

ElectroCap

Smart Home Stock

Pitch Deck



TÉCNICO LISBOA

Team members

SMART HOME STOCK



Ricardo Fiúza (Leader)

Hardware Engineer



Rafaela Pereira (Co-leader)

Communication App-Prototype



Renato Simões

Prototype Designer



Vera Amaral

Website Designer and Manager



Henrique Simões

Software Engineer



Leonor Mira

Image/Video Designer

Advisors and mentor

SMART HOME STOCK



António Grilo
Scientific advisor



Teresa Vazão
Coordinator



Ricardo Santos
Mentor

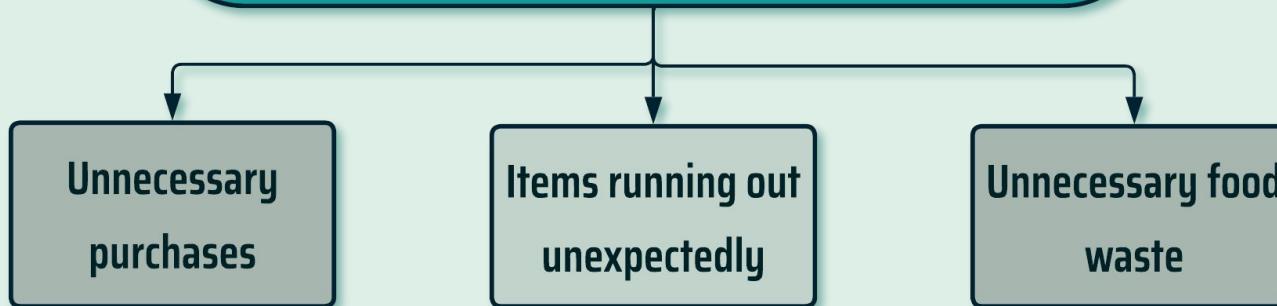


Problem definition

Problem definition

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What kind of items (and their respective quantity) do I have inside my home?





win
win

Solution
beneficiaries

Solution beneficiaries

SMART HOME STOCK



Household Member

Improved organization
and awareness of
available food supplies.



Shopper for Dependent

Streamlined shopping
experience with an automated,
more accurate and personalized
shopping list.



Environment

Reduction in food
waste contributes
to environmental sustainability.

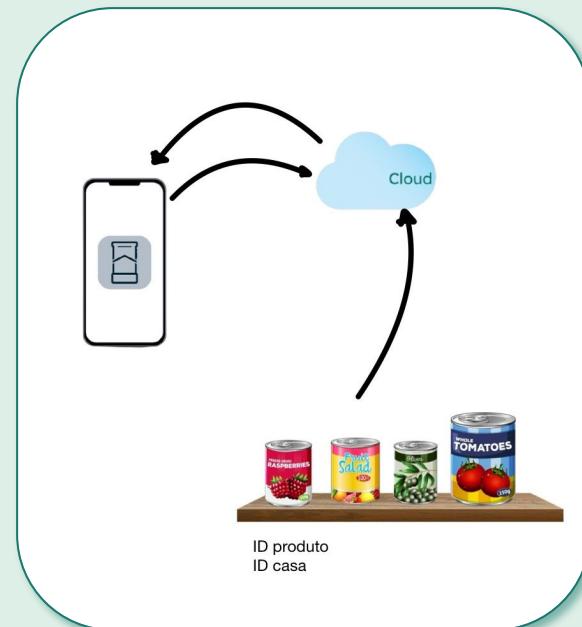


Technological solution

Technological solution

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- **Hardware:** determines which products and respective quantities are in stock.
- **Cloud Server (Database):** Receives and stores data of every product.
- **Mobile App:** user's interface.





Solution requirements

Solution requirements

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Camera to accurately monitor stored items



Weight sensors for item quantity determination



Mobile app is essential to know products data



Custom-made pantry shelves to accommodate every home



Solution requirements (Mobile App)

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Stocked Items

Displays every single stocked item and their respective quantities.



Low Item Quantities

Warns the user's when a determined product is low on quantity.



Shopping List

Automatically generates a shopping list based on products' quantities. User should be able freely add items.

