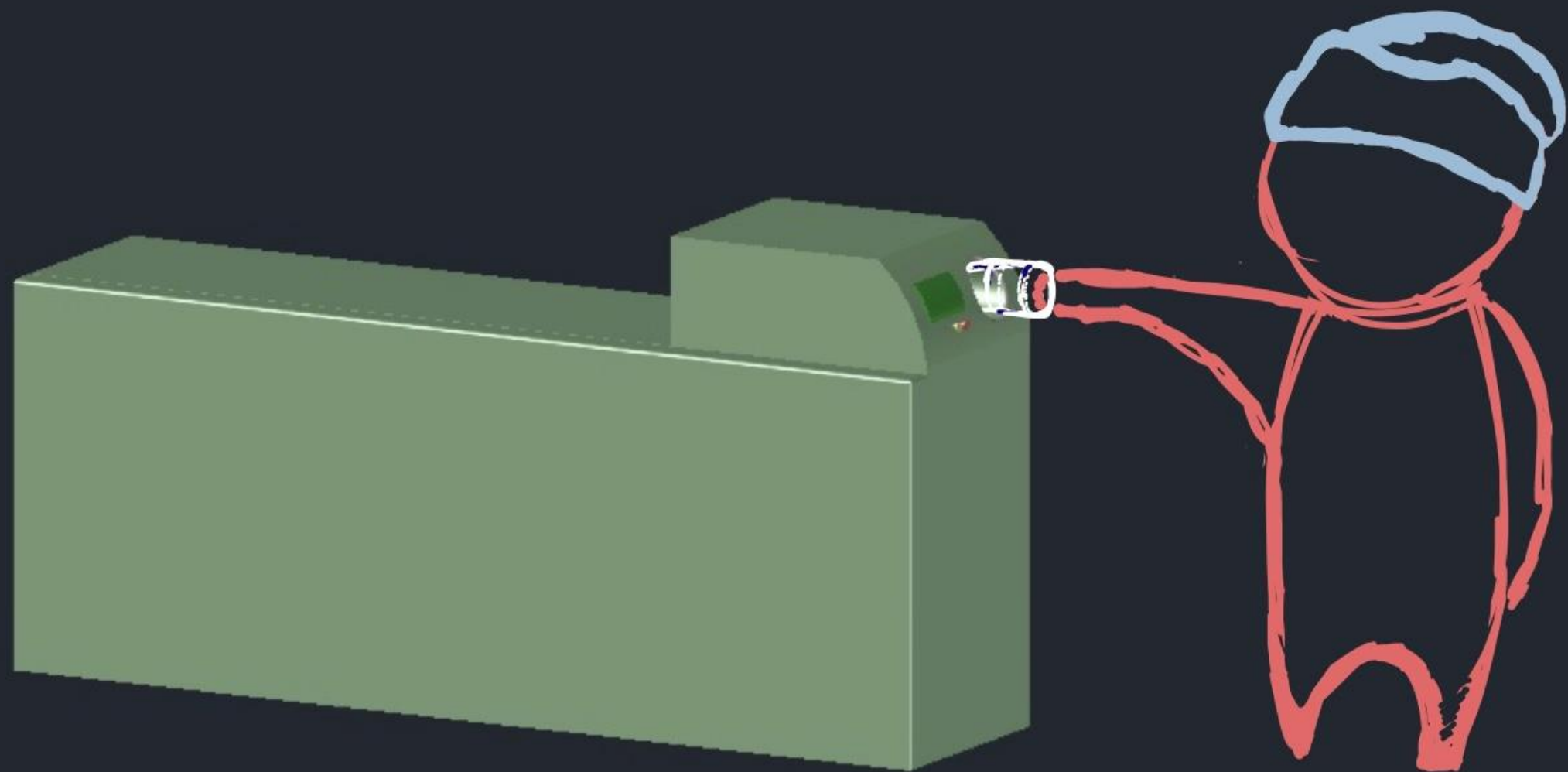


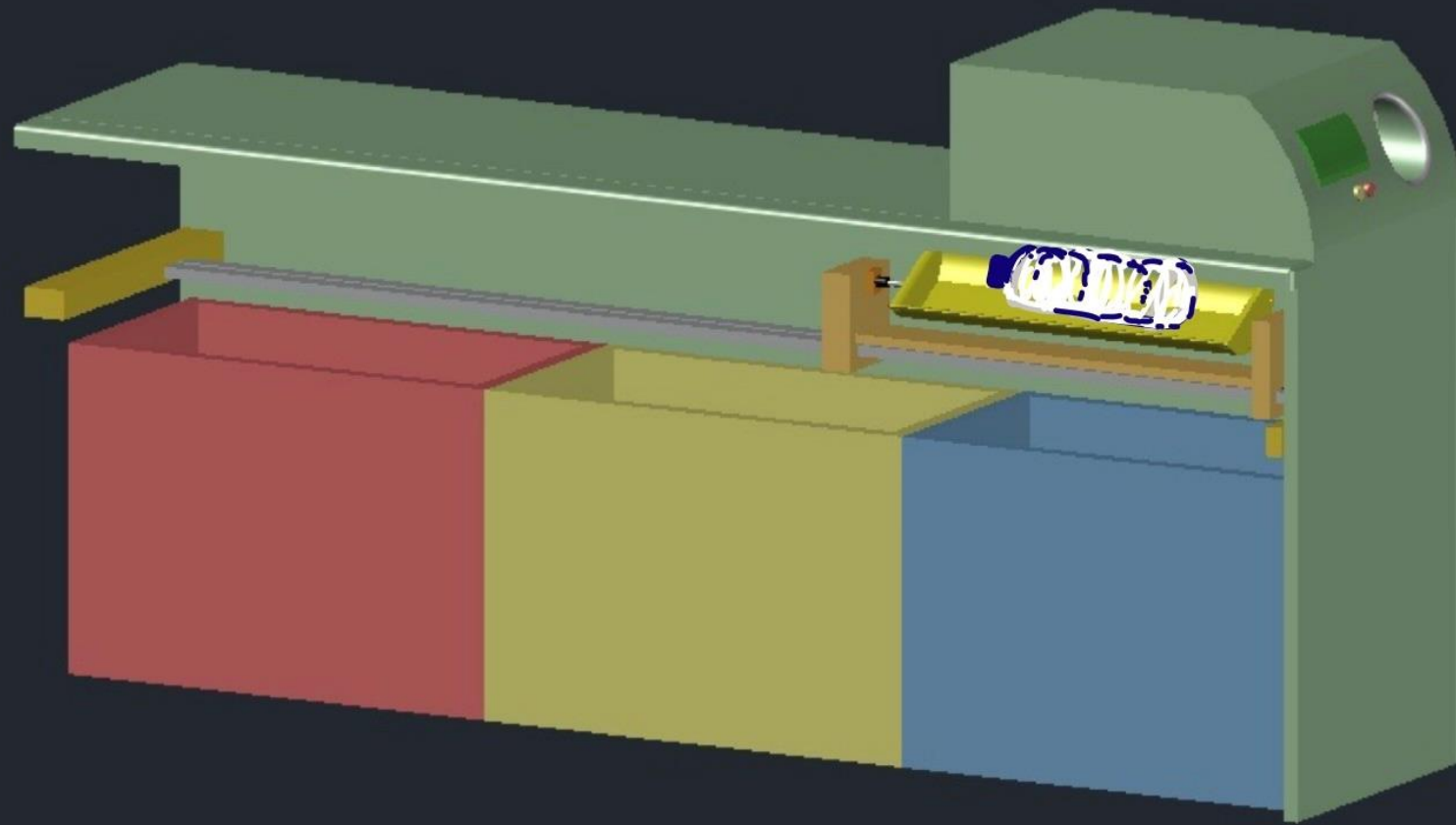
Less landfill**Ed**

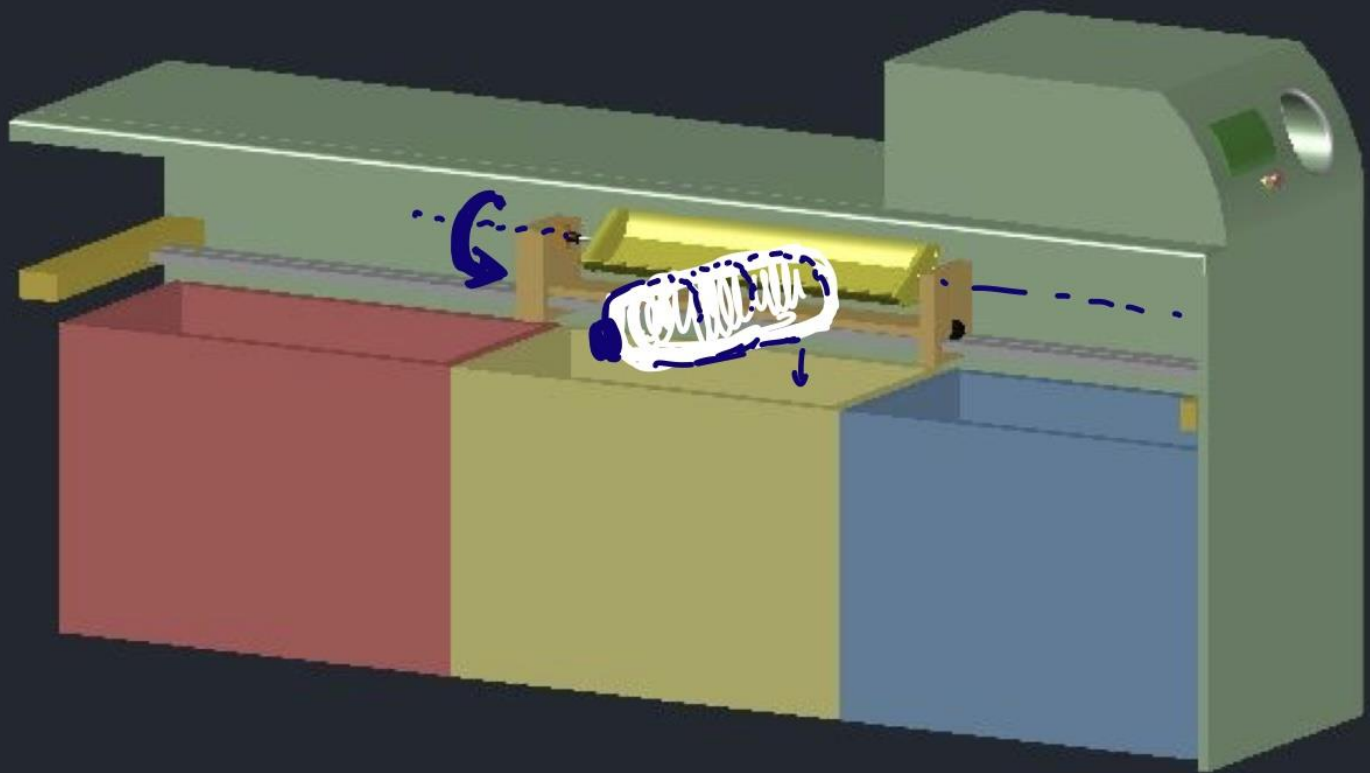
Less (CO₂) emitt**Ed**

More recycl**Ed**

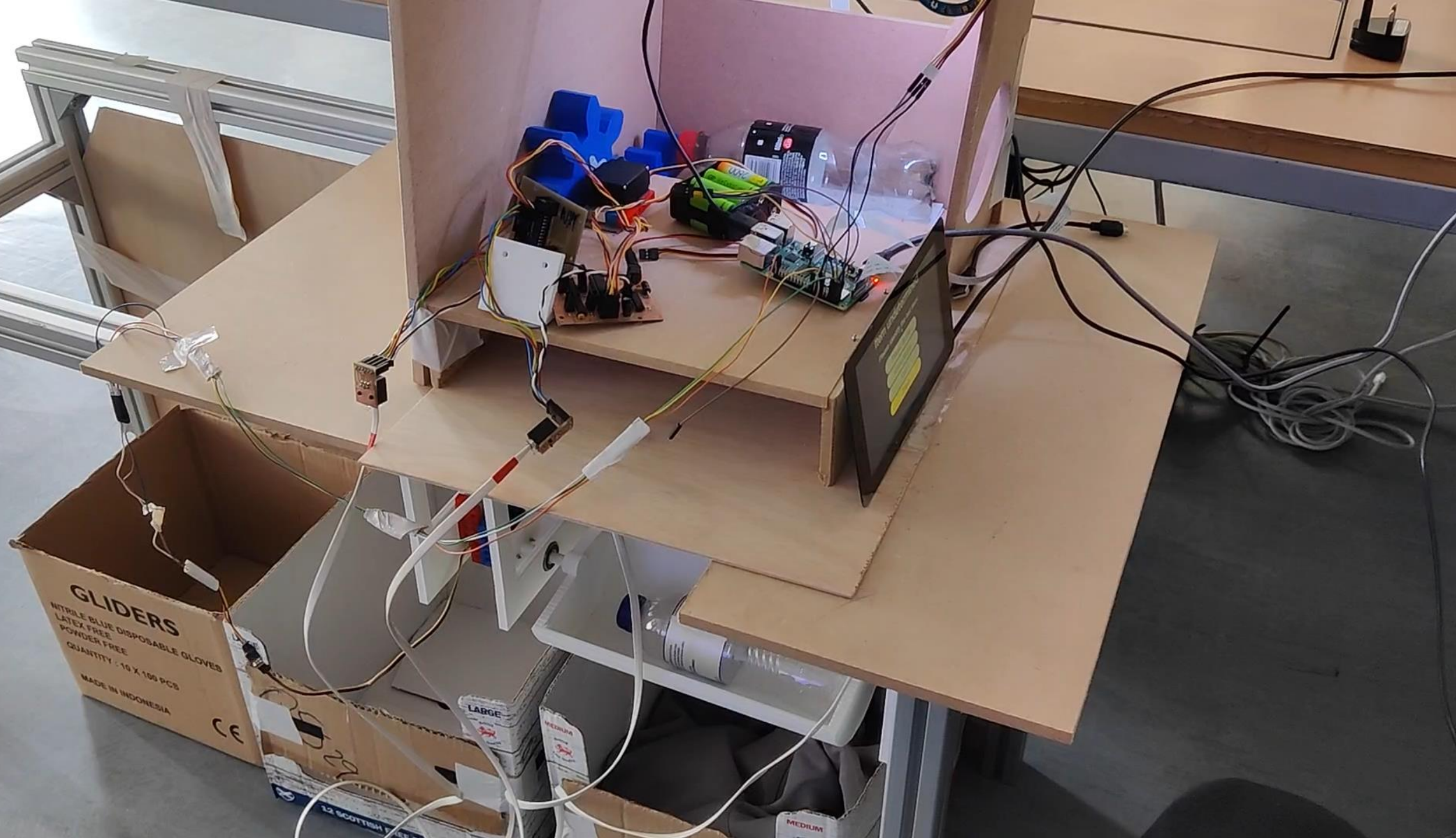








£ +



GLIDERS

NITRILE BLUE DISPOSABLE GLOVES
