



An Unbabel spin-off 🚀

# Halo

**Augmenting  
Human Communication  
with AI**

**Catarina Farinha**  
20th February 2025



# Hi, I'm Catarina!

## ACADEMIC BACKGROUND

- Master in Biomedical Engineering @ Instituto Superior Técnico (IST)
- PhD in Computational Psychiatry @ Faculdade de Medicina da Universidade de Lisboa (iMM)

## PROFESSIONAL JOURNEY

- AI Research Scientist @ Unbabel (2019-2023)
- AI Research Manager @ Unbabel Labs (2023-now)
- Product Lead @ Center for Responsible AI (2023-now)

## PERSONAL PROJECTS

- Data Science for Social Portugal Lead Team (2019-now)
- Portuguese Executive Women in Tech lead by Amazon (2023-now)



# CENTER FOR RESPONSIBLE AI

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## Fair and transparent

Developing AI products that contribute to a fairer society.

10

Startups

8

Research Centers

2

Unicorns

1

Law Firm

5

Industry Leaders

21

Products



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## AI Talent

Join a Center for responsible AI partner

Join the growing group of people that is shaping the future of Responsible AI.

At the Center for Responsible AI, startups, research centers and industry leaders unite in their commitment to develop fair, explainable, privacy-preserving and sustainable AI products and technologies. If you want to work on life changing projects, here is how you can get involved:



## PhDs in the Industry

Collaborate with industry experts in the development of Responsible AI solutions, gaining practical experience that connects academic research to real-world applications.

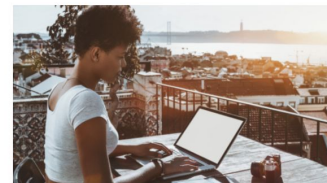
[View Opportunities](#)

Center for Responsible AI

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## Careers

Find job openings from our partners that will launch your AI-Oriented career in Portugal. Work inside a vibrant community, together with seasoned professionals and the best of academia in a friendly country with unparalleled perks.

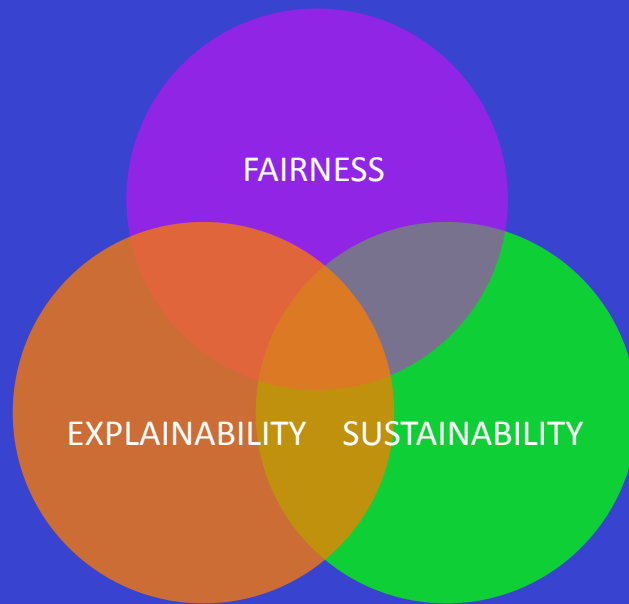
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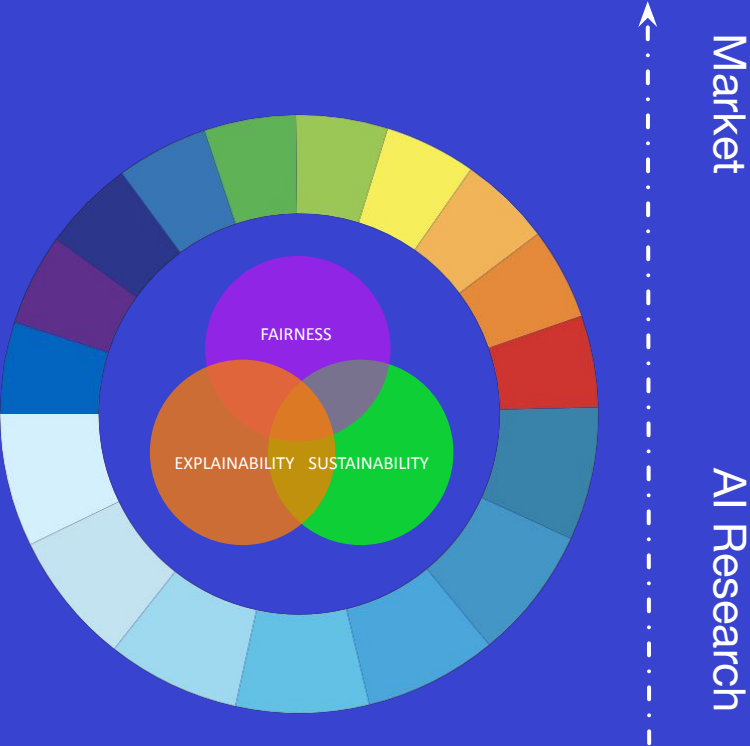
## Summer Internships