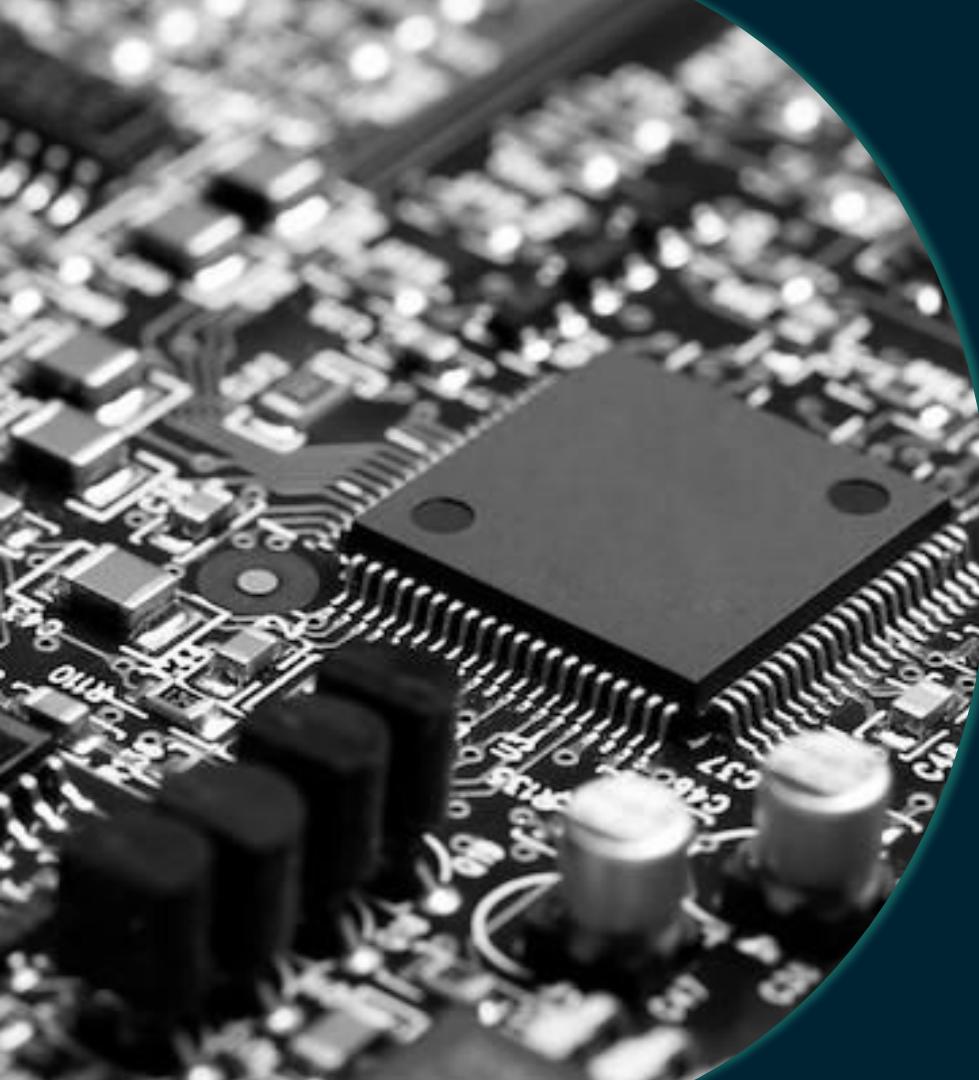


Competitors & previous work

Competitors & previous work

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Technology	Shopping list app	Smart shelves connected to mobile app. Automatic shopping list.	Smart Fridge	
Advantages	Not dependent on working hardware	Precise product data	More features (ex. voice control)	
Disadvantages	Not made automatically	Manual predefined product location, less intuitive & poor product stacking.	Costlier & only applies to fridges	



Technical challenges

Technical challenges

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Weight sensors
accurately measuring
items quantities

Visual confirmation of
working hardware

Camera identifying
products correctly

Safeguard user
stored data

Reliable
communication with
database

Create intuitive and
user-friendly
application



Testing and validation metrics

Testing and validation metrics

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To test and validate our idea, we decided to create a formulary.

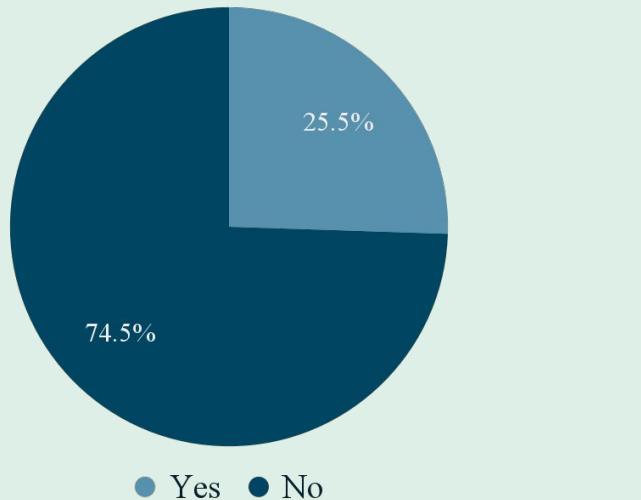
- More than 400 responses.
- Confirmation of problem existence in people's daily life.
- Obtained some ideas from responses that we could implement into our system to better improve its usefulness to the user.

Testing and validation metrics

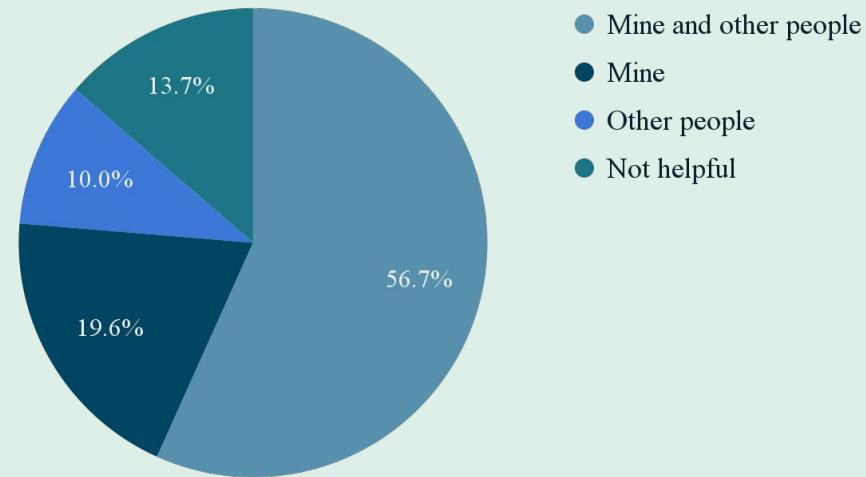
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Data Analytics | Nº of answers: 439

Responsibility for someone older or dependent



Usefulness of using an automated system at home



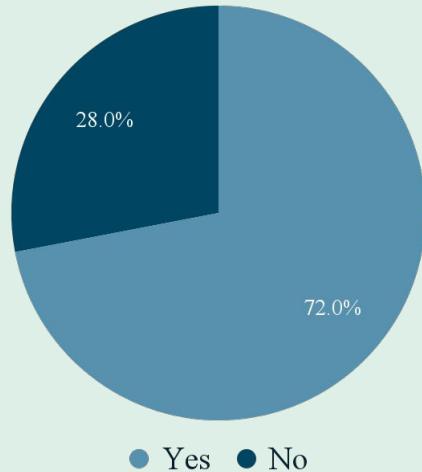
- Mine and other people
- Mine
- Other people
- Not helpful