LATEX FREE
POWDER FREE
QUANTITY : 10 X 100 PCS
MADE IN INDONESIA

CE

LARGE

MEDIUM

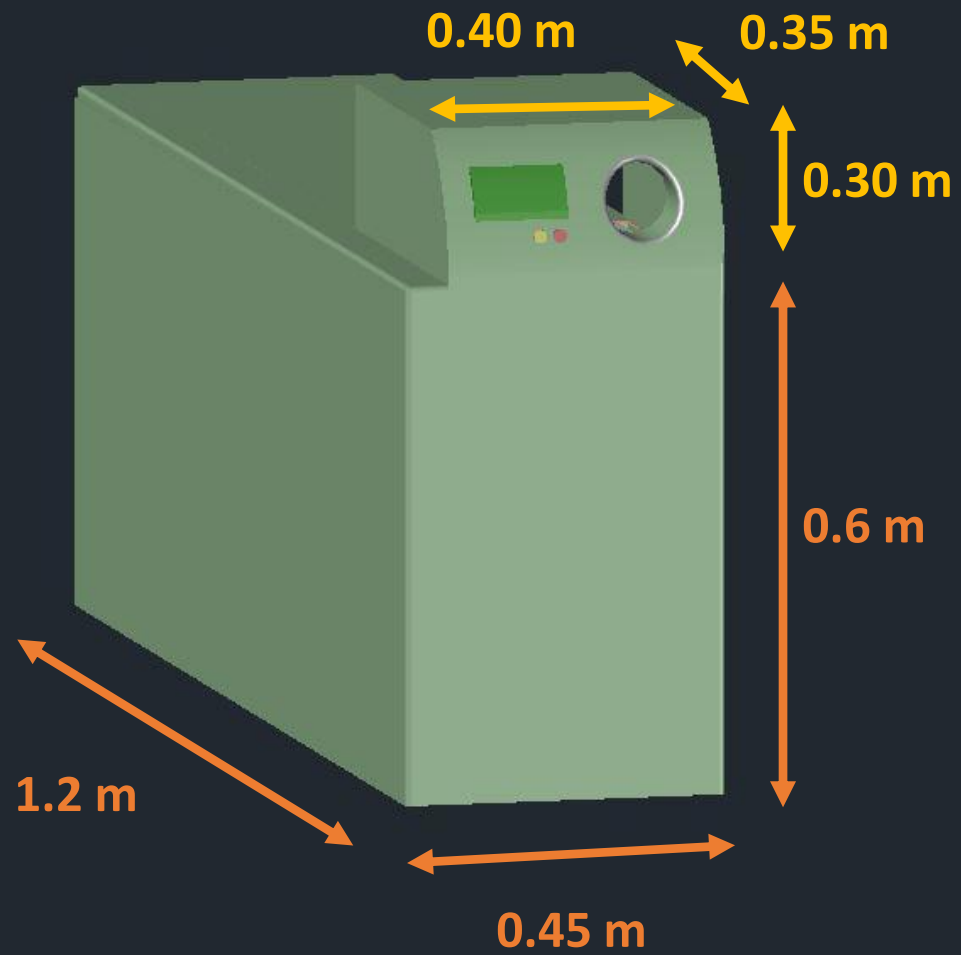
MEDIUM

Goals

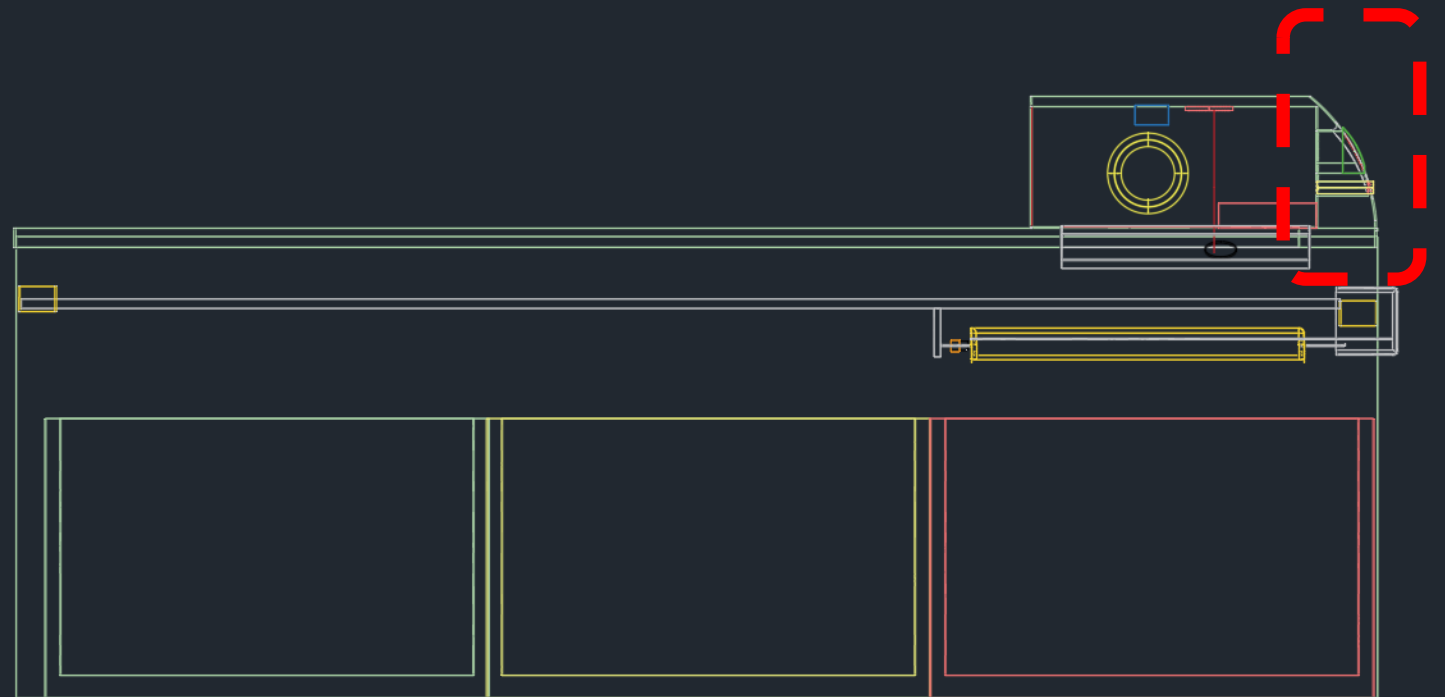
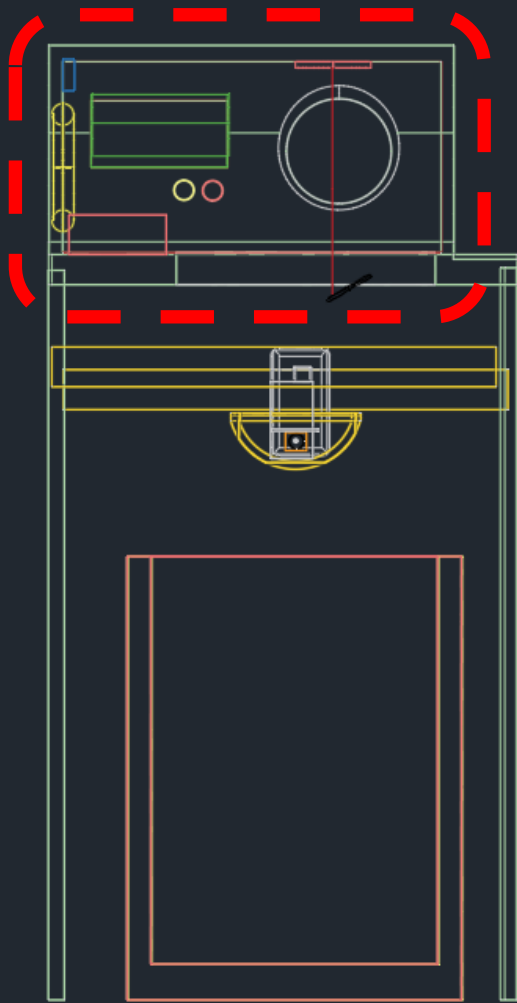
ROBOT DESIGN Hardware

Goals

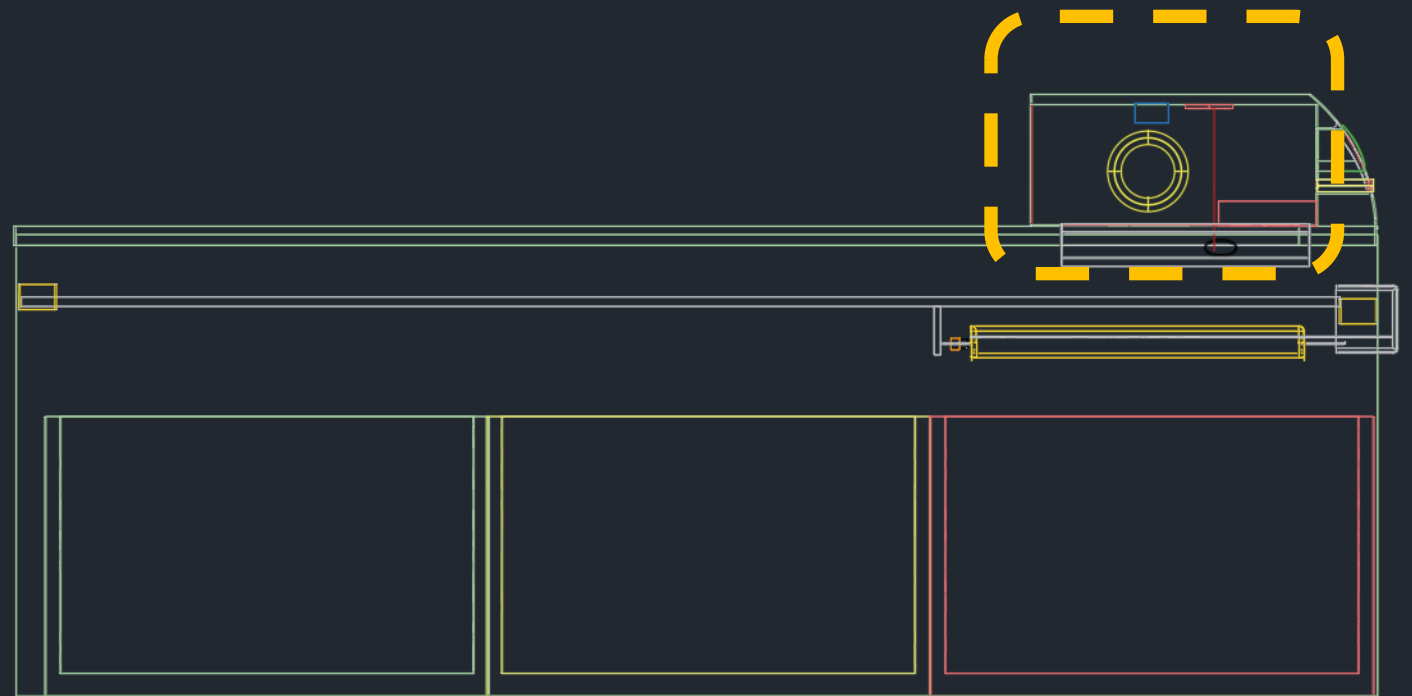