SUMMER

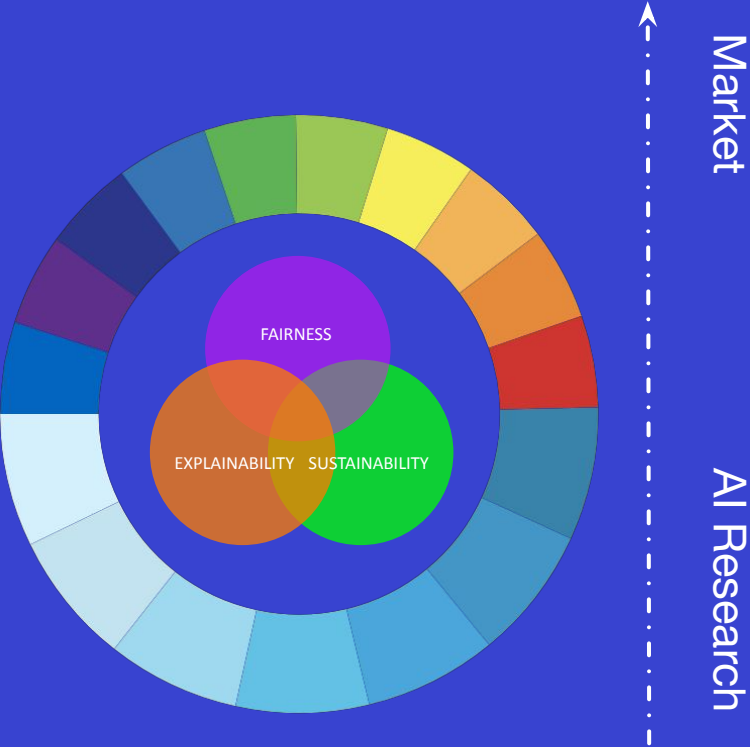
Our Internships will introduce you to real world projects that are making an impact today. Learn from the teams that are building the next generation of Responsible AI products. Apply now to the '24 Summer openings.

[View Opportunities](#)

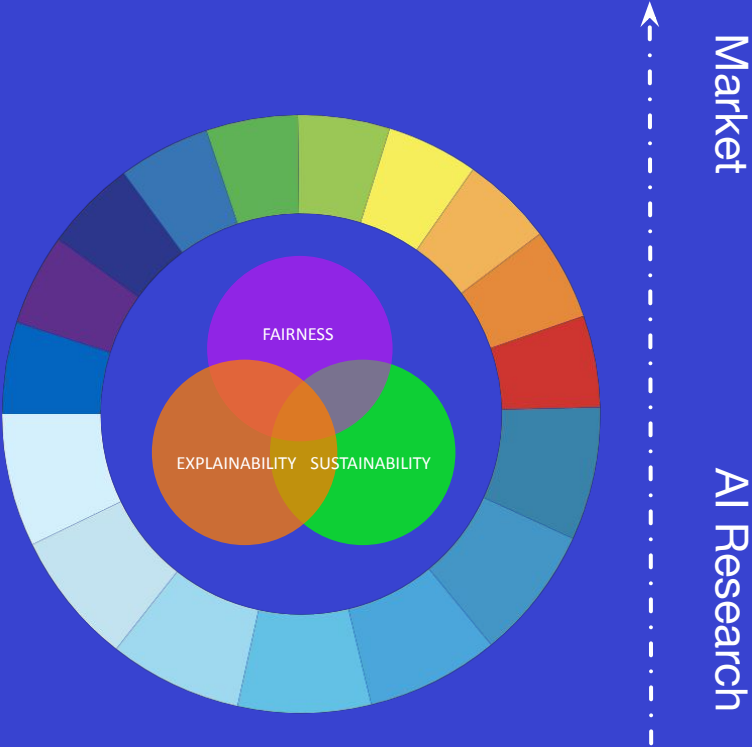




- Champalimaud Foundation
- CISUC
- FEUP
- Fraunhofer Portugal AICOS
- INESC-ID
- ISR-Lisboa
- IT