Testing and validation metrics

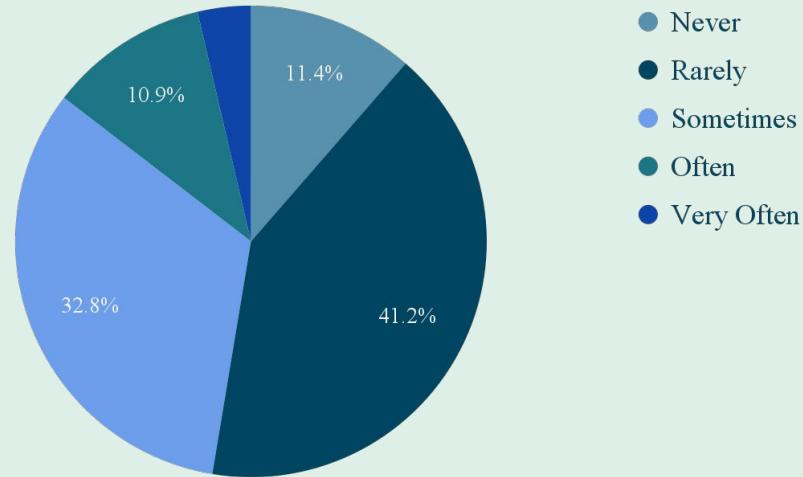
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Data Analytics | Nº of answers: 439

Do you have the habit of making a shopping list?



How often do you forget what you need to buy while





Division of labor & team

Division of labor & team

SMART HOME STOCK - Prototype team

Ricardo Fiúza	Rafaela Pereira	Renato Simões
Search for Partners (Responsible)	Wireless communication between ESP32 CAM and Firebase (Responsible)	Object Identification with ESP32 - CAM & OV2640 (Responsible)
Hardware Development and Management (Responsible)	Object Identification with ESP32 CAM	Wireless communication between ESP32 CAM and Firebase
Prototype Modelling	Prototype Modelling	Prototype Modelling (Responsible)

Division of labor & team

SMART HOME STOCK - Software & design team

Vera Amaral	Henrique Simões	Leonor Mira
Update Management (Responsible)	App Development and Management (Responsible)	Image Design (Responsible)
App Design	App communication with Firebase (Responsible)	App Design
App Development	Update Management	App Development



Original schedule

Original schedule (Based of original idea)

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Mid-program status

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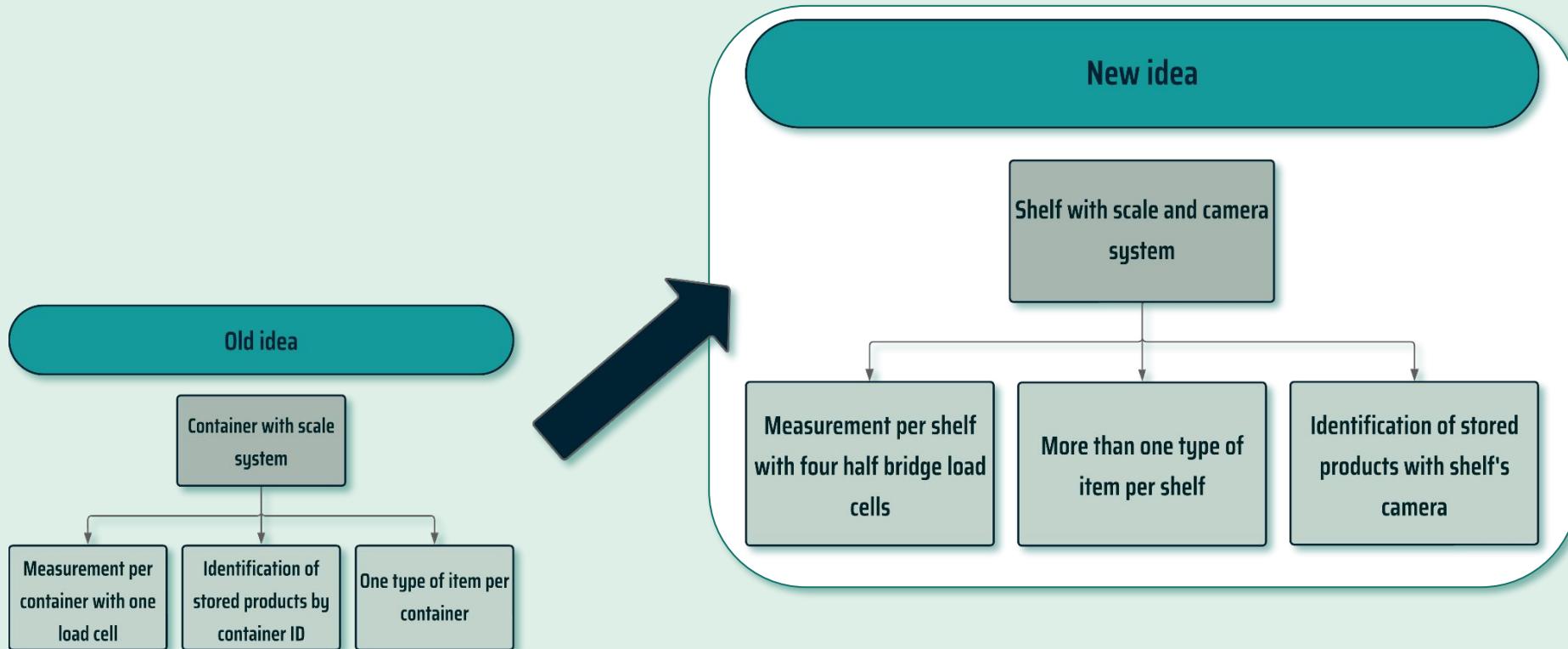
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**Achieved
results**

Achieved results (Mid-program)

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Achieved results (Mid-program)

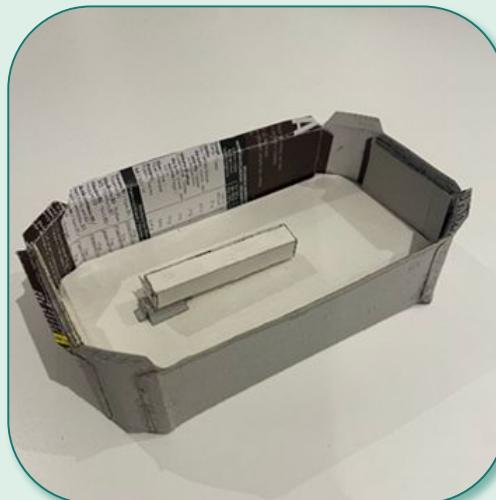
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Old idea