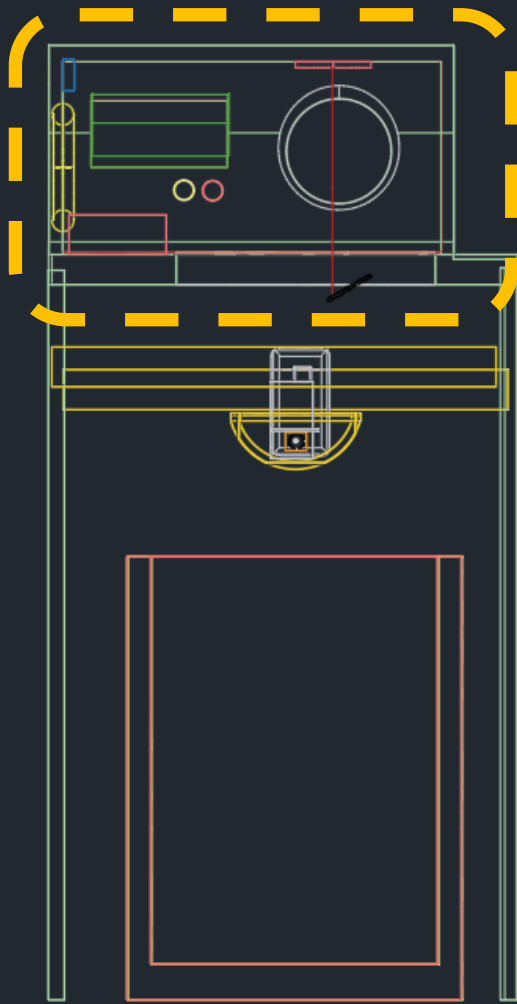
- Tune and improve hardware. [Achieved]
- Tune and improve control. [Achieved]
- Software & hardware integration. [Achieved]
- Production and assembly of detection chamber. [Not Achieved]
- Assembly of whole system. [Partially Achieved]



