

ElectroCap Mid-Program Pitch Deck

Vital Monitorization Bracelet

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Our Team

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Advisors and Mentors

Scientific Advisor



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Scientific Co-Advisor



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Problem definition

- In Portugal, more than 44.100 elderly people live in isolation.
- This number is likely to grow.
- It's hard to assure the safety of these people.



Solution beneficiaries

We are trying to reach out to:

- Individuals with family members in these conditions.
- Institutions and professionals whose job involves assuring the safety of old people.
- The elders themselves.



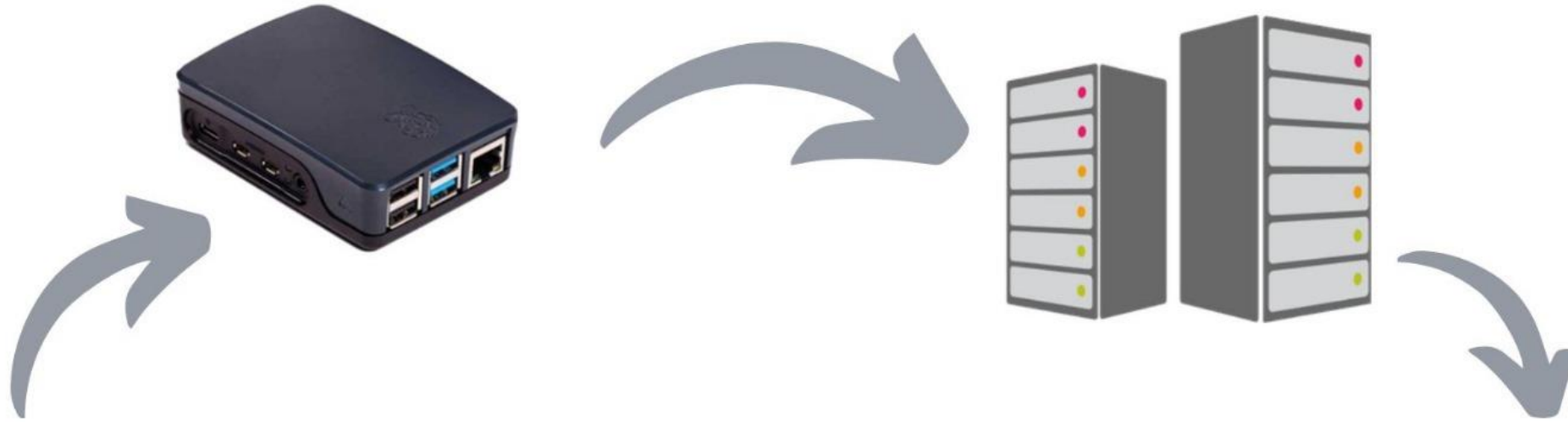
Technological solution

- Acquire data from a gyroscope, accelerometer, cardiac rate sensor, and oximeter.
- Translate data to useful information (motion tracking, heartbeat) in a cloud-based server.
- Display the relevant information in a phone application.

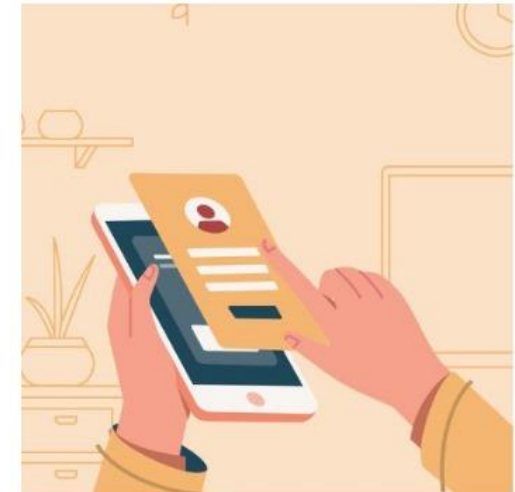
Easy to check the condition of an elder and via notifications, it's possible to act faster in case of an emergency.