- Prototype



Container design



Interior of the base



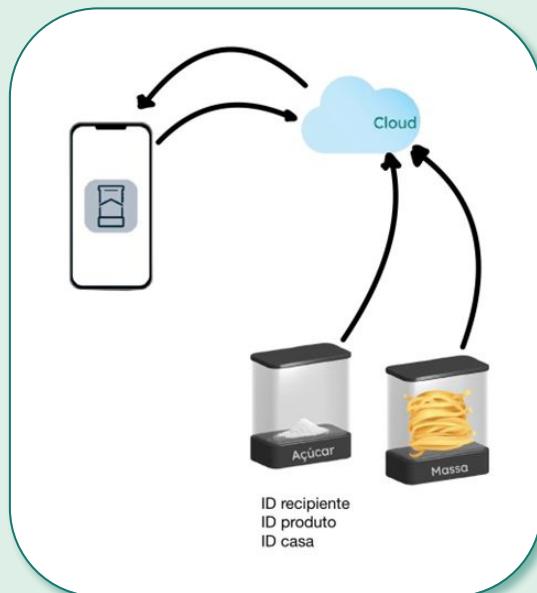
Base with lid

Achieved results (Mid-program)

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Old idea

- System



- Technology

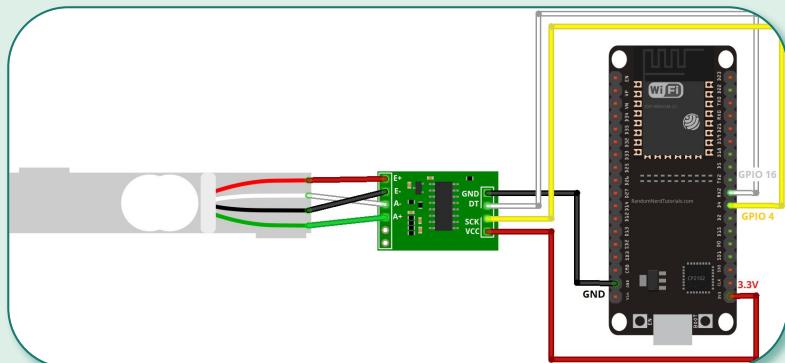
- ESP32
- HX711
- Load Cell
- Recipient
- Firebase
- Mobile app

Achieved results (Mid-program)

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Old idea

- Layout
- Hardware



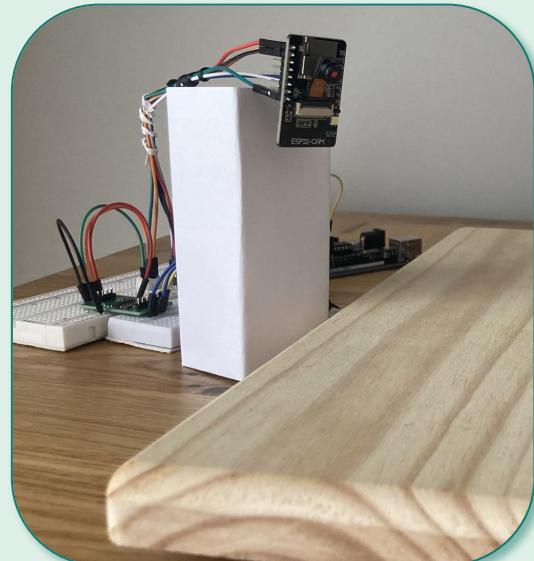
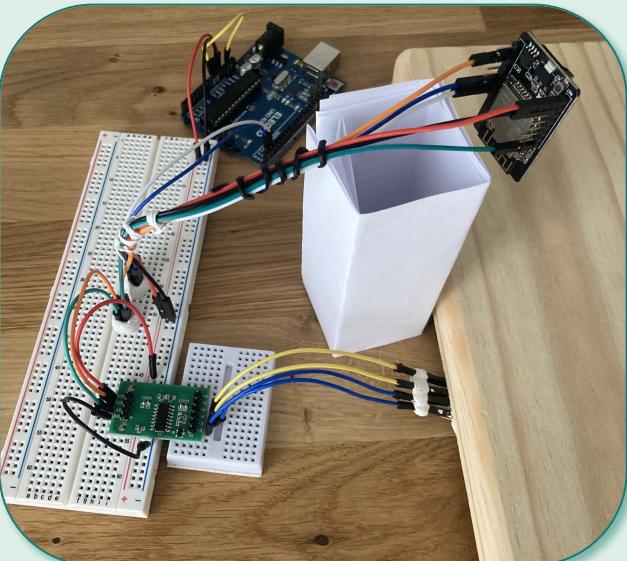
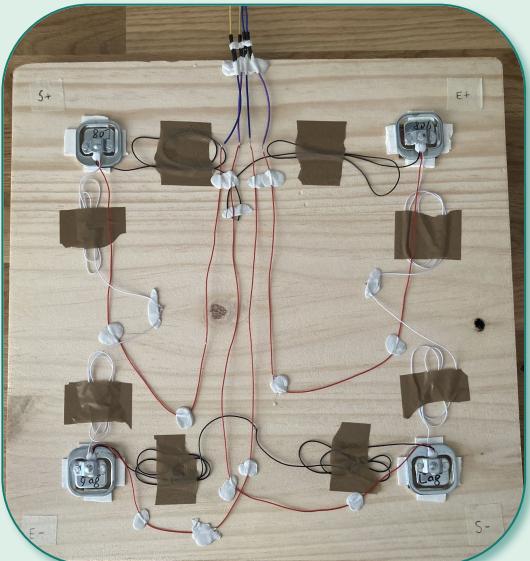
- ESP32 Wroom NodeMcu Wifi CP2102
- HX711 (24-Bit ADC)
- Load Cell (Weight sensor 10 kg)

Achieved results (Mid-program)