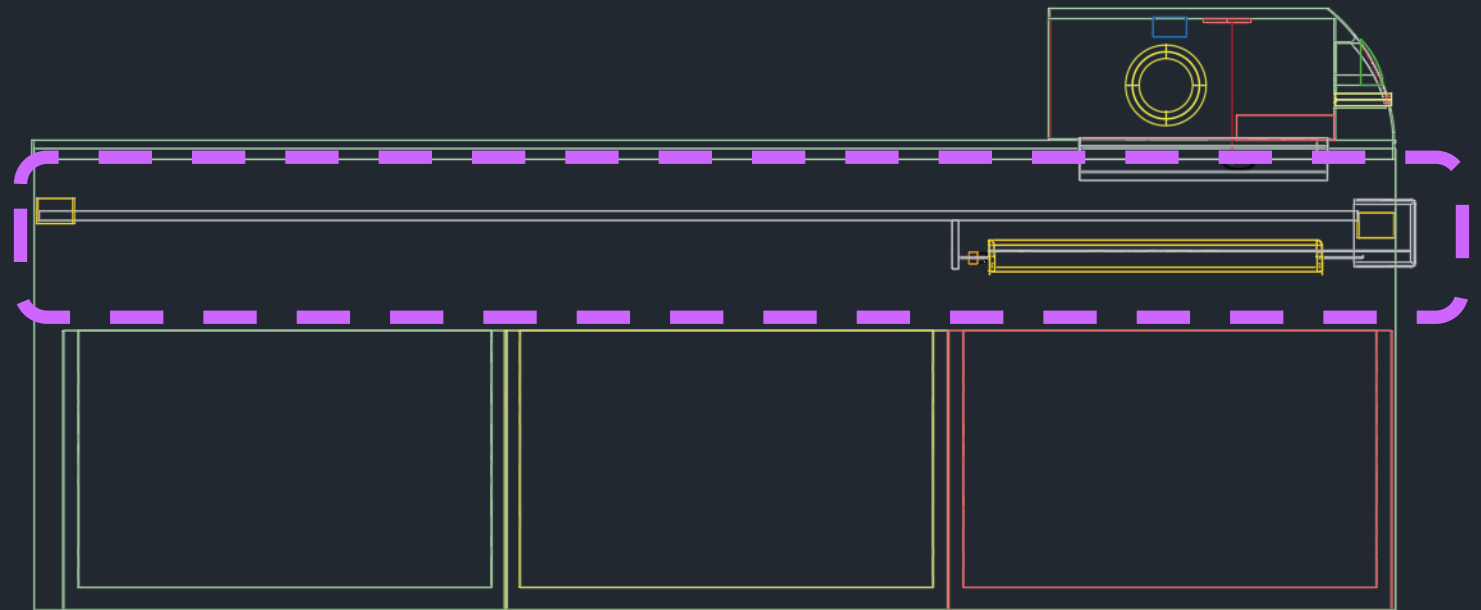
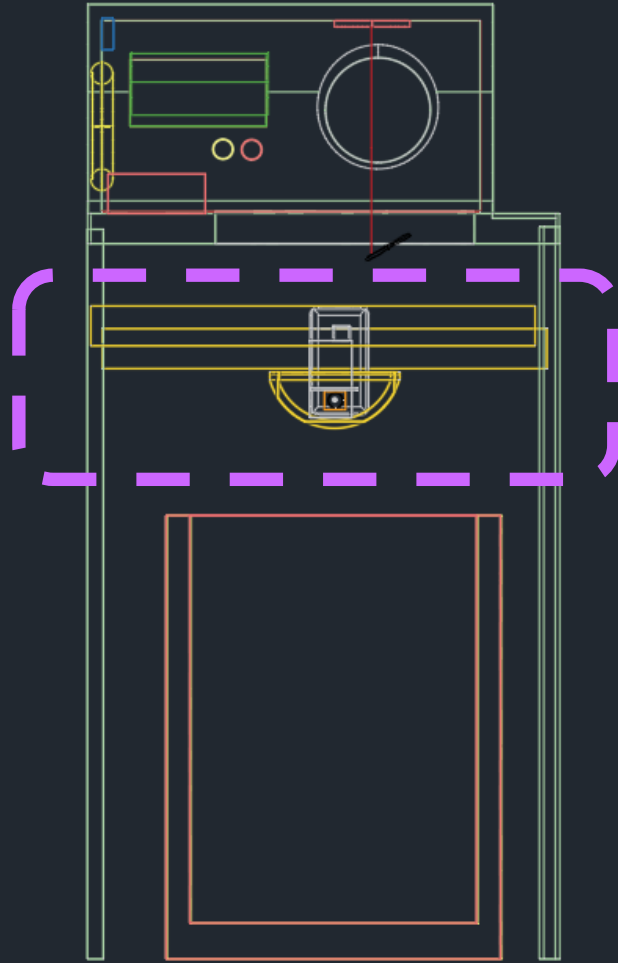
User Interface