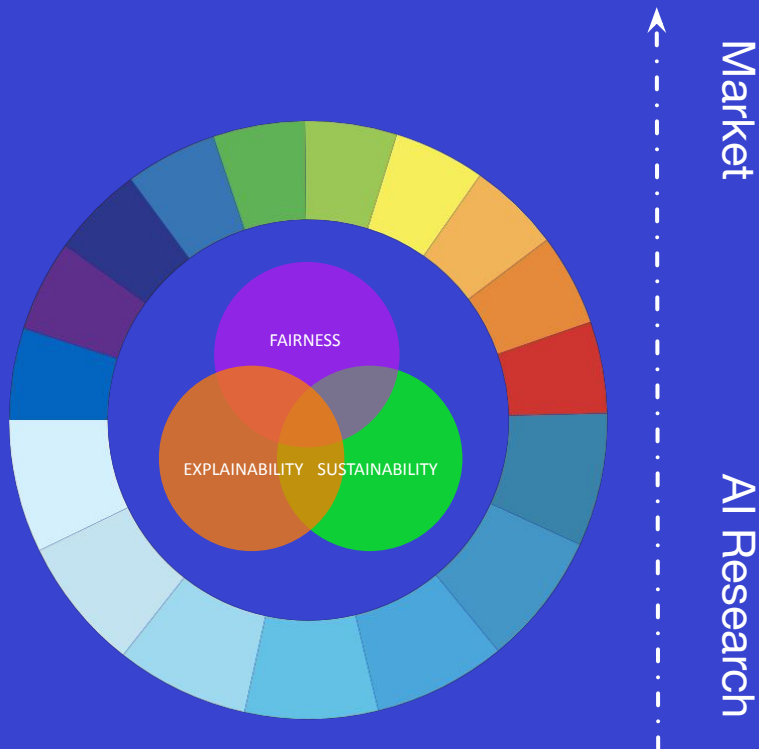
- Automaise
- Emotai
- NeuralShift
- Priberam
- Sword Health
- Unbabel
- VdA
- Visor.ai
- YData
- Yoonik
- Champalimaud Foundation
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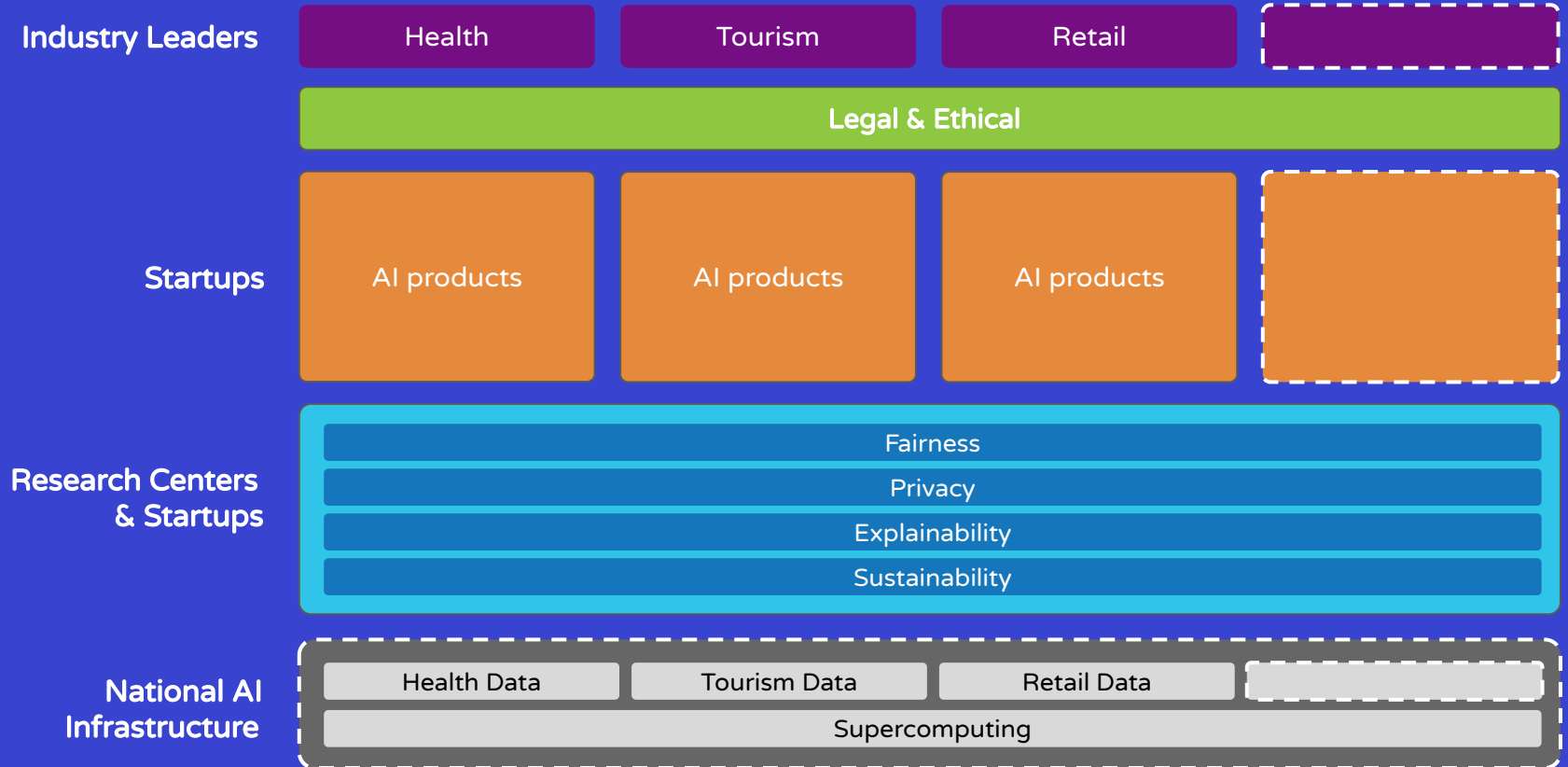


# Center for Responsible AI Pillars

- Feedzai
- BIAL, Hospital de São João, Hospital da Luz
- Pestana Group
- SONAE
- Automaise
- Emotai
- NeuralShift
- Priberam
- Sword Health
- Unbabel
- VdA
- Visor.ai
- YData
- Yoonik
- Champalimaud Foundation
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# Center for Responsible AI Pillars





Center for Responsible AI

21  
Products  
using  
Responsible AI



An Unbabel spin-off 🚀

# Halo


Augmenting  
Human Communication  
with AI





# The problem



A photograph of Stephen Hawking seated in his custom-built wheelchair. He is wearing a dark green sweater and glasses. A small electronic device is attached to his cheek. The wheelchair has a complex mechanical arm in front of him. The background is a plain, light-colored wall.

# Stephen Hawking

Theoretical physicist, cosmologist, and author

Lived with ALS for 50-plus years












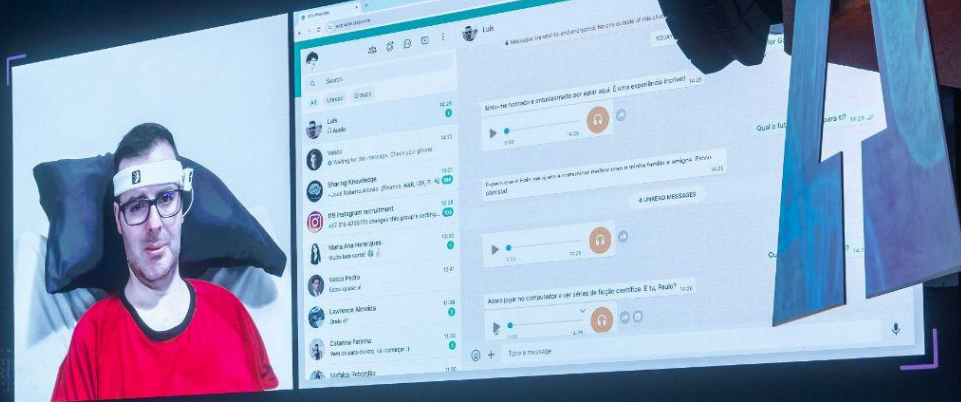
# Product Pod



# Halo's product pod



-  Unbabel
-  IT
-  Fraunhofer Portugal AICOS
-  INESC-ID
-  ISR
-  Champalimaud Foundation
-  Hospital de São João