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New idea

- Prototype

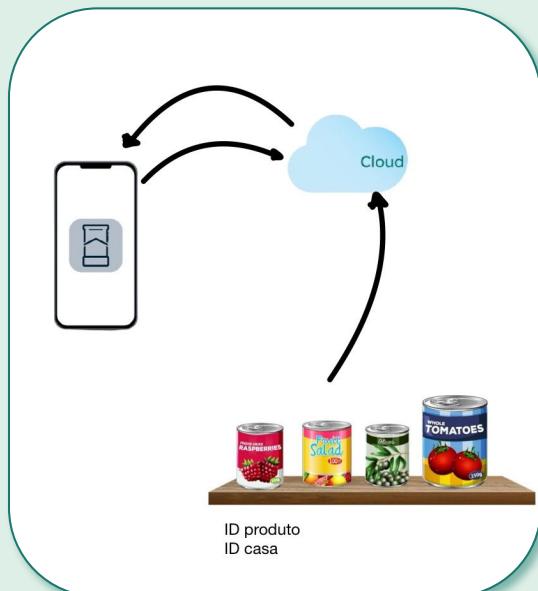


Achieved results (Mid-program)

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New idea

- System



- Technology

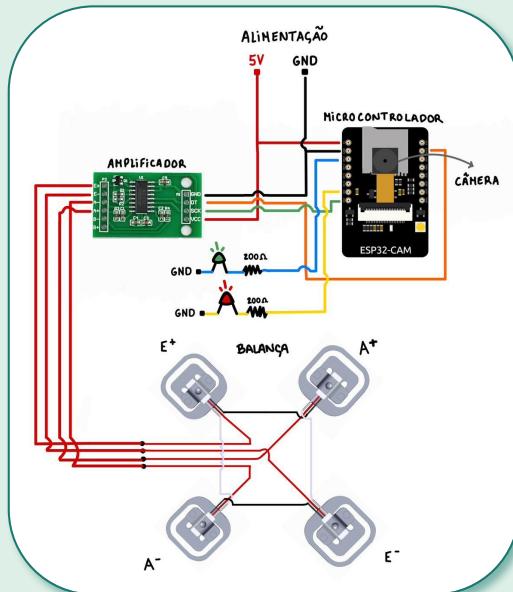
- ESP32
- OV2640
- HX711
- Half Bridge Load Cell (50 kg)
- LED
- Resistor
- Wooden board
- Firebase
- Mobile app

Achieved results (Mid-program)

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New idea

- Layout



- Hardware

- ESP32 - Cam (Microcontroller)
- OV2640 (Camera)
- HX711 (24-Bit ADC)
- 4x Half Bridge Load Cell (Weight sensor 50 kg)
- Green LED (Camera indicator)
- Red LED (Scale indicator)
- 2x Resistor (200 Ω)

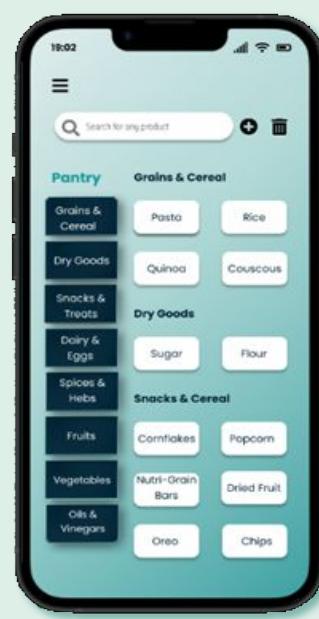
Achieved results (Mid-program)

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Mobile application

- Figma (app design)



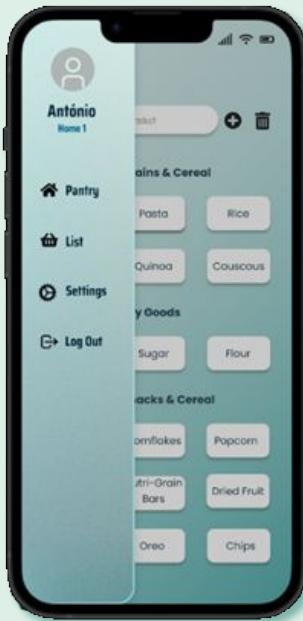
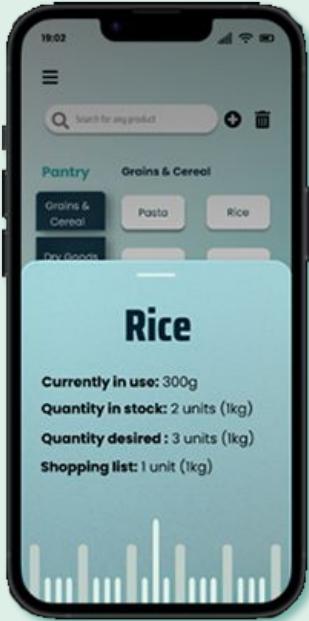
Achieved results (Mid-program)

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Mobile application

- Figma (app design)





Members contribution

Members contribution (Mid-program)

SMART HOME STOCK - Prototype team

Ricardo Fiúza	Rafaela Pereira	Renato Simões
Prototype Modeling	Prototype Modeling	Prototype Modeling
Hardware Block Diagram	Hardware Block Diagram	Hardware Block Diagram
Hardware Projection	Hardware Projection	Hardware Projection

Members contribution (Mid-program)

SMART HOME STOCK - Software & design team

Vera Amaral	Henrique Simões	Leonor Mira
Web Development and Management	Web Development and Management	Web Development and Management
Figma Application Design	Figma Application Design	Figma Application Design
Figma Website Design	Figma Website Design	Figma Website Design



Challenges faced

Challenges faced (Mid-program) - Idea change

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Why did Smart Home Stock team changed their approach?