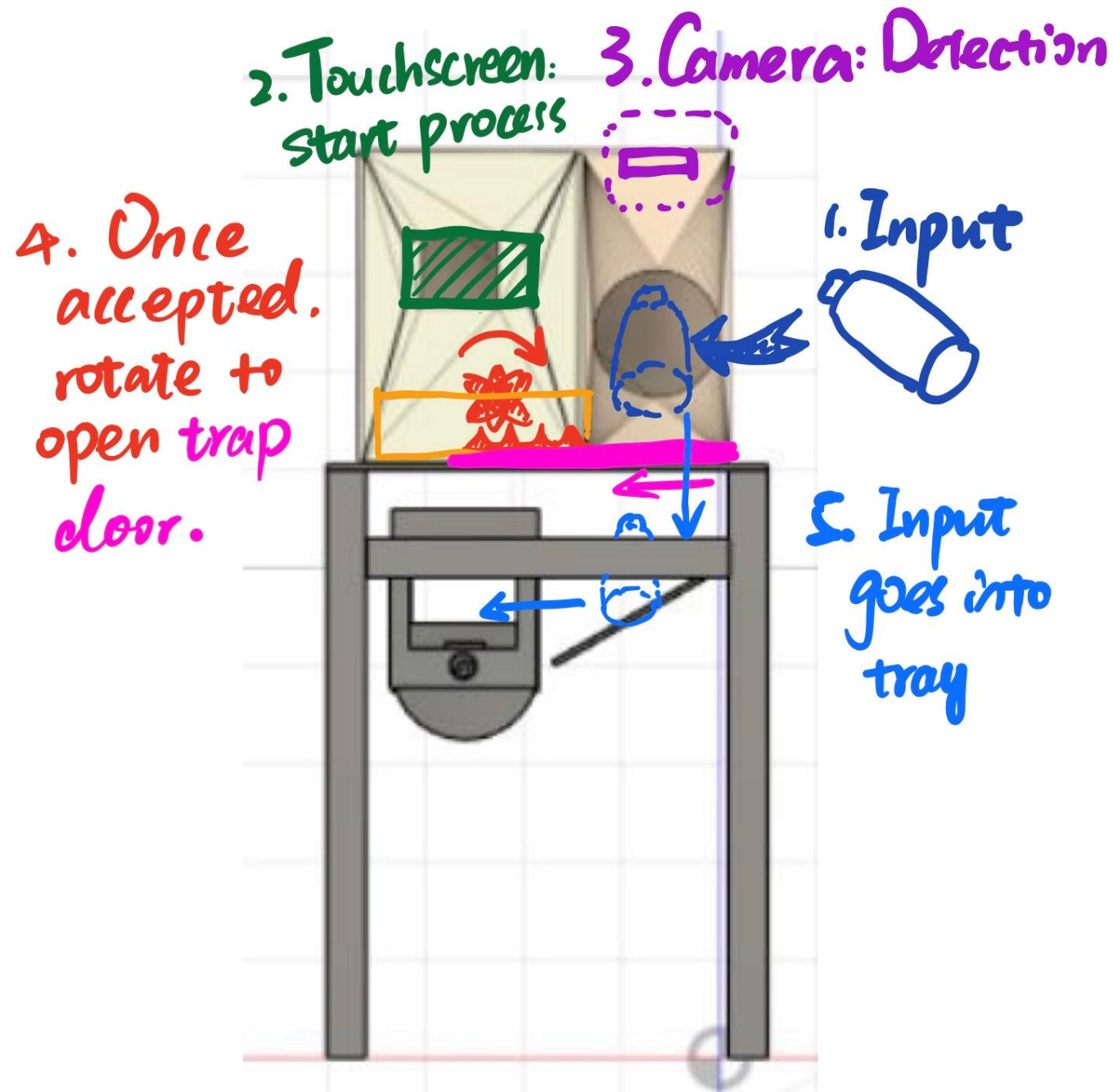


Detection Chamber



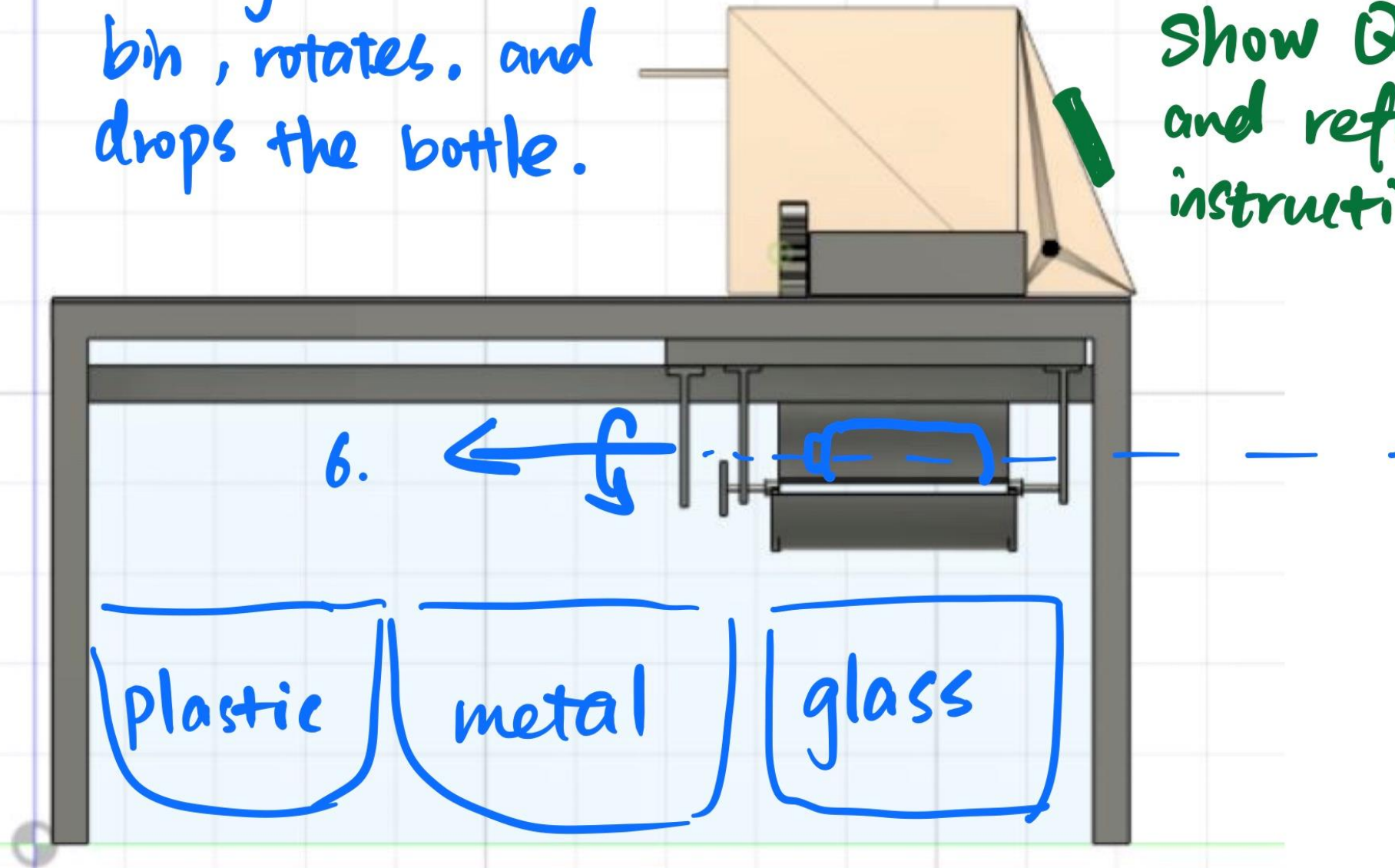
Tray and Track

