Baggage Handling System

GROUP 35

LUIS RODRIGUEZ IGNAS ŠABLINSKAS STEPHAN SALVI

NORBERT ROMANSKI ERNESTAS RAUDONIS VICENTE VEGAR

Fully Functional System

SCAN ME

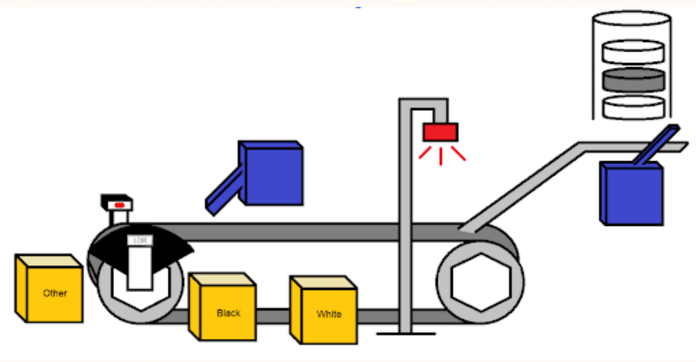
THE BACKLOG

No.	Robot Task	Purpose	Priority	Sprint Nº	Status
1	Have proper infrastructure	Ramp is used to place disks on the conveyor belt, sensors are mounted to the conveyor belt	Must	2	Done
2	Mechanically push items off the conveyor belt	Place disks in boxes	Must	2	Done
3	Have a rotary encoder	Detect if the conveyor belt is stuck	Must	3	Done
4	Distinguish between black, white and coloured disks	Sort disks by color, placing them in correct boxes	Must	4	Done
5	Have buttons to activate and turn off the robot	Button is used to start feeding the disks and running the sorting system	Should	5	Done
6	Have a switch to start and stop the conveyor belt	Be able to start conveyor belt when robot is activated and stop it when an error occurs	Should	5	Done
7	Have a manual override mode	Allow user to manually sort a disk in the case that something went wrong with sensor or an unexpected disk is put on the conveyor belt	Should	5	Done
8	Detect and handle errors	Conveyor belt and sorting of disks stops and robot waits for an input to restart	Must	6	Done
9	Have LEDs that signal current status of the robot	Green LED to signal that robot is running, yellow LED to signal that robot is in manual override mode, red LED to signal that an error has ocurred	Must	6	Done
10	Report its processes on a website	Display the current status and actions of the robot, the number of disks sorted (per colour) and any errors	Should	7	Done
11	Outputs audios	Alert users of current status and errors	Could	7	Done

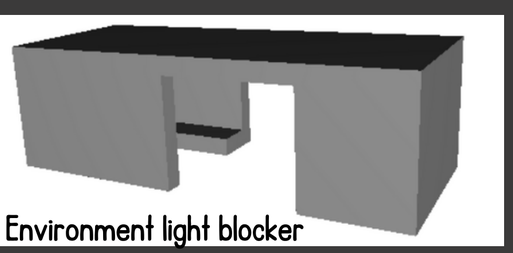
The Sorting System

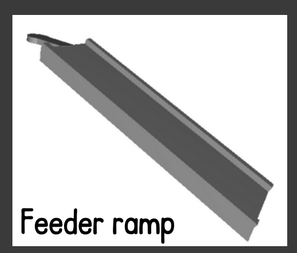
- 2 ARDUINOS
- RASPBERRY PI
- LUGGAGE FEEDER
- FEEDING CYCLINDER
- CONVEYOR BELT
- ROTARY ENCODER
- LIGHT RESISTOR
- RGB SENSOR
- INFRASTRUCTURE PIECES
- SORTED BAGGAGE STORAGE
- START, STOP, MANUAL OVERRIDE BUTTONS

