

PROJECT XCEED

1 — Initial situation

2 — Research

3 — Idea & Implementation

4 — User test

5 — Prospects

TEAM



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CHALLENGE

In order to offer users an individual onboarding experience for charging electric cars, communication must be adapted to the different skill levels of the various users. With continuous and intelligent monitoring of progress, the onboarding UX should be adapted accordingly so that all user groups can gradually develop into experts.

MENTAL MODELS AT GAS STATIONS



Searching for Station

We actively search for a gas station when the level on the display is low



Refueling

The process is simple and quick, insert the tap into the tank and stop at the desired amount of fuel



Payment

Payment is usually made in person, sometimes directly at the pump by debit/credit card, cash or, more rarely, via an app

TRANSFER TO EVs



Searching for Charger

The search for charging stations is more complex, there may be fewer charging stations, availability may fluctuate



Charging Process

The charging process is significantly slower than the refueling process, even with fast charging



Payment

Payment can be more complicated as different providers use billing systems such as their own cards or apps

PAIN POINTS



Charging station



Payment

FEARS

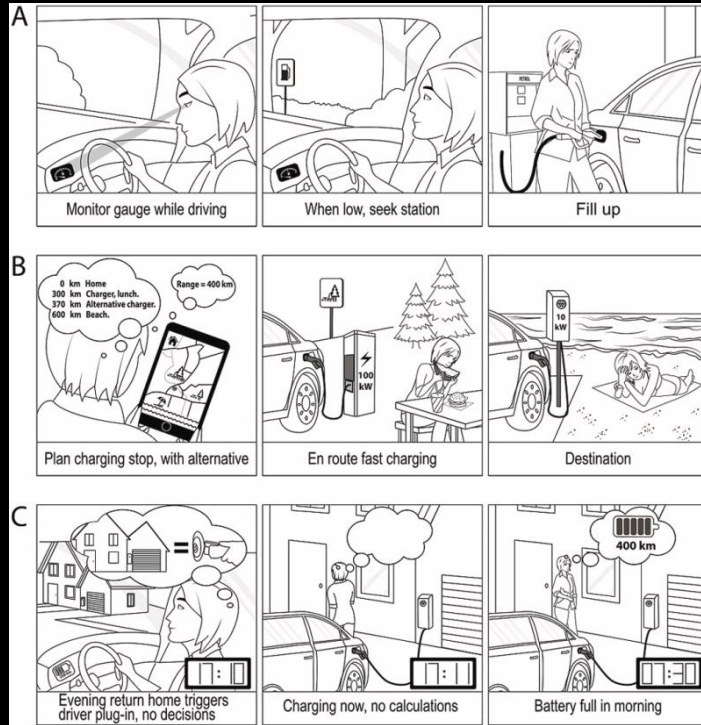


Range



Charging time

TRANSFER TO EVs



- Study by the University of Delaware identifies 3 “charging types”
- For inexperienced owners, the charging symbol works in a similar way to the fuel gauge, when the battery runs out it searches for a charging station, transferring the original mental model
- Long-distance drivers plan charging in advance
- Experienced “Daily Drivers” have adapted a new mental model and load event-based

UX IM ONBOARDING

- **Onboarding should be individual for each product/service (+ for each user)**
- **However, there are certain steps that are important for good user onboarding**

Know the target group

Understand which different users use the product/service and what their needs are

Drive toward Key Actions

Recognize which actions are essential for using the product and align onboarding accordingly

Choose your medium

Different users learn best in different ways, video, text, sound, trial and error...

**PERSONAL VOICE
CHARGING ASSISTANT**

FUNCTIONALITIES



Help with Problems



Smart Data



Adaption on Level



Provide Informations

PERSONAS



Anna Scherer

32 years old

Lives in Bonn

Mental Model "B"

Education & Job

Master's degree in BioGeoSciences and environmental consultant for energy company

Motivation

She used to drive a VW Polo, but due to her environmental awareness and the increasing availability of electric cars, she decided to switch to an electric car about four months ago

Driving Behavior

Drives about 15km to work almost every day, she also uses her vehicle for shopping, visiting friends or occasional weekend trips

PERSONAS

Experience

Anna does not yet have much experience in this area, but as her friend and some of her work colleagues already own an electric car, she was able to find out about certain topics in advance, such as having her own wallbox or charging on the move.