Solution Visualization



- The bracelet gathers information constantly
- It transmits it to a local router
- The router sends the information to the server
- Finally the server communicates the information to the app



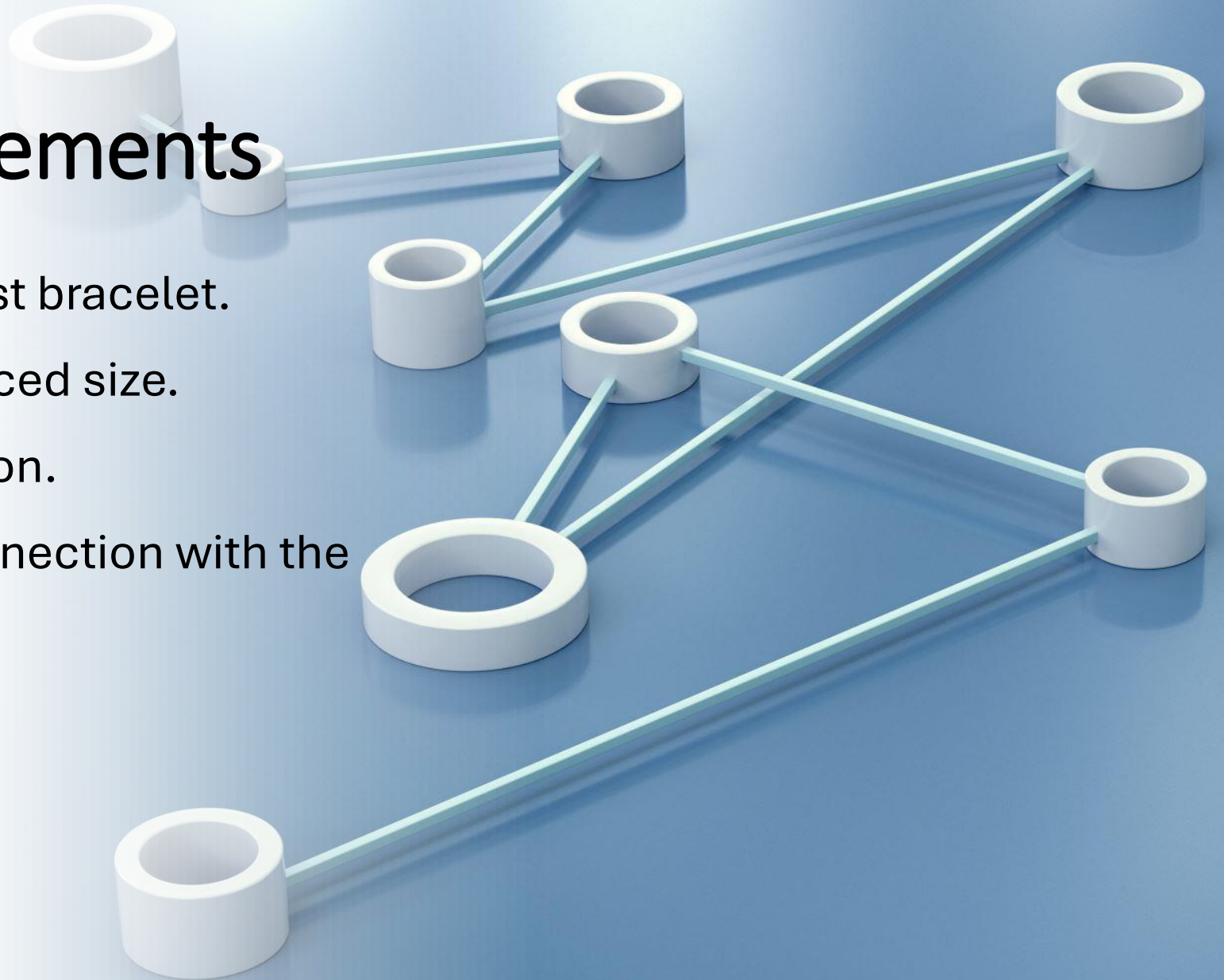
Competitors

- IDIWATCH (<https://idicare.com/pt/idiwatch/>) – out of service.
- Pager – only works as SOS.
- Caring professionals – requires the presence of a person 24/7 to have full-time monitorization.