**DEMO** 





# Halo Proprietary AI System

## Halo Headband

Advanced hardware for neural signal detection and real-time processing, no calibration needed.



## Headphones

Audio interface, hands-free, freedom to move.



## App

Speech recognition and voice cloning.



## AI Persona

Personal LLM using Retrieval Augmented Generation (RAG) and vector database with user preferences.

Hello, do you need any help now?



**I would love a strawberry milkshake**

Live,  
in-person speech.

Integration with WhatsApp  
for text messaging.





# AI Persona

Preferências

Conversas

Entrevistas

Relações

Convicções

AI Persona



# Halo Multimodality







# Halo Ecosystem



## Sistema Halo

### Halo Home

- 1** Recolhem memórias (de Natal) de todas as pessoas à nossa volta

Construir a memória do Halo é uma tarefa colaborativa



As memórias são privadas e guardadas em segurança dentro de cada Home.

- 2** IA recolhe factos relevantes das memórias



Recolhe nomes, vozes, expressões, gostos pessoais

- 3** O Halo usa as memórias para criar novas mensagens



Agora tem mais informação sobre os gostos de cada um. O Halo gera melhores frases no tom do utilizador.

Os utilizadores Halo usam estas memórias para gerar novas frases que enviam através das suas duas plataformas:

### Halo Headband



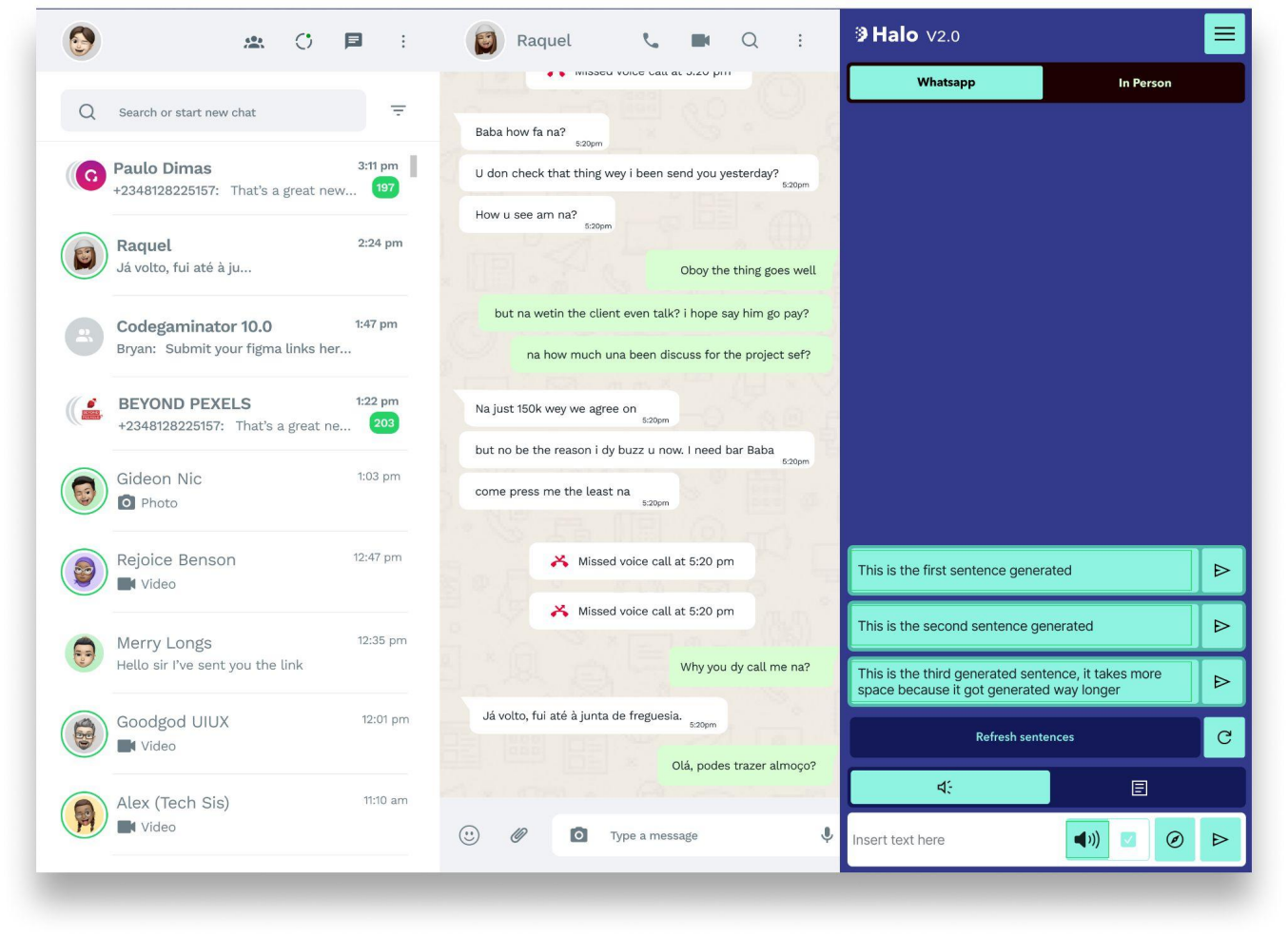
A Headband captura biosinais que transforma em mensagens. Estas são enviadas pela App Halo.