Problems

Although she learns quite quickly how the charging stations work, she sometimes has problems starting, stopping or monitoring the charging processes, especially when she is confronted with new charging stations and charging services on trips that she is not yet familiar with from her everyday life. She is also sometimes unsure how to optimize the energy consumption of her electric car and maximize its range, as her interest in the environment and sustainability means she wants to further reduce her ecological footprint and charge her car with the most environmentally friendly electricity possible.

USER STORY

Before heading back from a hiking trip with friends, she searches her smartphone for charging stations that are conveniently located on the route and also looks for an alternative station in case the other one is already occupied.

However, Anna is lucky and parks her electric car at the selected public charging station while the group visits a nearby cafe to make sure they have enough charge for the journey home.

As they plan to spend about an hour in the cafe, she asks the voice assistant at the charging station:

“Hey, what percentage of the battery will my car be charged to in an hour?” and receives an immediate reply:

“Hi Anna, in the next hour your car can be charged to 85% at this station. This is definitely enough to reach the destination you set in the navigation system, you will still have a 40% charge when you arrive.”

USER STORY

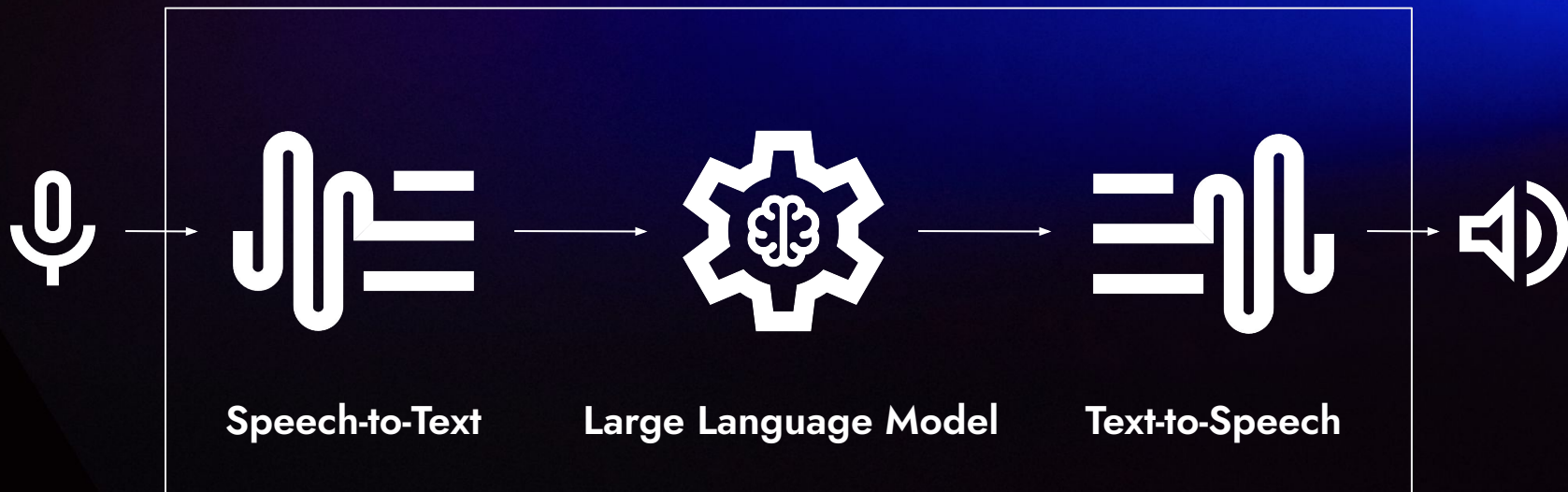
After the group returns to the car three quarters of an hour later and Anna pulls the plug out of the charging socket, the voice assistant announces:

"Welcome back, your car has been charged to 74% in the meantime, it costs €19.30 at this charging station. The payment process will be completed automatically."