	First Idea	Second Idea
Advantages	Easier product identification and quantity tracking Simpler implementation of automation	Cheaper Less hardware Integrated pantry shelf technology
Disadvantages	Too costly for general use Requires more space for technology	More challenging product identification and quantity tracking Harder implementation of automated system

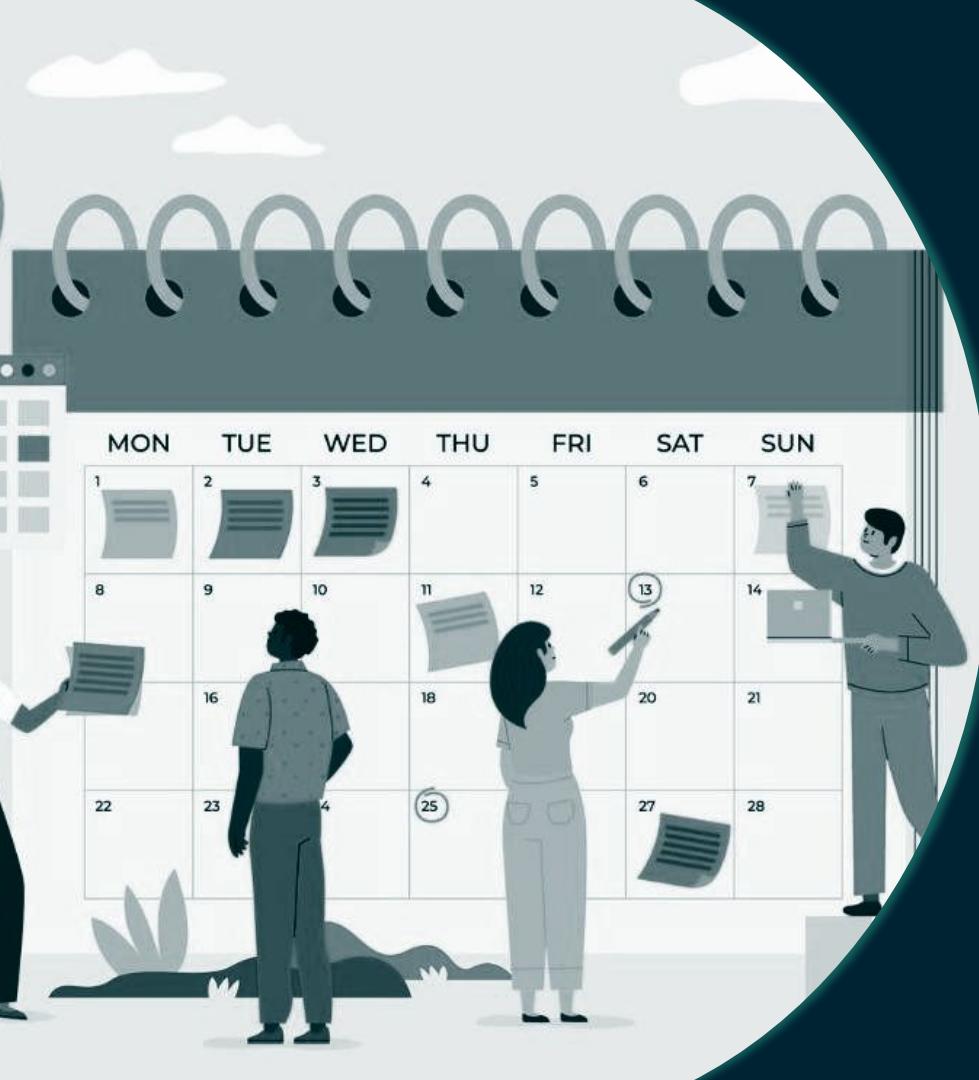
Challenges faced (Mid-program)

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Other challenges faced

- How other programs/technology work.
(ex: HTML & CSS)
- Calibration of half bridge load cells.





Schedule deviations

Schedule deviations (Mid-program) - Causes

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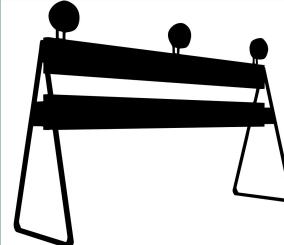
Unclear
project scope
and objectives

Underestima-t
ing task
complexity

Technical
hurdles and
unforeseen
issues

Limited access
to equipment,
software and
expertise

Personal
commitments
and workload





Corrected
schedule

Corrected schedule (Mid-Program)

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Final results

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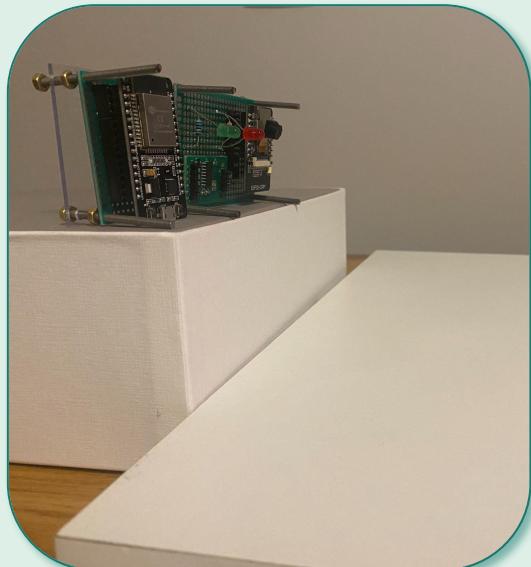
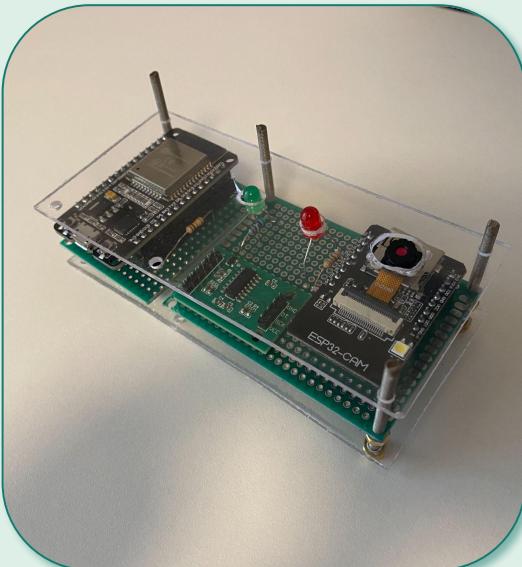
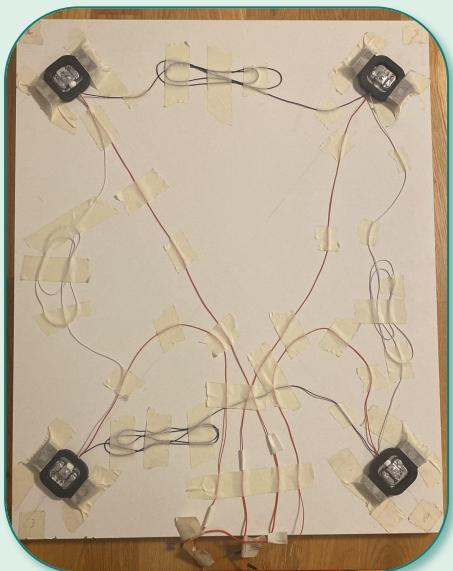
RESULTS

