

Inside Health



FINAO
BIOTECH

INSPIRED
BY OUR PAST
DRIVEN
BY OUR FUTURE



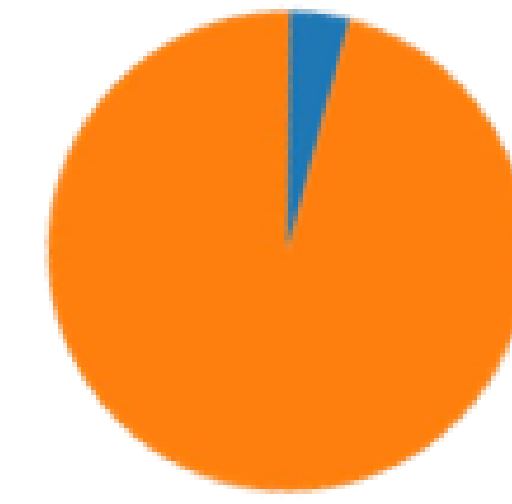
ULS
ALTO
ALENTEJO

Integrated Tele-Geriatric Health Monitoring Hub

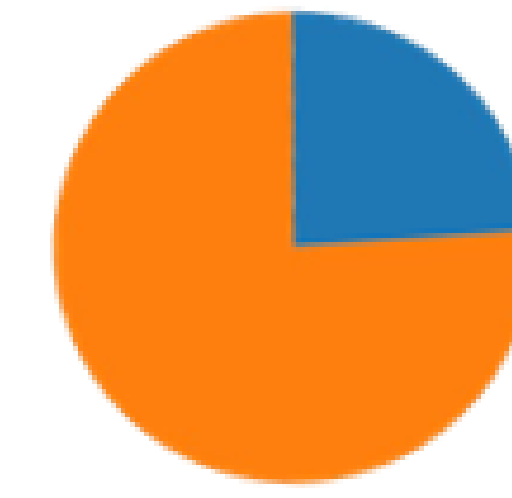
Filipa Dias (109933); Guilherme Farinha (110617); Luís Carvalho (110507);
Madalena Espiguiha (109795); Pedro Brás (109679)

Problem Definition

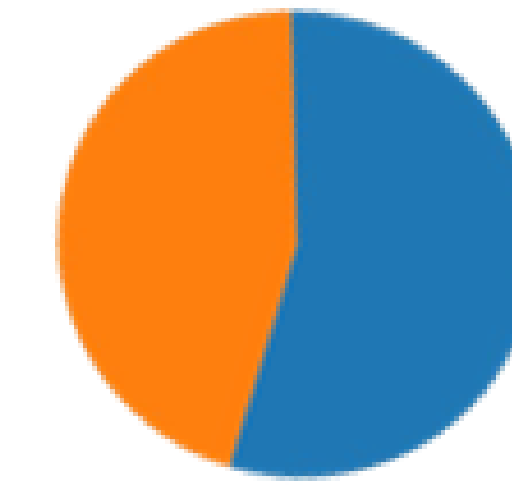
- Portugal has a rapidly aging population facing mobility and distance barriers, leading to missed appointments and delayed care.
- Current teleconsultations are clinically limited. Physicians cannot collect essential physiological data (such as heart rate, respiratory sounds or ECG signals), which compromises diagnostic reliability.



More than 4% of the Portuguese population ($\approx 400,000$ people) reported unmet medical needs due to barriers such as distance, costs, or waiting times



Approximately 24% of the Portuguese population is aged 65 or older (≈ 2.5 million people)



More than 55% of elderly people in Portugal have at least one chronic condition. ($\approx 1,4$ milhões)

Beneficiaries

- Elderly Patients: Avoid long journeys while receiving comprehensive remote care;
- Families: Save personal time and gain confidence in their relatives' health monitoring;
- Doctors: Perform teleconsultations with accurate diagnostic data and improved scheduling.