As Anna wants to know whether she has charged using sustainable electricity, she also asks "Can you please tell me whether this charging station is powered by renewable energy?" and receives an answer from the assistant:

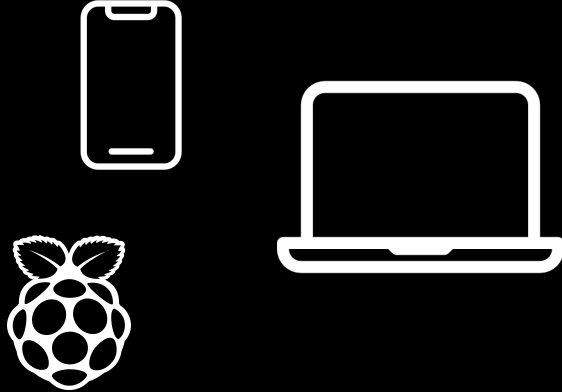
"According to my current data on the electricity mix, this charging station is currently powered by electricity from renewable sources, which means that charging your vehicle is very sustainable"

PROTOTYPICAL IMPLEMENTATION

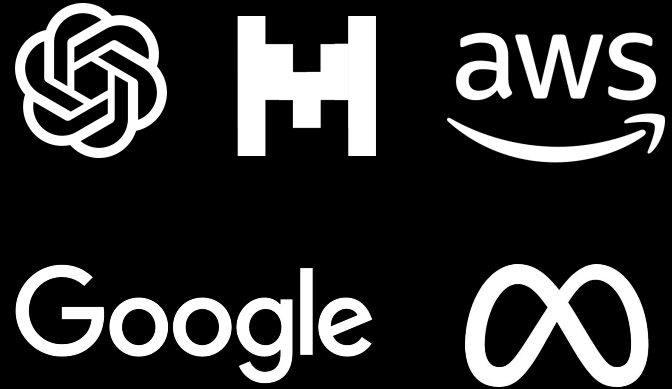


PROTOTYPICAL IMPLEMENTATION

Hardware



AI-Models



1ST PROTOTYPE - OPEN AI ASSISTANT API

- **Ability to use a custom version of ChatGPT tailored to a specific task**
- **Can access different tools in parallel, OpenAI provides File Search, but can also call self-hosted tools via Function Calling**
- **Assistants can access persistent threads that save the message history and context for a user**
- **Access to files in various formats is possible, which the assistants can use for their response**

CHALLENGES & PROBLEMS

- **Working Prototype**
- **Fluctuating & excessive latency due to additional API calls for STT/TTS and Knowledge Retrieval**
- **Voice control challenge**
- **No information on when all GPT-4o functions are available for the API**

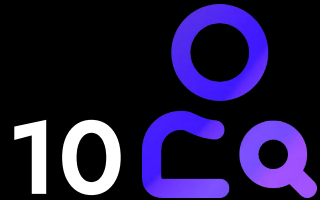
2ND PROTOTYPE - NATIVE 40 CUSTOM GPT

- Voice chat so far only via Mac desktop application or via native smartphone app
- Very low latency, feels like you are talking directly to the assistant
- Voice stream, recognizes quite well when the user input should be sent
- “Wizard of Oz”, Changing the assistant by clicking after the onboarding
- Introduce Custom GPTs