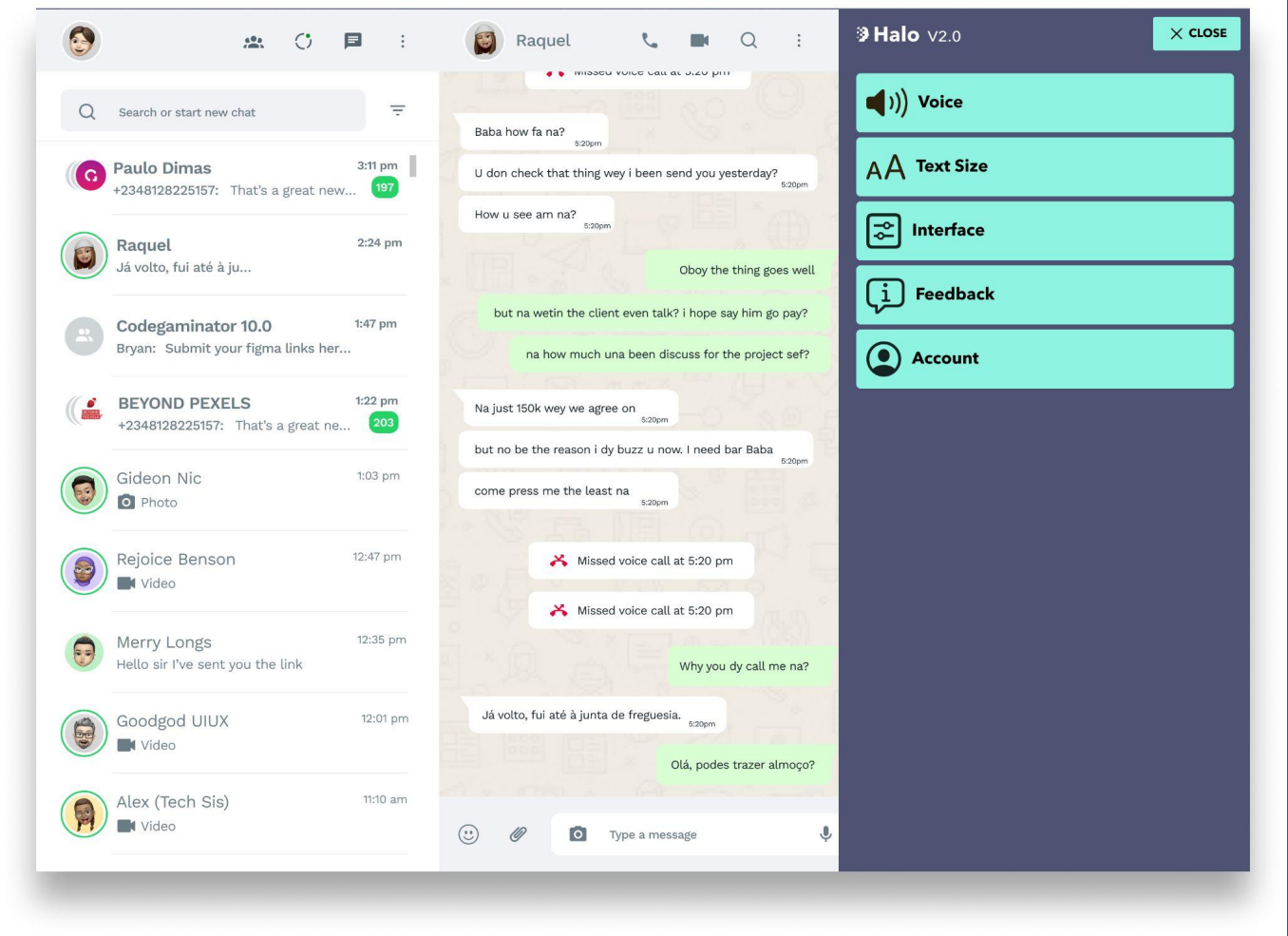
### Halo Sidebar

NOVA VERSÃO



Usando eye-trackers, a Sidebar gera frases que envia como texto ou em voz, em tempo real.







# Halo Home

# Basic onboarding

- Questionnaire with personal questions
- Information from family and therapeutics
- Past conversations

...

Answers are converted to a simple and clear format using GPT-4

### Unbabel - Halo Onboarding

This is a set of 100 questions used to personalize the language model used in the app Halo, developed by Unbabel.  
All answers are optional and should be answered with the amount of content you deem relevant. The more content, the more information the language model will have available.  
We recommend skimming through all the questions before answering, in order to avoid similar answers.

nuno.infante@unbabel.com [Switch account](#)

🔒 Not shared

What is your full name?

Your answer

Where and when were you born?

Your answer

Where do you currently live?

Your answer

### Knowledge

#### nuno info:

Info

Nuno's favorite color is blue.

Nuno's favorite food is "Bochechas de porco preto" (black pork cheeks).

Nuno's favorite book genre is scientific divulgation, and his favorite book is "Talk to...

Nuno's favorite movie is "Interstellar", and he enjoys sci-fi movies.

Nuno does not have any favorite phrases from films or books.