OUR ROUGH DEV IDEA

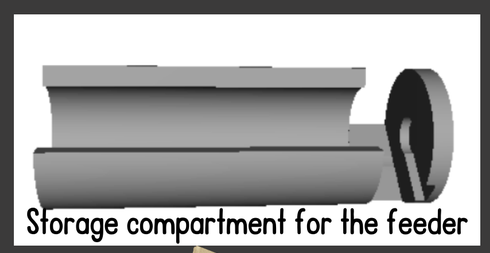


Our 3D-Printed Parts


Environment light blocker

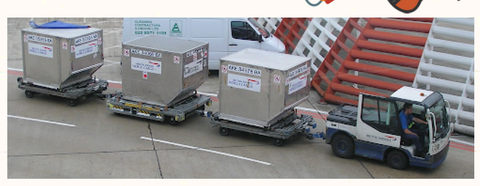

Feeder ramp


Servomotor custom size arm


Storage compartment for the feeder

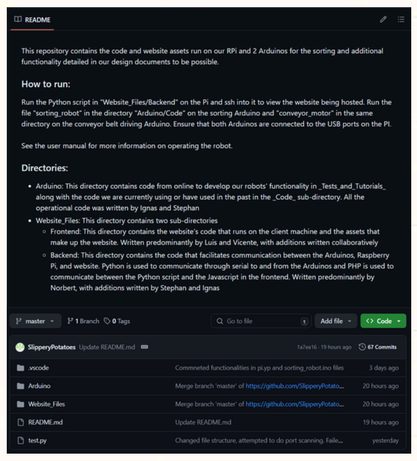
Airport Scenario

- LAST SECTION
- LUGGAGE FROM ONE FLIGHT
- SORTING BY WEIGHT
- YELLOW BOXES REPRESENT TOW TRAILERS
- EASE LOADING OF CARGO
- MANUAL OVERRIDE
- WEBSITE

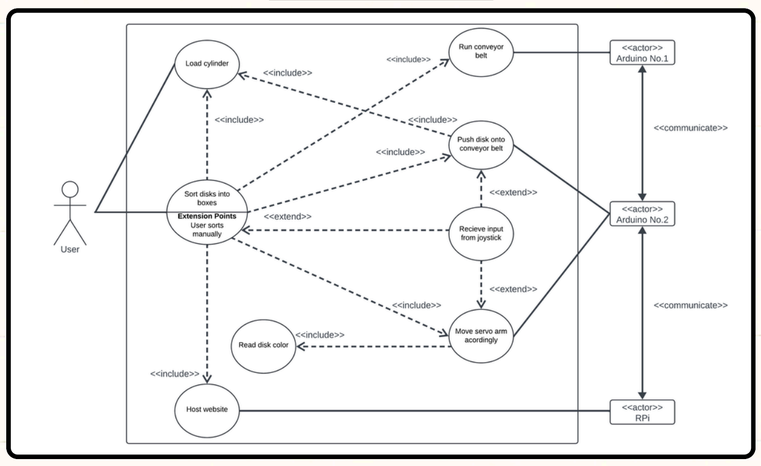


Systems Development Architecture

OUR REPOSITORY



USE CASE DIAGRAM



FULL DECISION DOCUMENT

SCAN ME

OUR MAIN DECISIONS

Decision taken	Purpose	Sprint Nº
Use RGB sensor (purchased from Tinytronics)	Light sensor provided does not allow our robot to have the desired functionality	1
Use a rotary encoder to detect if conveyor belt is stuck/stopped running	Proximity sensor was innacurate and incosistent	1
Only use one arm to place disks in boxes	More efficient and less error prone	2
Use a second arduino (purchased from Tinytronics)	One arduino will be used to drive the conveyor belt and the other one will be used to control sensors and servo motors	2
Design and print 3D cylinder and ramp	We want to have a fully automated system which feeds disks onto our conveyor belt	3
Design and print a box to encolose RGB sensor	Cardboard box was not very effective and disks often got stuck while going through it. 3D box will provide greater enclosure and will exactly fit the conveyor belt's dimensions	5

Documentation and Time Management

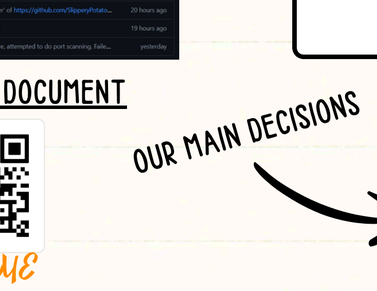
Trello Boards

Meeting Minutes

Our task distribution

Logbook

Total Hours



Weekly Average

ERROR HANDLING

CONVEYOR BELT IS STUCK!

- ROTARY ENCODER DETECTS THAT THE CONVEYOR BELT WAS NOT MOVING FOR 3 SECONDS AND SENDS THE INFORMATION TO RASPBERRY PI

SCAN ME

LUGGAGE WAS EXPECTED BUT IS MISSING

- RGB SENSOR DOES NOT DETECT ANY CHANGE ON THE CONVEYOR BELT AND REPORTS THE ERROR TO RASPBERRY PI

SCAN ME

RGB SENSOR ISSUES

- RGB SENSOR REPORTS EXTREMELY LOW VALUES TO RASPBERRY PI INDICATING THAT THE SENSOR IS BLOCKED OFF OR LIGHTNING CONDITIONS ARE TOO DARK

SCAN ME

HOW DO WE HANDLE ERRORS?

- ONCE THE ERROR IS DETECTED GREEN LED TURNS OFF AND RED LED TURNS ON. IN ADDITION, THE RASPBERRY PI REPORTS THE SPECIFIC ISSUE ON THE WEBSITE INTERFACE.