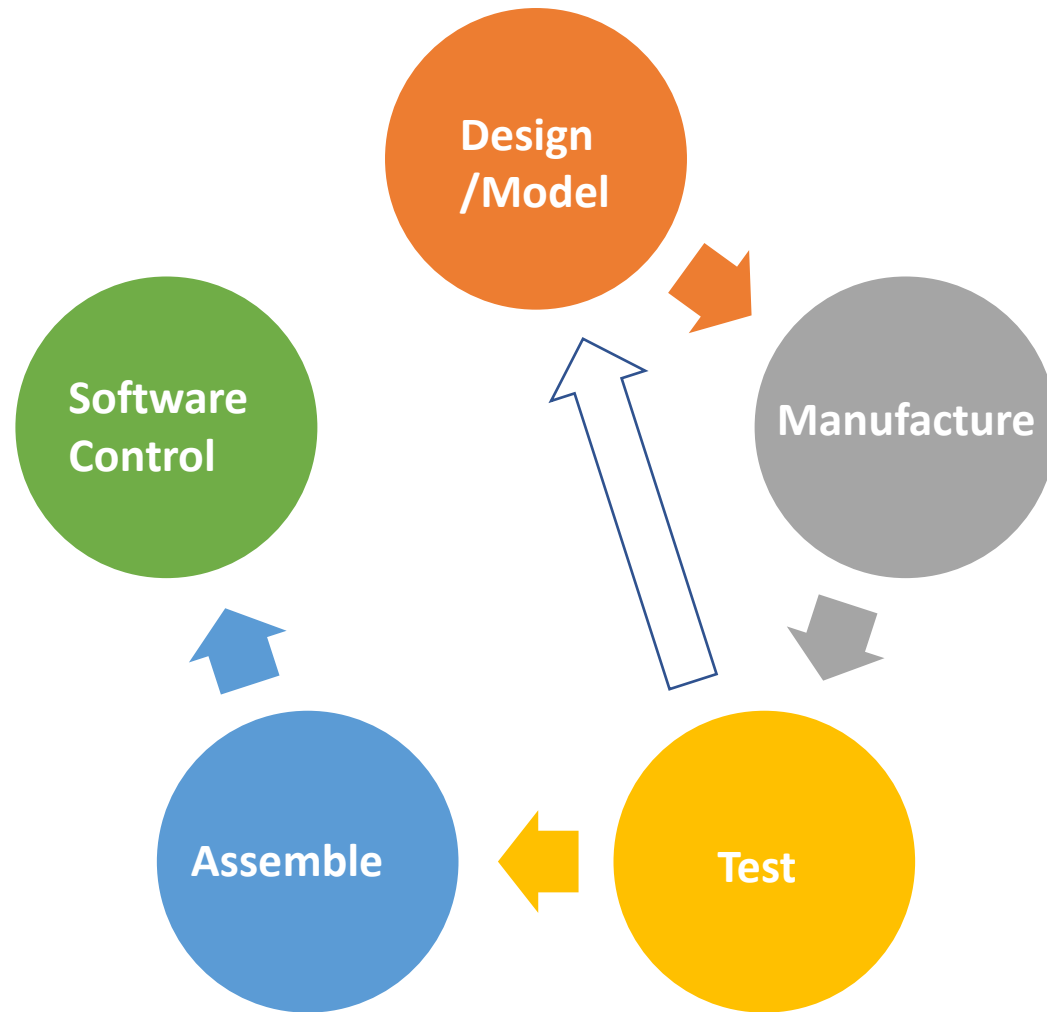




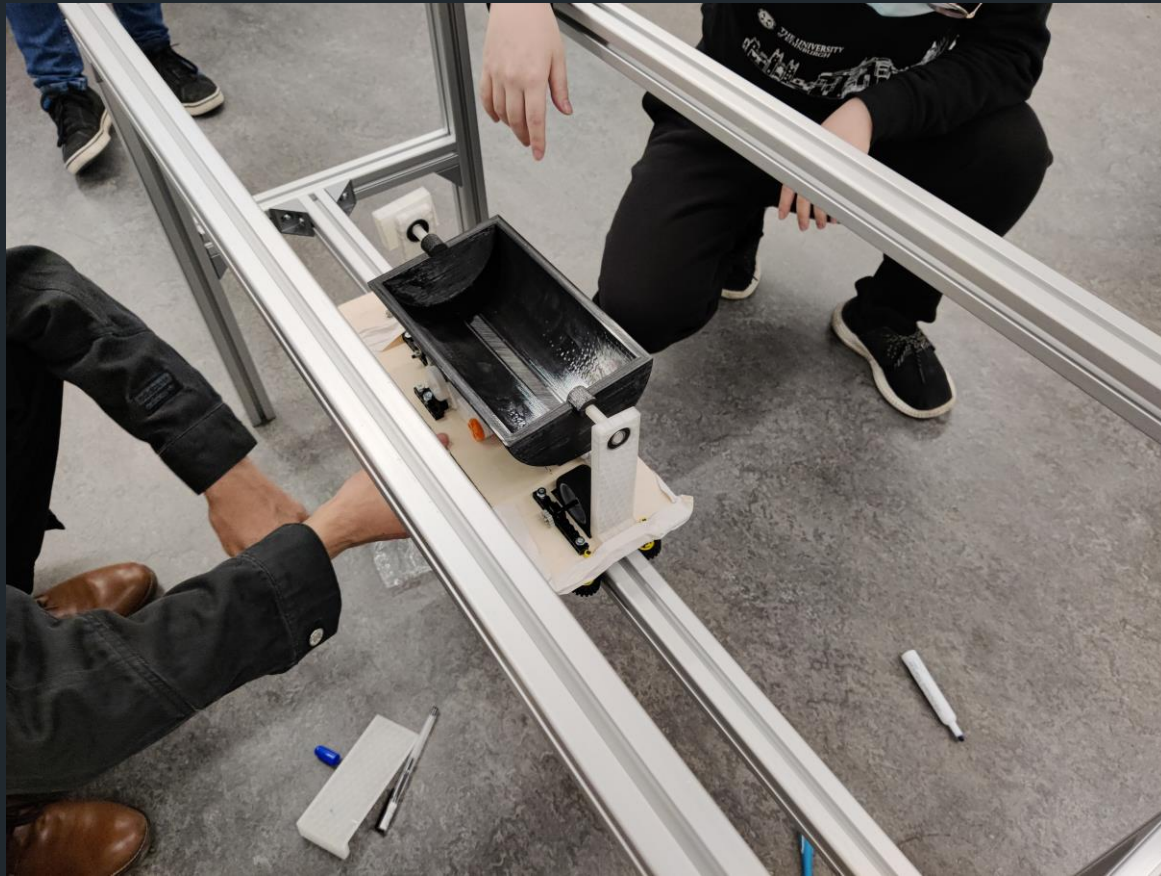
6. Tray moves over the correct bin, rotates, and drops the bottle.