Solution requirements

- Comfortable and robust bracelet.
- Lasting battery of reduced size.
- Reliable data acquisition.
- Private and secure connection with the server.
- Intuitive application.



Technical challenges

- In the project's implementation, we anticipate that the most challenging aspect will be ensuring that the bracelet is practical, comfortable, and water-resistant since the goal is for it to be worn for extended periods, including during bathing.
- Ensuring the longevity of the battery life will also be a challenge. Providing an intuitive interface for both the user and the monitor is another important aspect.
- Implementing a robust and fast communication system that allows the monitor to receive alerts with minimal latency will also be a significant challenge.

Partners

Currently operating independently.

- Professional caretaker (potential partner).
- Juntas de freguesia.
- Nonprofitable organizations.



Testing and validation metrics

- Extensive sensor testing in a controlled environment.
- Autonomy tests.
- Server stress testing.
- Prototype testing in a controlled environment.
- Prototype testing with elderly people.



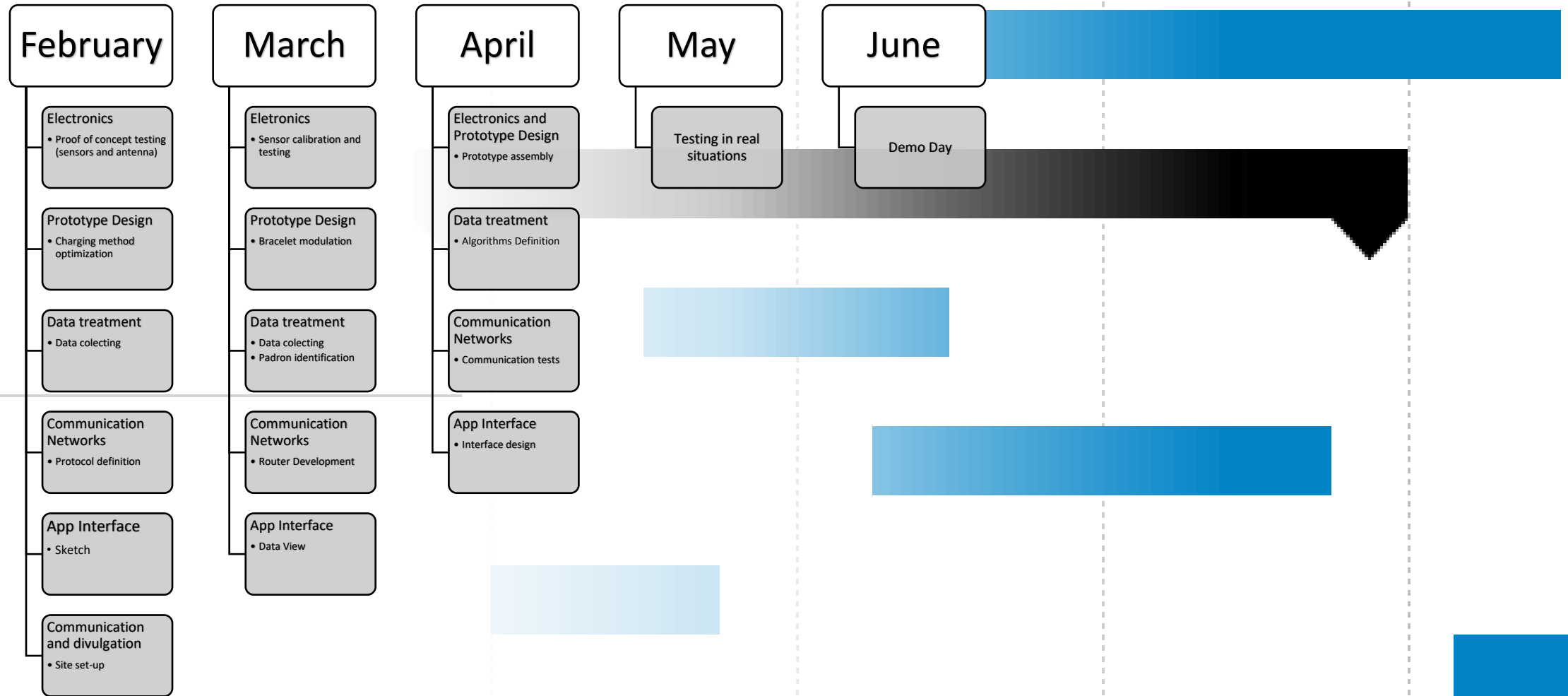
Initial division of labor (1)