Final project
results

Final project results - Prototype

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- New and improved wooden board
- Extra ESP32 (One for the camera and one for the scale)

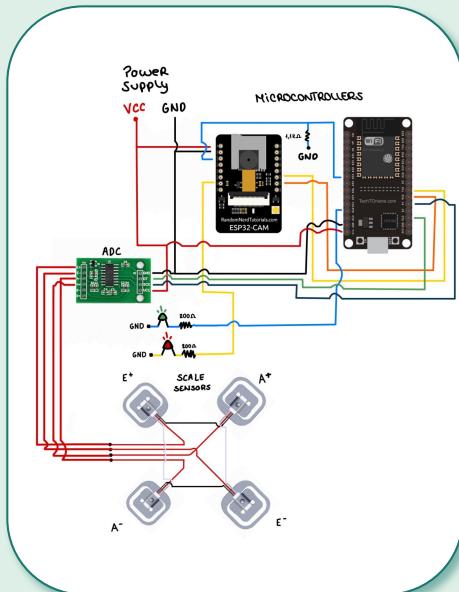


Final project results - Prototype

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Final idea

- Layout

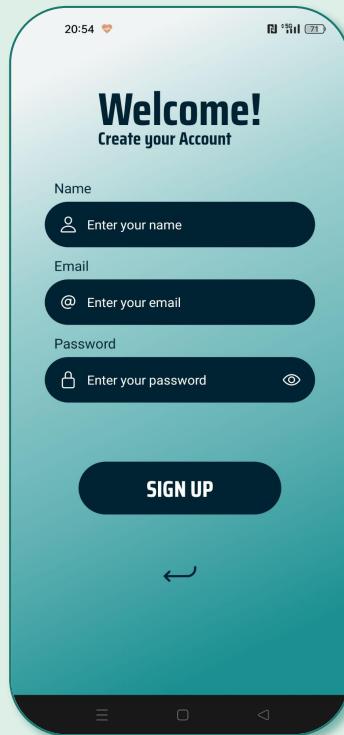
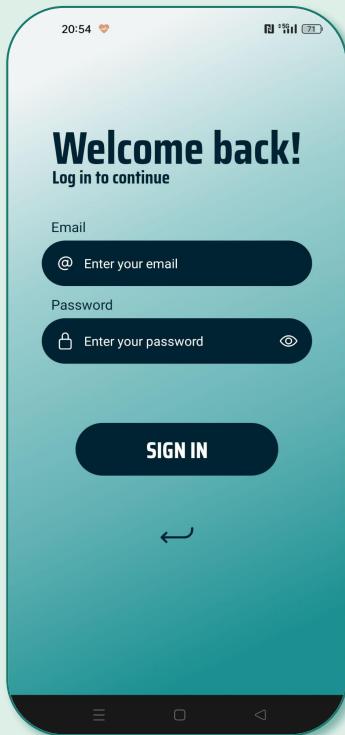
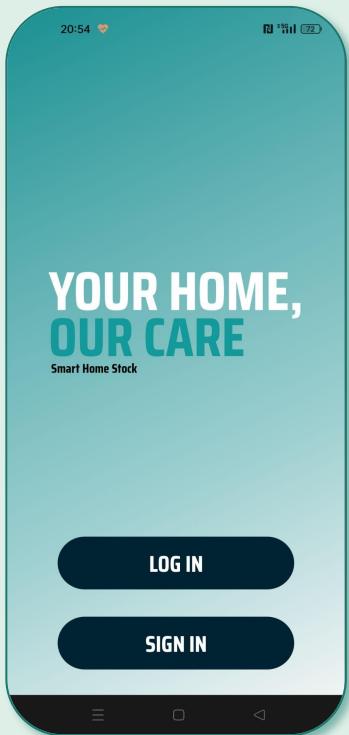


- Hardware

- ESP32 - Cam
- ESP32 Wroom NodeMcu Wifi CP2102
- OV2640 (Camera)
- HX711 (24-Bit ADC)
- 4x Half Bridge Load Cell (Weight sensor 50 kg)
- Green LED (Camera indicator)
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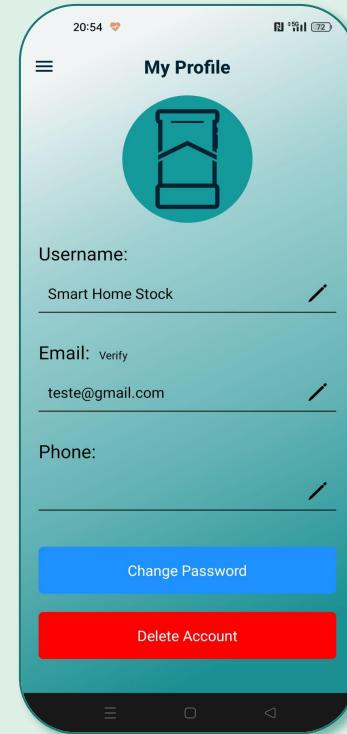
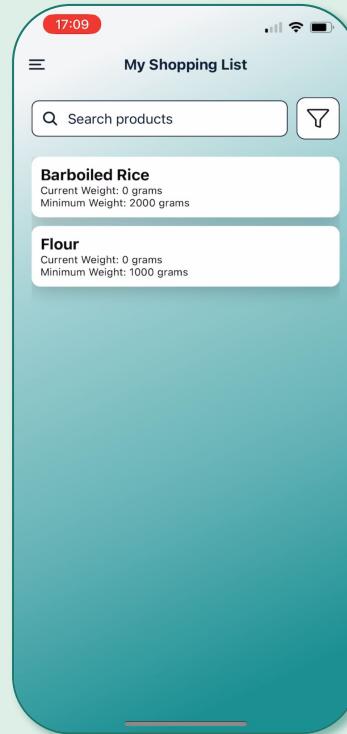
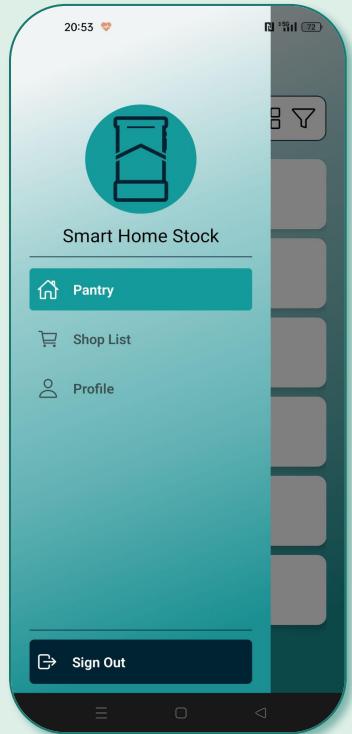
Final project results - Mobile App