7. Touchscreen:
Show QR code
and refund
instructions.

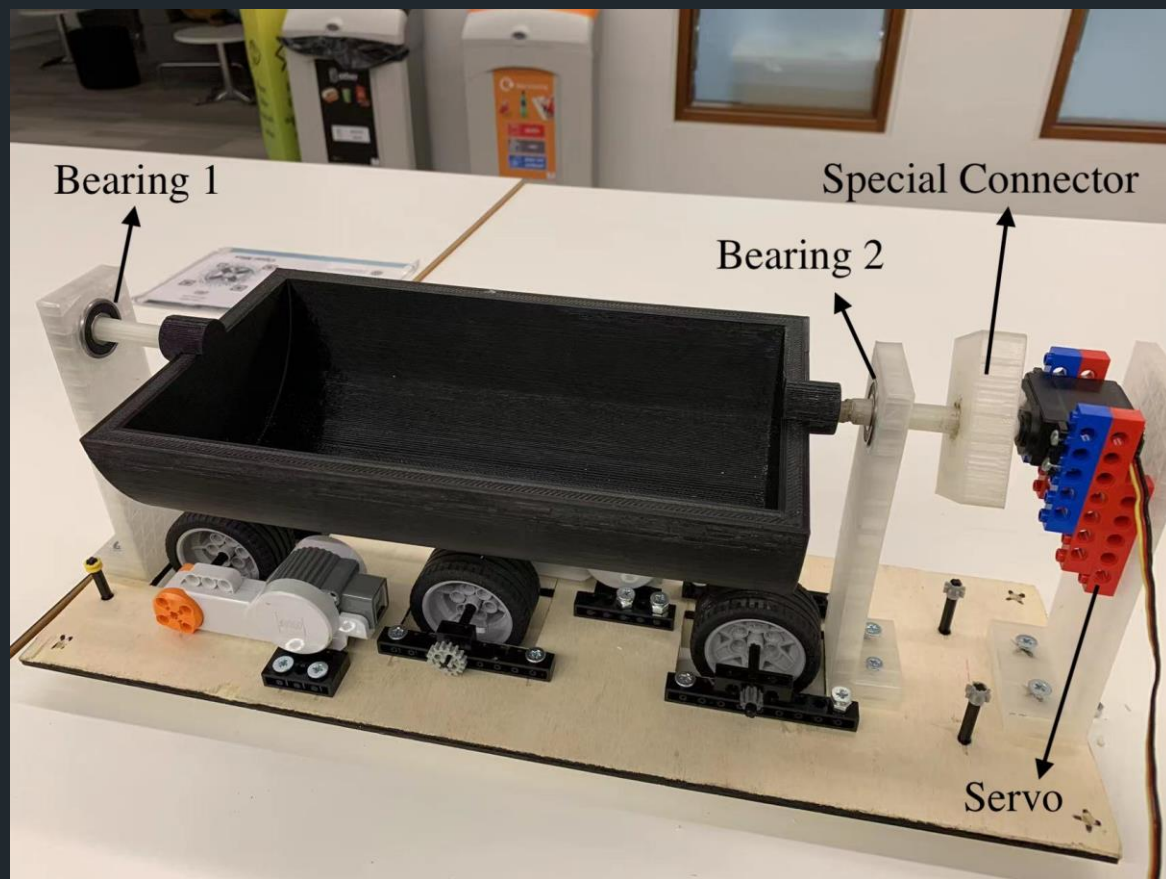




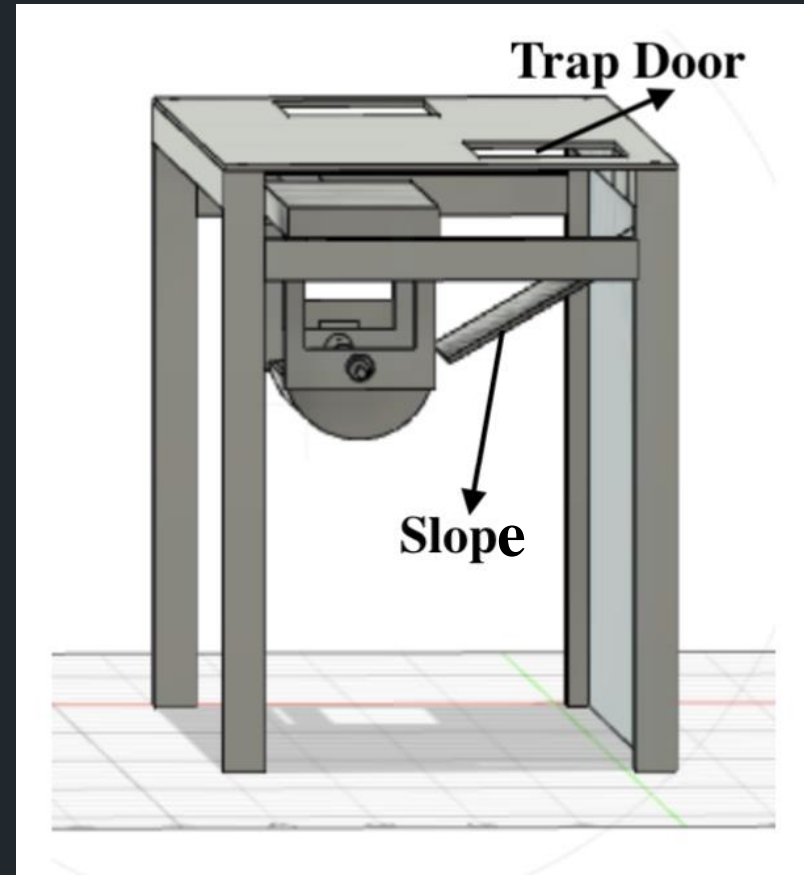
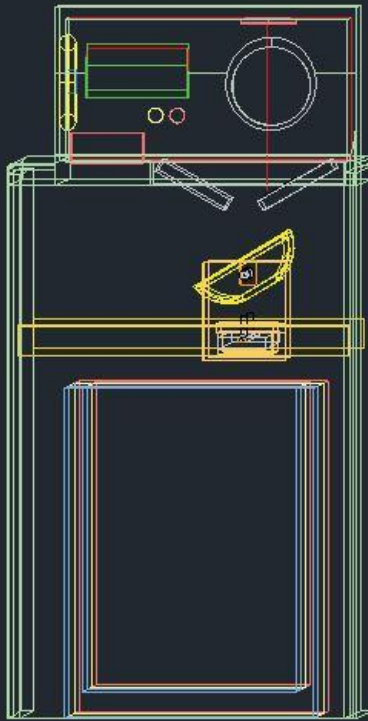
Major Changes



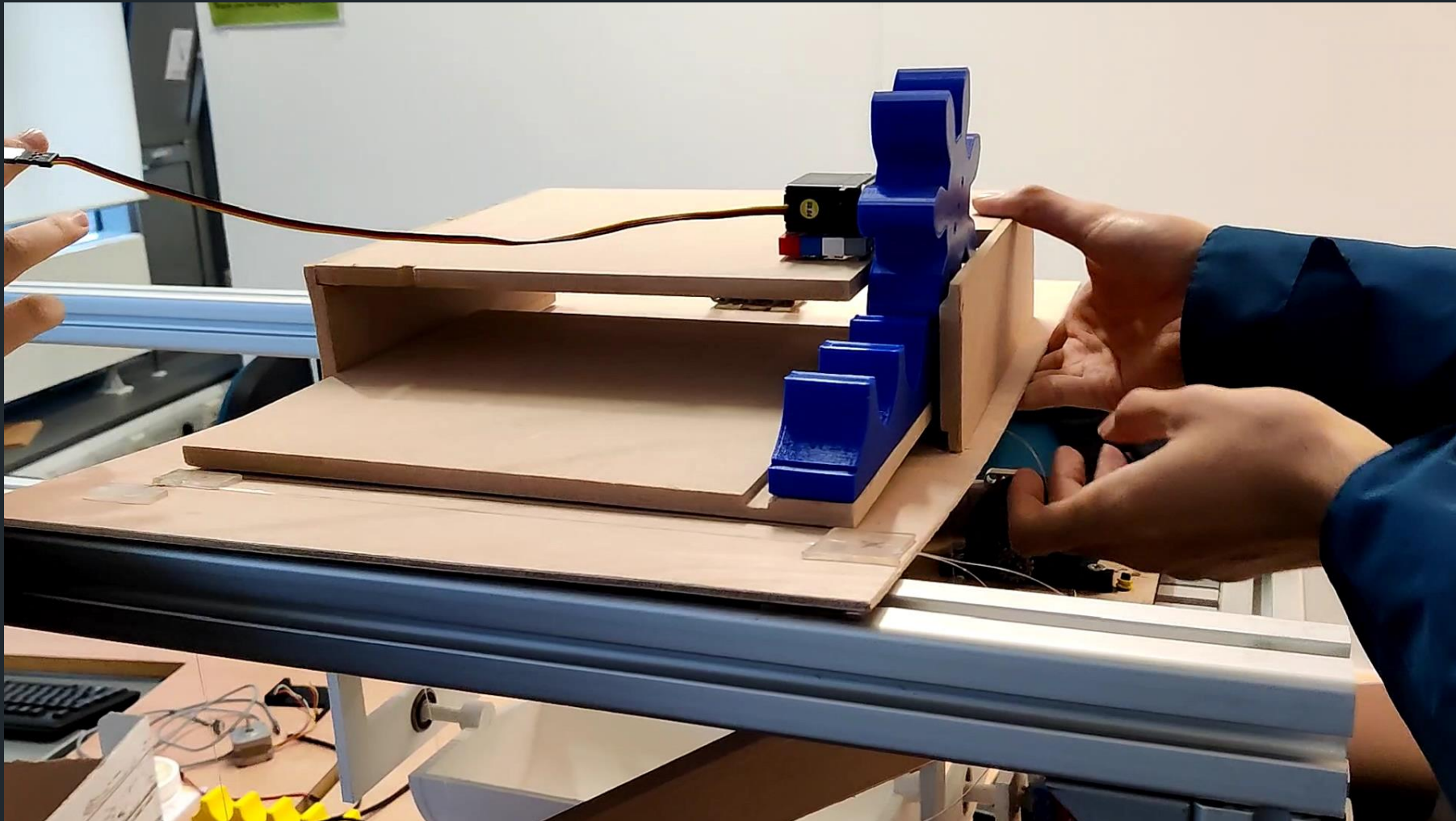
Major Changes



Major Changes



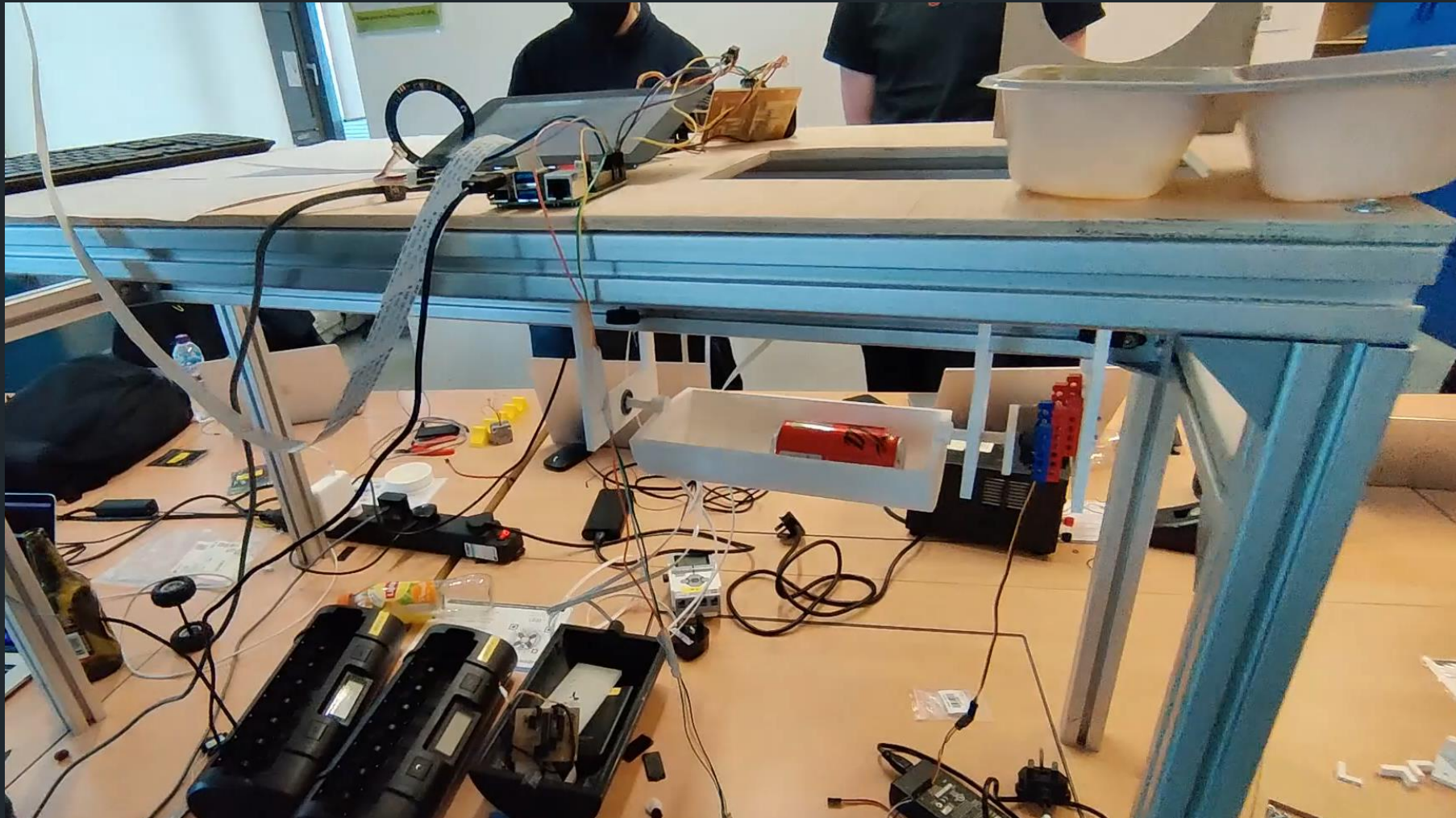
Major Changes



Improvements (Before)