Nuno does not have a preferred style of music and likes to listen to everything new...

Nuno is interested in tennis.

Nuno's hobbies include surfing, going to the gym, hiking, and running.

Nuno's favorite way to relax is doing Legos or puzzles and also cleaning.

Nuno prefers a climate that is cold but also enjoys hot days with a small breeze.

Info to add

Add



Sign in



Caretaker

Help gather information about  
the Patient's routines and habits

SIGN IN



Patient

Create and Edit personal  
information and change how the  
Persona behaves

PATIENT SIGN IN

Unbabel

**Halo** Persona



Responde às perguntas de hoje!



0/5

Interviews



**Quiz**

0/100

**Journaling**



Luis Silva

Unbabel

**Halo** Persona



Get your daily blocks done!



1/5

Interviews



**Quiz**

1/100

**Journal**



Luis Silva



**Quiz**

100 Questions

Tell me more about your hobbies

Start typing here





Unbabel

**Halo** Persona



Get your daily blocks done!



1/5

Quiz



Quiz

1/100

**Journal**



**Luis Silva**

## Journal

24/6/2024

Ha dias em que fico com fome

Ontem fui a carcavelos

gosto de bacalhau a gomes de sá

Start typing here

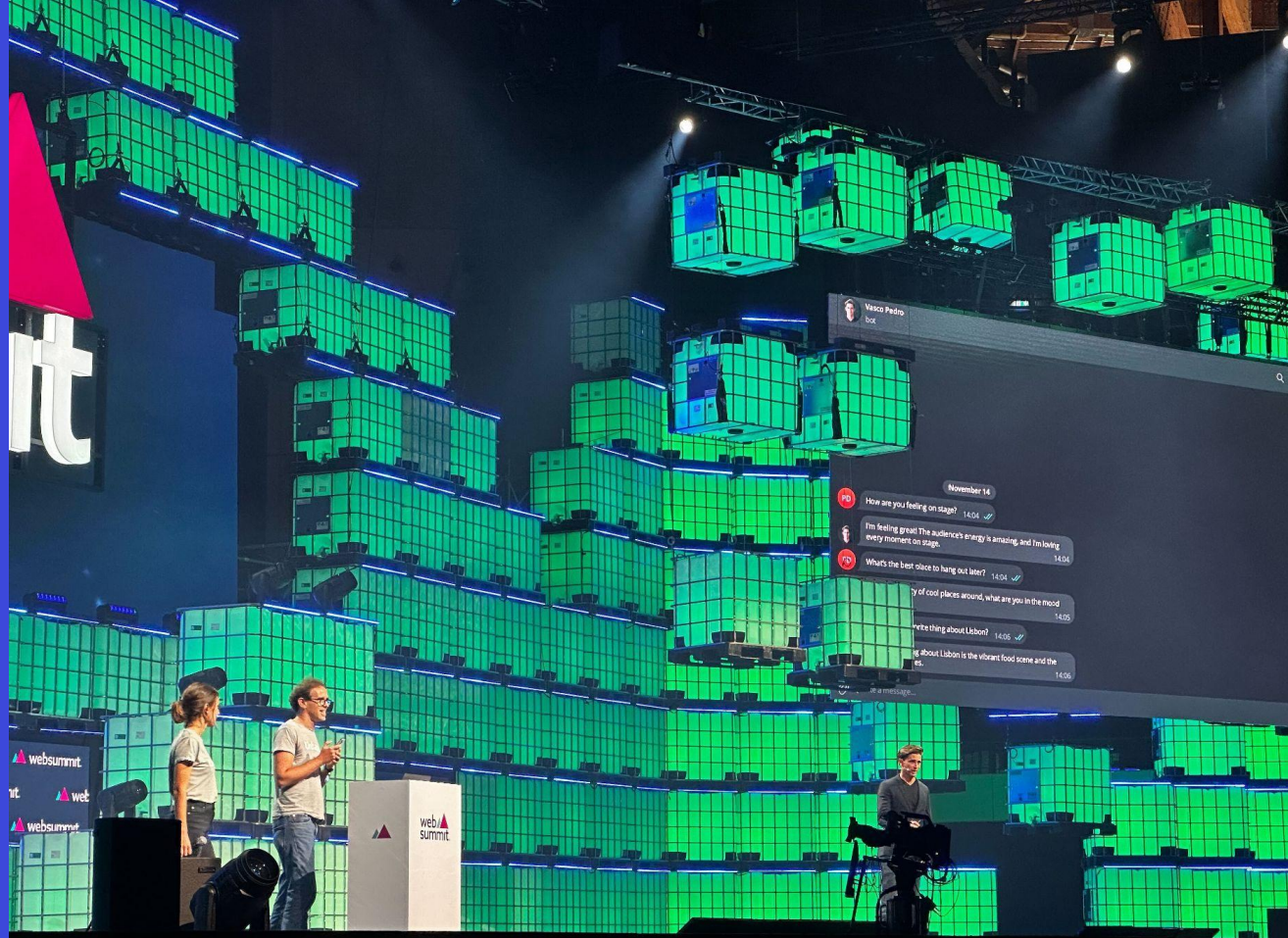


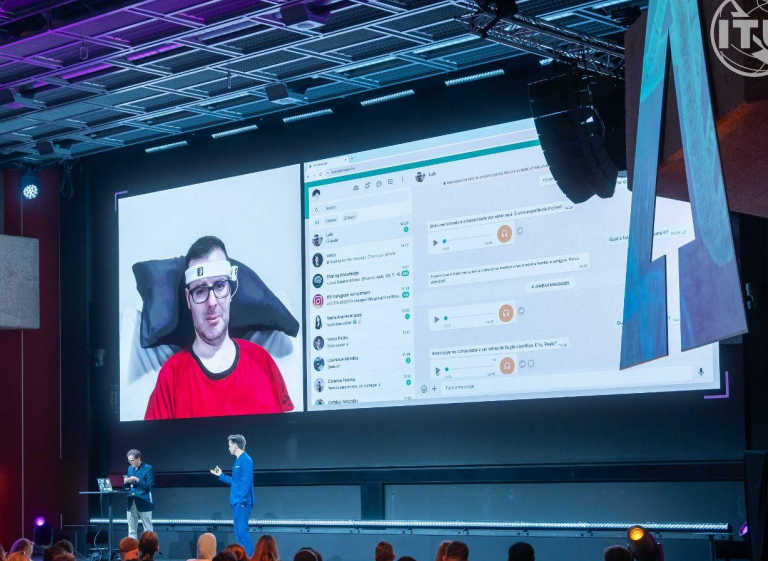


# Halo in the news

# Halo at Web Summit

8000+ people watching





structures of the language. "You also have to have the perfect translation, you also have to have 'human-level intelligence,'" says Mr. Caswell. Without being a competent poet, it is difficult to translate a haiku.

That is if users can even agree on what a perfect translation is. Translation has long been a struggle between "transparency" and "fidelity"—the choice between translating sentences exactly as they are in the original language, or exactly as they feel to the target audience. A transparent translation would leave an idiomatic phrase as it is, letting English speakers hear a Pole dismiss a problem as "not my circus, not my monkeys"; a faithful one may even go so far as to change whole cultural references, so that Americans aren't taken off-guard by "football-shaped" being used to describe a spherical object.

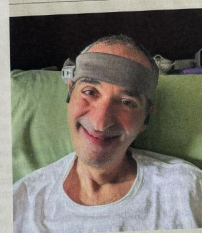