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Final project results - Mobile App

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Members final contributions

Members final contributions

SMART HOME STOCK - Prototype team

Ricardo Fiúza	Rafaela Pereira	Renato Simões
Pitch Deck	Demo Video Recording	Demo Video Recording
Final Prototype	Hardware Projection	Final Prototype
Hardware Coding	Hardware Coding	Hardware Coding

Members final contributions

SMART HOME STOCK - Software & design team

Vera Amaral	Henrique Simões	Leonor Mira
Web Development and Management	Web Development	Pitch Deck
Demo Video Recording/Editing	App Development	Poster
Poster	Hardware Projection	Demo Video Recording/Editing



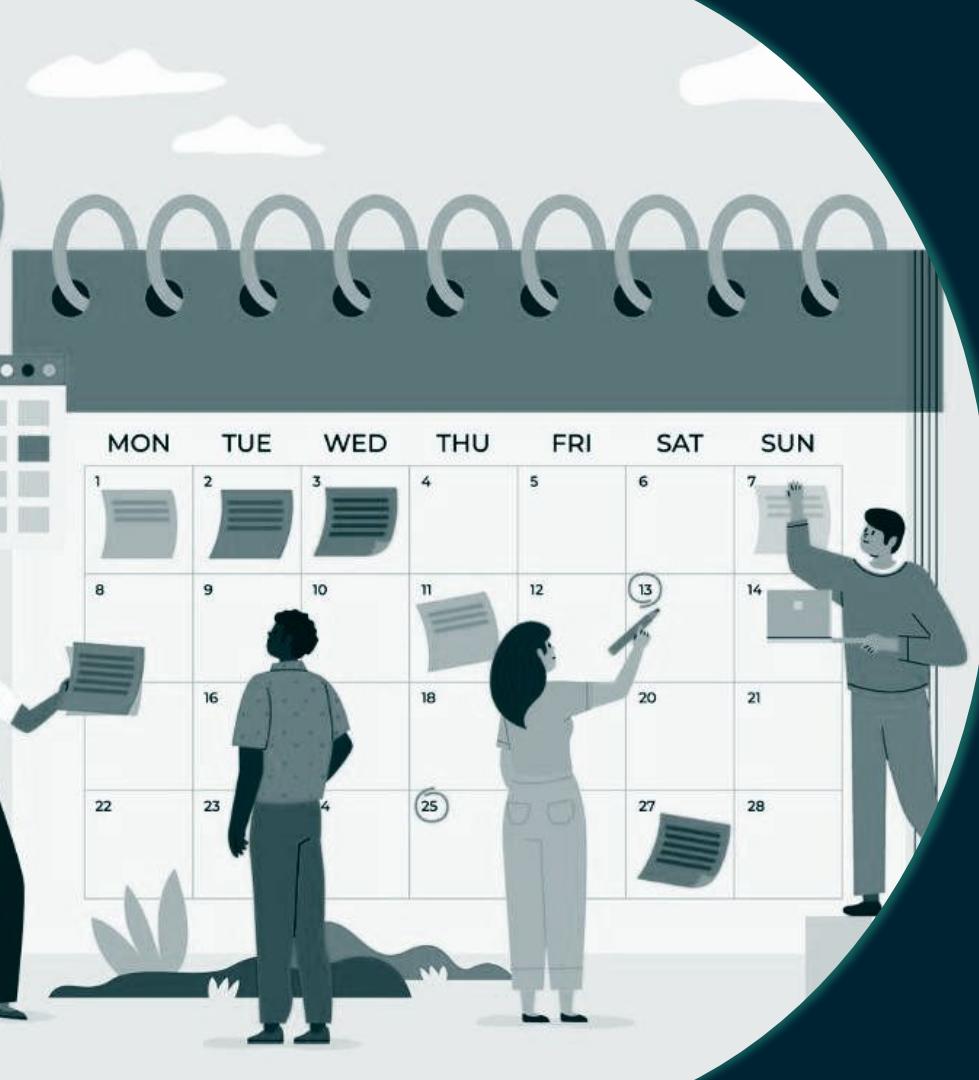
Final stretch challenges

Final stretch challenges

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- Learning how to use Expo to program mobile App.
- Malfunctioning hardware.
- Synchronization between camera and scale.





Final schedule deviations

Final schedule deviations - Causes

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Documentation wasn't always clear and didn't always align with our needs



The need to learn mobile app programming from scratch



Introducing a new ESP32 was a late realization



Hardware optimization, specifically the functioning of the load cells



Personal commitments and workload





Final schedule

Final schedule

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Contact



smarthomestockhs@gmail.com

Website



[Smart Home Stock Website](#)

Demo Video



[Smart Home Stock Demo Video](#)