Improvements (After)



SOFTWARE

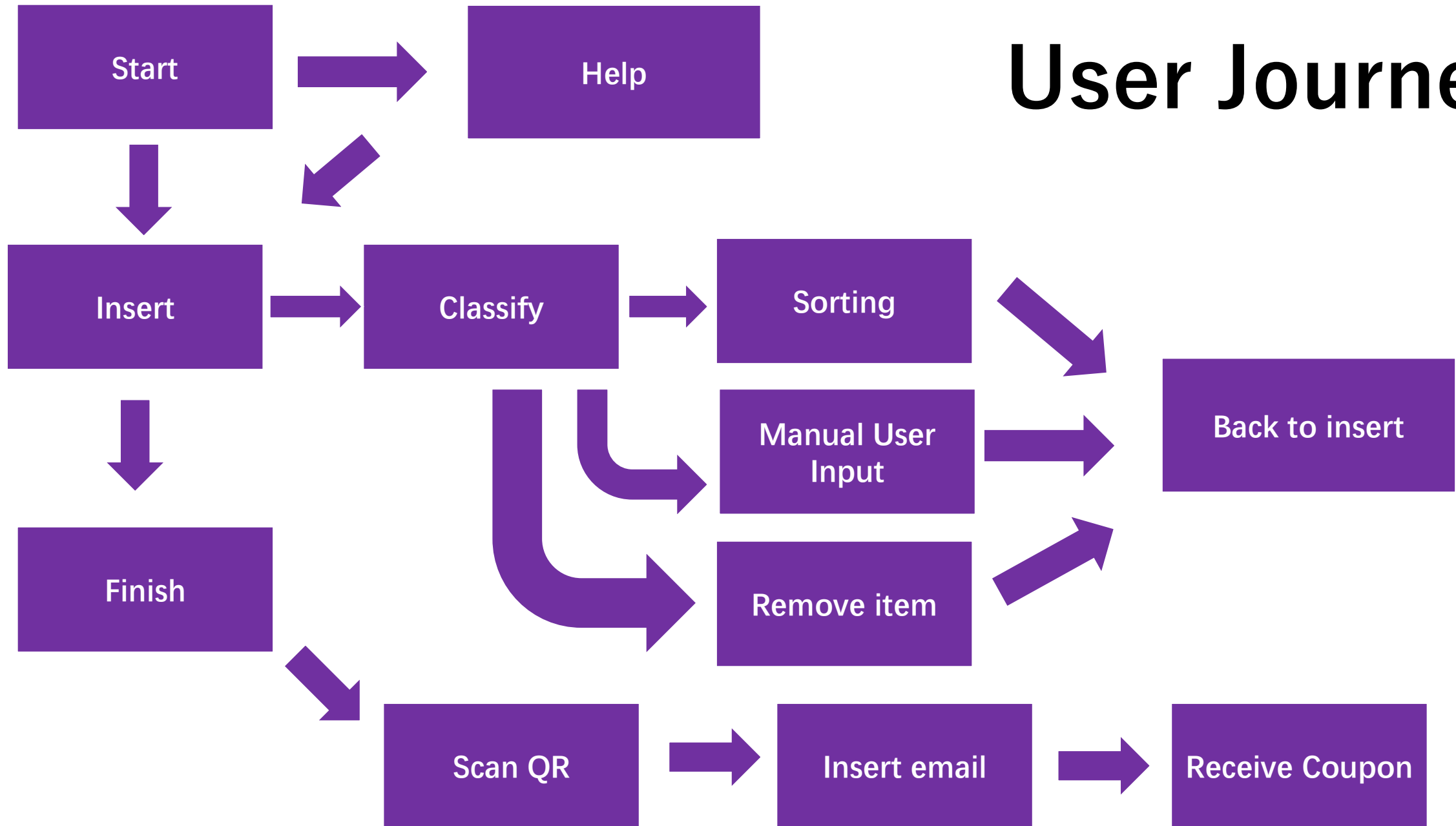
Progress Recap

- Shown at Demo 1:
 - Investigated approaches, selected and trained Vision Model
- Shown at Demo 2:
 - Integrated camera
 - Relabelled dataset to improve real-world performance
 - Moved classification task to server

Goals for Demo 3

- Create user-facing application [Achieved]
- Add refund functionality [Achieved]
- Add transaction records [Achieved]
- Integrate software and hardware [Achieved]
- Automate image capture using an IR sensor [Not Achieved]

User Journey



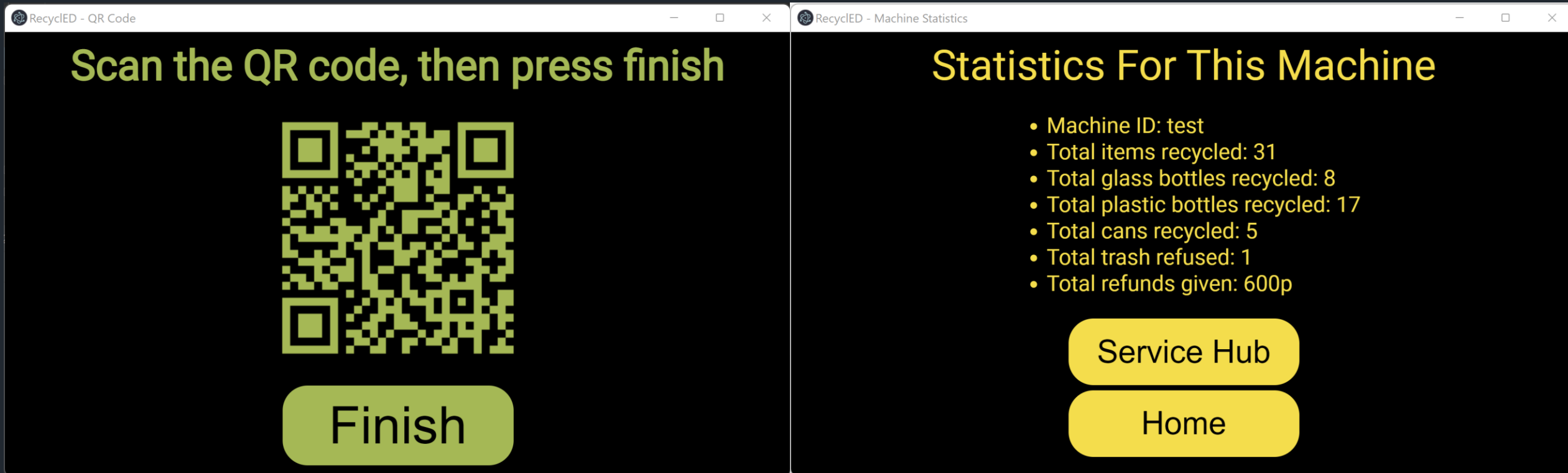
App

- Built using Electron – which is as simple as writing a webpage
- Connects camera, classification, control, QR codes, database, email
- Various methods to achieve functionality:
 - Requests to server – DB writes
 - Javascript modules – picam integration, QR code
 - Running python files with Pythonshell module – file upload for classification
- Application state is preserved between pages using a JSON file

App

User Mode: QR Code

Service Mode: Machine Statistics



Database

- MySQL database instance on Google Cloud Platform
- Stores device data + a record of each transaction
- For GDPR purposes no personally identifiable data is stored
- Device data can be displayed in the app
- Transaction data is used to generate the right refund values

Email

- Once the user is finished recycling, a QR code is displayed.
- After the user scans the QR code on their phone, they're redirected to a website where they can enter their email to get their coupon.
- Emails contain their unique transaction ID and the value of the coupon, which can be redeemed at a later date.

Email

Website

RECYCLED

Save some money for saving the environment.

Get a coupon sent to your inbox.

Your Email

SUBMIT

Email

RECYCLED

Thank you for using RecyclED.

Your coupon is worth £ 0.00.

(Transaction ID: 33)

Infrared

- This was a failure at the last demo – we couldn't get it to work
- This time we did get it working with the Raspberry Pi
- Because of delays in the printing of the detection chamber, we didn't have time to integrate and calibrate the sensor in the machine
- So we removed it



**Thanks for Listening
Any Questions?**