Even if there could be a simple dial to turn between transparency and fidelity, perfecting the interface of such a system would require AI assistance. Translating between languages can sometimes require more information than is present in the source material: to translate "I like you" from English to Japanese, for instance, a person needs to know the gender of the speaker, their relationship to the person they are addressing and ideally their name to avoid the impolite use of the word "you". A perfect machine translator would need to be able to interpret and replicate all these subtle cues and inflections.

Adding checkboxes and dials to an interface would bamboozle users. In practice, therefore, a perfect machine translator would be human-level in the quality of

DeepL launched a voice-to-voice transla-

### Assistive intelligence Voice commander

LISBON  
AI can bring back a person's own voice



**P**EDRO, A FORMER IT security specialist, was forced to quit his job in 2021 when his motor-neurone disease (MND), a neurodegenerative condition, worsened. He can no longer get around without the assistance of his wife or carer and is largely non-verbal.

But when Pedro speaks, his lightly accented English flows with ease. His

they say. It then generates three possible responses for him, playing them through headphones one at a time. A monitor, resembling a sweatband sits on his forehead, waiting for an eyebrow twitch that he uses to select a response. The eyebrow is one of the last muscles over which most MND patients lose conscious control.

That's not to say the system is perfect. A conversation crammed into multiple-choice options is a frustrating limitation; at times, Pedro grimaces at the limited responses available. When trying to explain how long he had lived in Lisbon, the most accurate answer correctly said where he had moved from, but claimed not to know when—to the mock horror of his wife.

The system, dubbed Halo, is a project at Unbabel, a tech company based in Lisbon. Pedro has learned to use eye-tracking software to control a computer, and for nuanced thoughts it is still his preferred method. But the hardware required is bulky, and every time he moves it must be recalibrated from

# Press and media

“ALS took away Luis ability to speak, but not his voice, thanks to AI. Connecting with him was moving, it was inspiring and that’s what AI for Good is all about. “

**Doreen Bogdan-Martin**

Director of the International Telecommunication Union



“It’s a long way from perfect. But even in its prototypical state, it is an astonishing thing to witness. I felt lucky to speak to Pedro, and I’m hopeful that many others will follow.”