Pedro Lopes	Vasco Martins	Tiago Dias
Data Treatment	Hardware Setup	System Modulation
Data Translation	Router Setup	Design Data Base
Server/client Protocol Setup	Final Prototype Setup	Pattern Identification
Algorithms Definition	Find partners and volunteers for testing	Battery Solution

Initial division of labor (2)

Miguel Pereira	António Quendera	Bernardo Santos
Communication Network	App Interface	Electronics
Protocol Definition	App Design	Sensors and Processor Setup
Server/client Communication	App Implementation	Sensor Calibration
Site Development		Sensor Testing

Original Schedule



Mid-program status

- A low-level prototype of the application has been made;
- More than half a dozen interviews were conducted with elderly individuals or their respective family members;
- Tests were carried out to assess the functionalities of the heartbeat sensor, gyroscope and accelerometer sensors;
- Google Forms designed to enquire elderly or family members;
- Website updated and well-structured with what has been accomplished so far;
- Unfortunately, the choice of processor is pending due to complications with sensor's compatibility.

Achieved results and new objectives defined

Results and Conclusions so far:

- Limit the project to household use only;
- Guarantee the safety of user data used to ensure users' satisfaction and trust;
- The HR sensor needs precise placing to ensure good results;
- Use of Arduino for bracelet main processor;
- App design to use simplistic and simplified health markers as default.

New Objectives:

- System with in-house router (Raspberry Pi) connected to the internet;
- Required minimal prototype that is functional, discrete and comfortable required for testing.

Challenges faced by the team

- **Battery:** We had to balance the functionalities we planned to implement, to ensure the energy efficiency of the bracelet;
- **Usage Environment:** We opted to implement the use of the bracelet in a domestic environment due to the lack of viable means of communication without an external device to the bracelet when outside the home;
- **Size:** We faced difficulties in choosing the microprocessor and the sensors, to ensure that the bracelet did not become too large on the wrist.



Deviations from original schedule

Main causes:

- Yet to start data treatment due to time delay in the sensors acquisition;
- We didn't have as much time as we expected due to heavy work on other courses.

Consequences:

- Although we experienced some alterations, the calendar didn't suffer many modifications;
- We may be left without enough time dedicated to optimization testing.

Contribution of each team member (1)

Pedro Lopes	Vasco Martins	Tiago Dias
Server solution	Sensor set up	Interviews
Research solution with remote server	Sensor choosing	Write interview guide
Integration processor-sensor	Sensor testing	Interviews
Interviews		Research I2C

Contribution of each team member (2)

Miguel Pereira	António Quendera	Bernardo Santos
Site set up	App design	Processor set up
Site set up	Low level prototype	Processor choosing
Research solution with personal server	Research graphic design	Processor testing
Site update	Design app home page	
Team managing	Interviews	

Corrected Schedule