Engineering Requirements

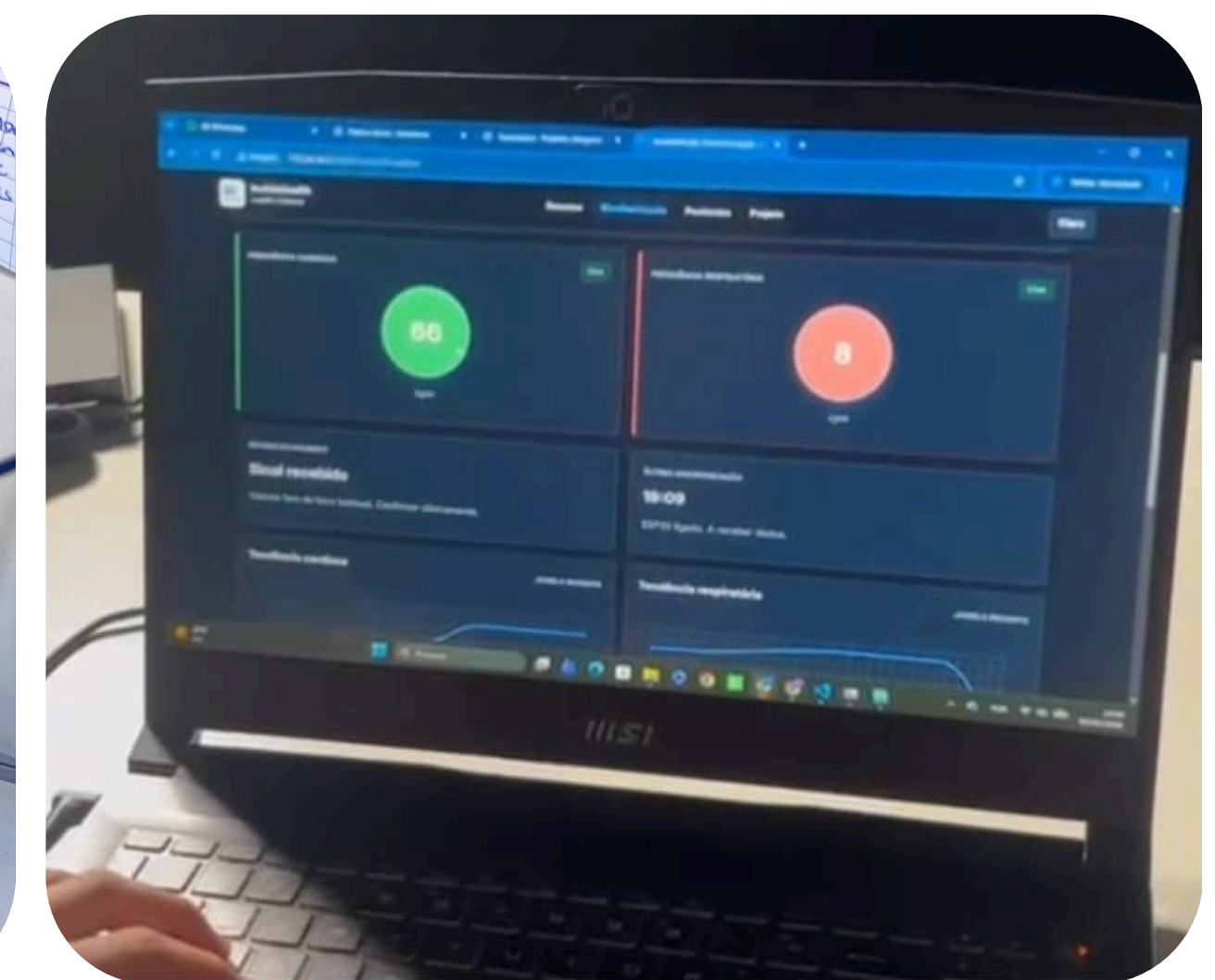
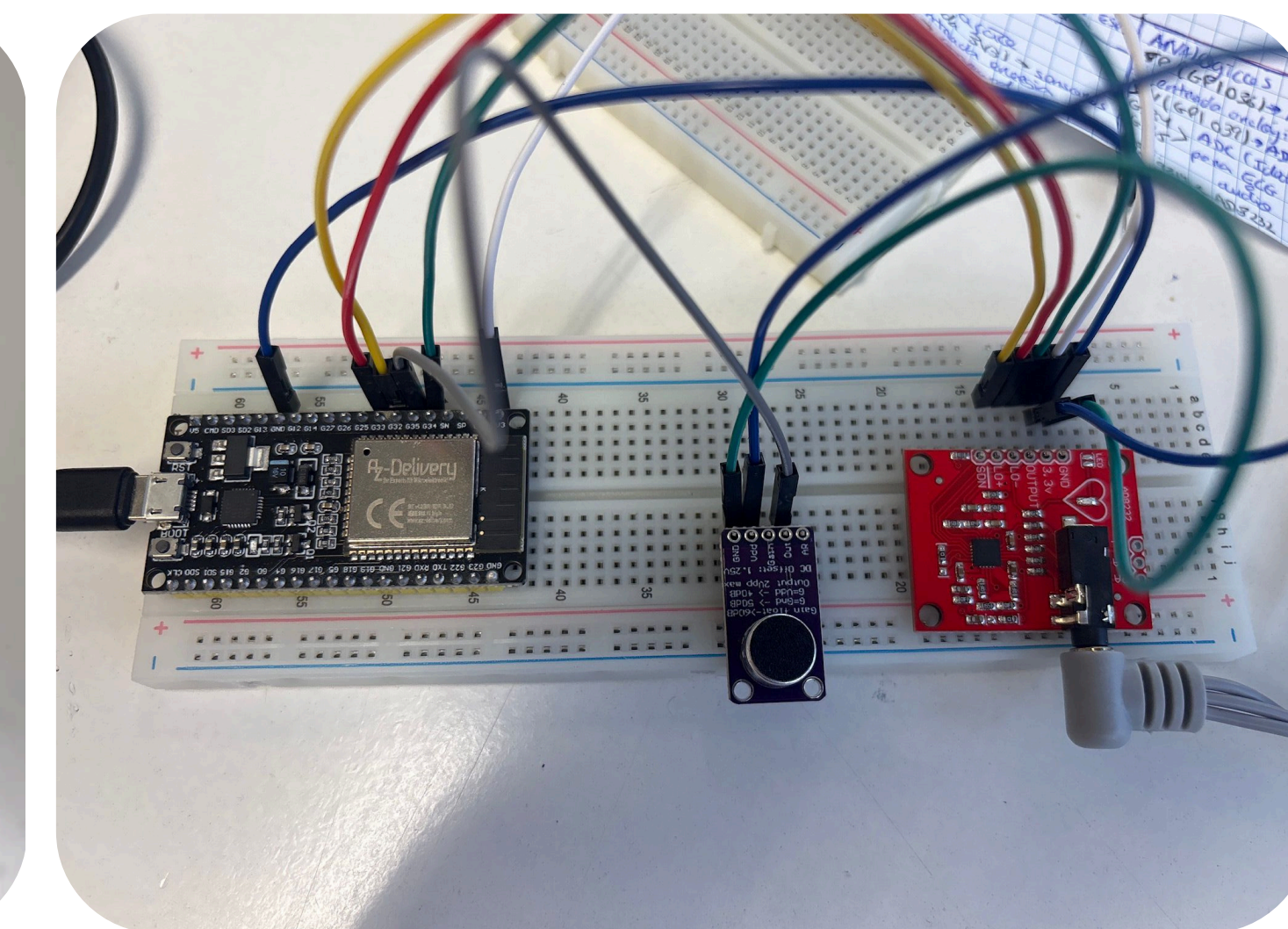
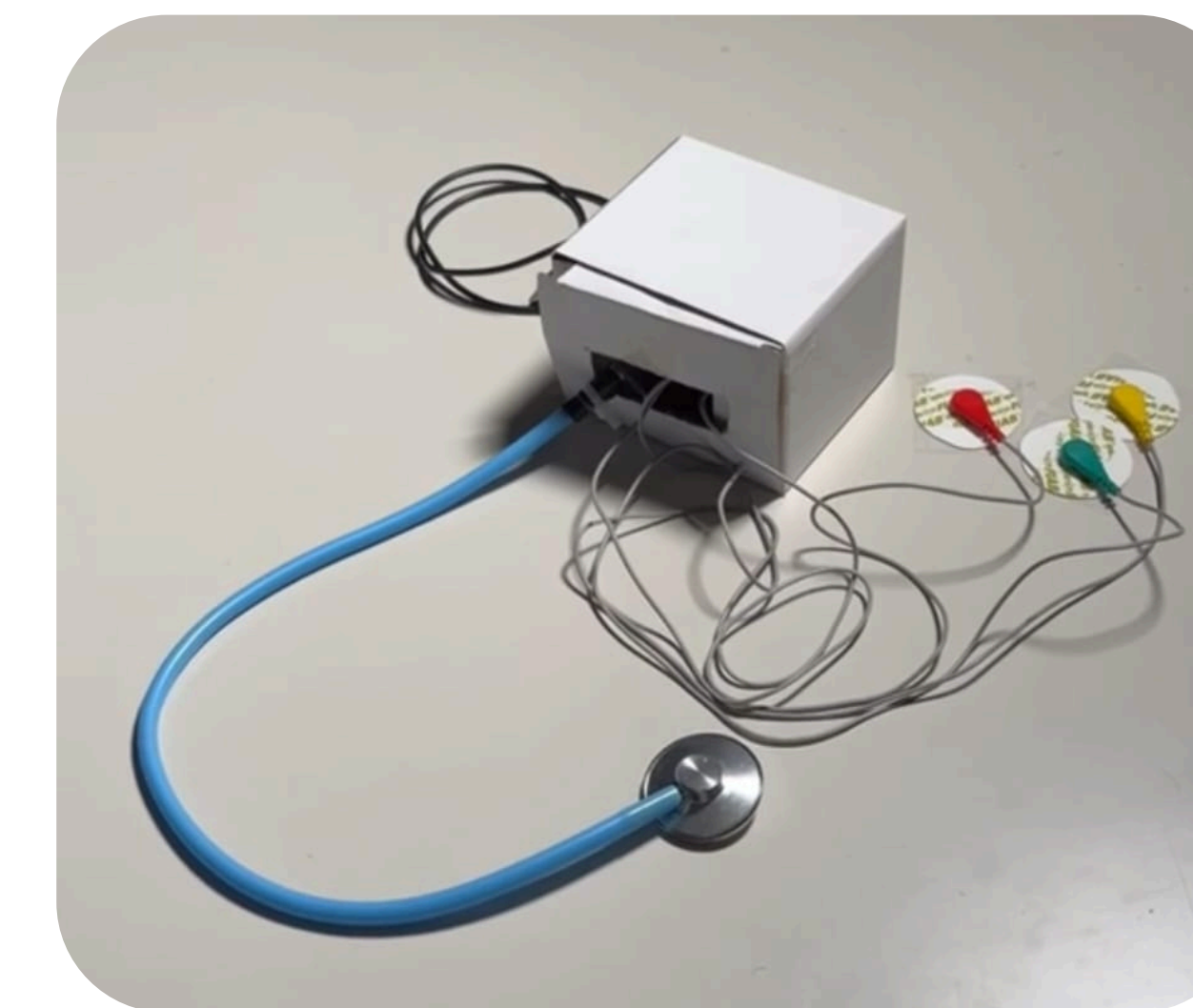
- Acquire ECG and cardio-pulmonary acoustic signals;
- Transmit data wirelessly to an external interface;
- System latency of less than 1 second;
- Lightweight wearable design (under 300 g).

System Architecture

An ESP32 microcontroller manages all signal acquisition, processing acoustic heart sounds from a digital stethoscope via a MAX9814 module, while simultaneously recording ECG data from three chest electrodes through an AD8232 module.

Solution

A wearable platform integrating biomedical sensors to support teleconsultations. It acquires physiological signals and transmits them in real-time to the cloud. Doctors receive the patient's vital signs (ECG graphs, respiratory rates and heart/lung sounds) on a desktop interface during the call.



Resultados

To validate our solution, we conducted practical tests with elderly users in simulated teleconsultation scenarios. The firsthand feedback was highly positive, confirming a significant and tangible improvement in remote patient care and monitoring. These real-world results demonstrate that Inside Health successfully achieves its primary goal: providing an accessible, comfortable, and clinically reliable telehealth experience for the elderly population.



<https://inside-health.netlify.app/>