**Alex Hern**

from The Economist

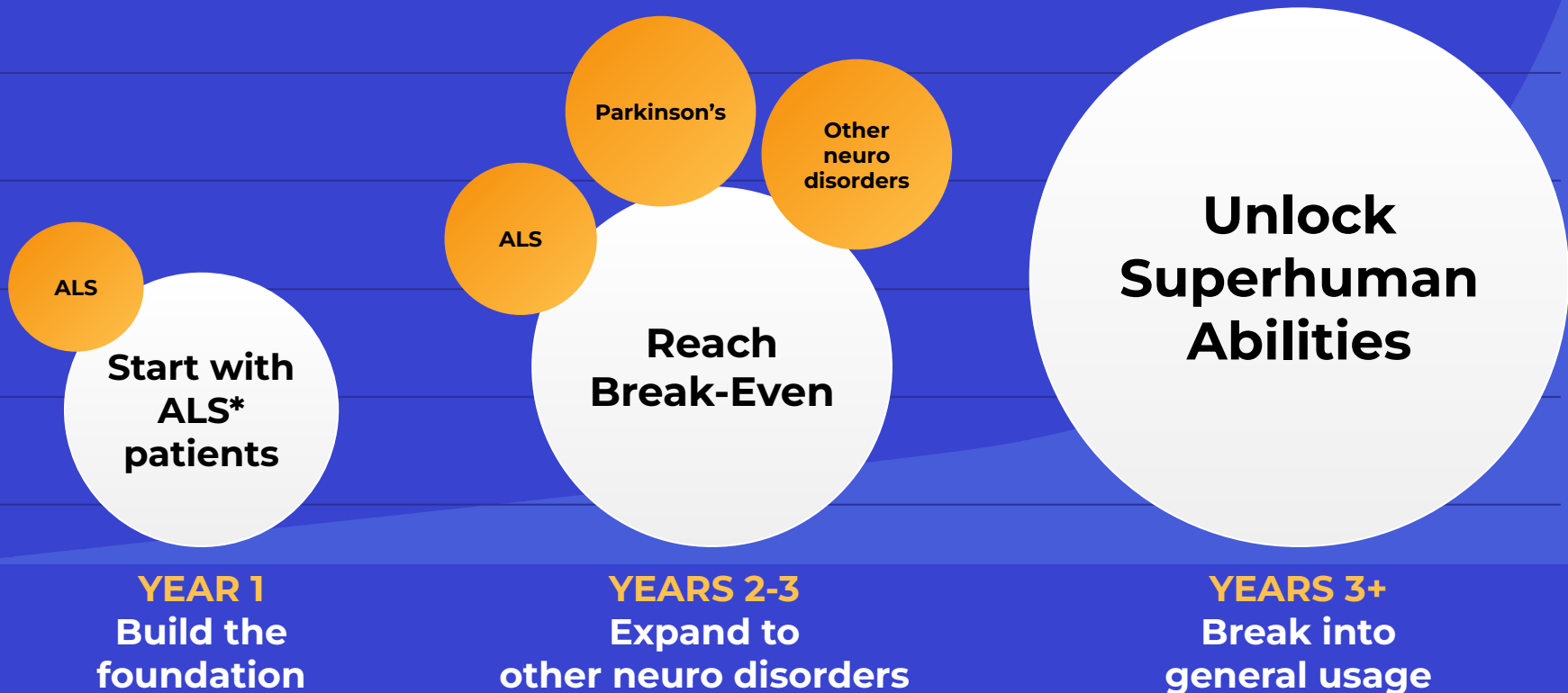
The  
Economist



# Expand beyond ALS



# The Halo Master Plan



\* Amyotrophic Lateral Sclerosis



# **Business Model**

**(very much WIP)**

# Neuro Disorders Market Size (EU+US)



ALS

**70K**

USERS

Parkinson's

**330K**

USERS

Other disorders

**>2M**

USERS

**€84M**

**€400M**

**>€2B**

**€100/month subscription**

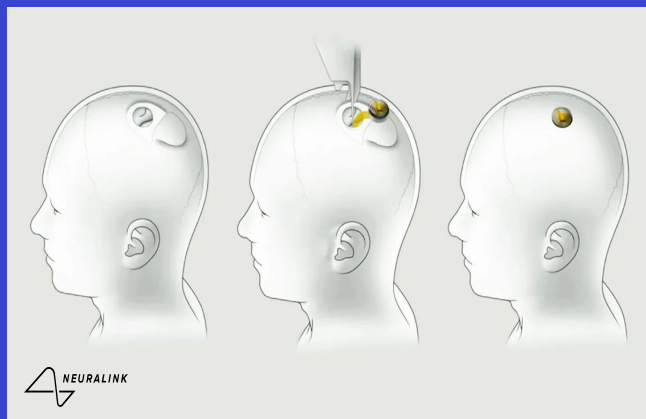
Includes advances in neural interface  
hardware and AI (eg: voice cloning)





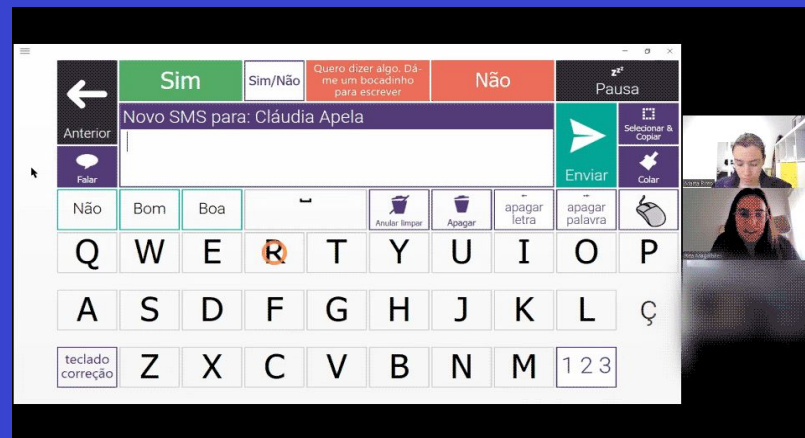
# Competition

## Invasive Neural Interfaces



**Halo is non-invasive,  
not requiring a surgery.**

## Eye Tracking



**Halo is faster, can be used  
everywhere, and is calibration free.**



**It is time for your  
contribution :)**



# In 3-4 groups, let's think about the following challenges

**Scaling strategy:** Given Halo's focus on ALS patients and later expansion into other markets, what should be the strategy to scale internationally? Consider factors like regulatory approvals, partnerships, and distribution channels.

**Business model optimization:** Should Halo stick to a subscription model, or are there alternative revenue streams that could be more sustainable? How could freemium or tiered pricing work for different user groups?

**Hardware-software integration:** As Halo evolves with non-invasive neural interfaces and wearable devices, how should the business model adapt? Should hardware be sold separately, bundled with a subscription, or provided via a leasing model?

**Market expansion & positioning:** Beyond ALS, how can Halo effectively position itself for other neurological disorders and eventually consumer applications? What partnerships or marketing strategies would accelerate adoption?