USER STUDY @ MEDIA NIGHT



Measure UX



Participants

Pre-
Questionnaire



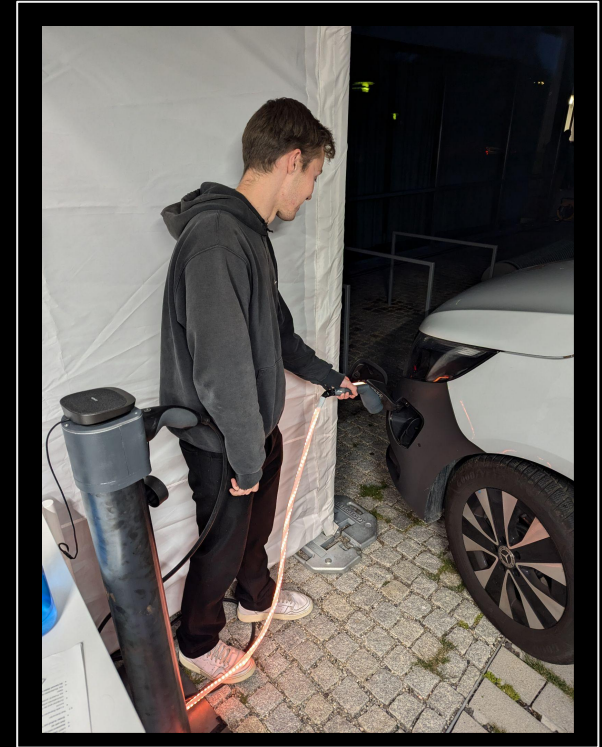
Test-Cases



UEQS, CTAM



Interview



PARTICIPANTS

- Sex 4 ♀ 6 ♂
- Age 22 - 63 Ø 33 years
- Edu 100% Academics



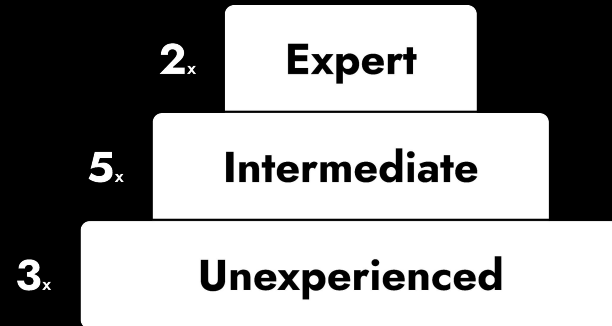
Charging
Experience?



EV
Owner?



Ø 2 years



OBSTRUCTIVE OR SUPPORTIVE?

***Had an answer
for everything!***

Intermediate, 26 F

Intermediate, 26 F
Intermediate, 23 F
Expert, 36 M

***Responded well
to me!***

***Quickly gave me
the information I
needed!***

Intermediate, 23 F

***Can I
already reply?***

Unexperienced, 24 M

Unexperienced, 22 M

***Partly generic
answers ...***

UEQ-Score **0.9**

RATHER SUPPORTIVE

COMPLICATED OR EASY?

Intermediate, 57 M

*Not much typing,
just speak into it!*

*Direct and easy
interaction, without
searching for buttons*

Unexperienced, 24 F

*Relaxed charging, despite
being a beginner!*

Unexperienced, 24 M

I find the system easy to use.

STRONGLY AGREE

Learning how to operate the
system is easy for me.

STRONGLY AGREE

UEQ-Score **1.5**

REALLY EASY

INEFFICIENT OR EFFICIENT?

Talks to much

...

Unexperienced, 24 F
Intermediate, 26 F,
Unexperienced, 24 M

*I can look that up
on my phone!*

Experte, 29 M
Intermediate, 63 F

Intermediate, 57 M
Expert, 36 M

*Back and forth
costs time!*

*Long response
time!*

Intermediate, 26 F

UEQ-Score **-0.2** 

SLIGHTLY INEFFICIENT

CONFUSING OR CLEAR?

Intermediate, 26 F

***Could not
understand the
answer!***

Unexperienced, 24 M

***Is it still
listening?***

***7x No
Misunder-
standings***

almost everybody

***Accurate
Answers!***

Unexperienced, 22 M

Intermediate, 63 F
Unexperienced, 22 M
Intermediate, 23 F

Clear answers!

UEQ-Score **0.9**
RATHER CLEAR

BORING OR EXCITING?

Intermediate, 63 F

***Nothing new ...
only on another
medium.***

Fun times!

Intermediate, 23 F

Interacting with the Assistant
would be fun

SLIGHTLY AGREE

The system makes charging
more interesting

RATHER AGREE

UEQ-Score **0.9**

RATHER EXCITING

USE IN PUBLIC?

Intermediate, 26 F

*Only when
nobody watches*

2_x

NO

*As long as it talks
back, sure!*

Intermediate, 23 F

8_x

YES

I would be proud to show
the system to people who
are close to me.

SLIGHTLY AGREE

People who I like would
encourage me to use the
system

NEUTRAL

BUTTON?

Unexperienced, 24 F

Keyword was too complicated...

Intermediate, 26 F

100% sure, it starts listening

Expert, 36 M

less error prone than speaking

DISPLAY?

Unexperienced, 22 M

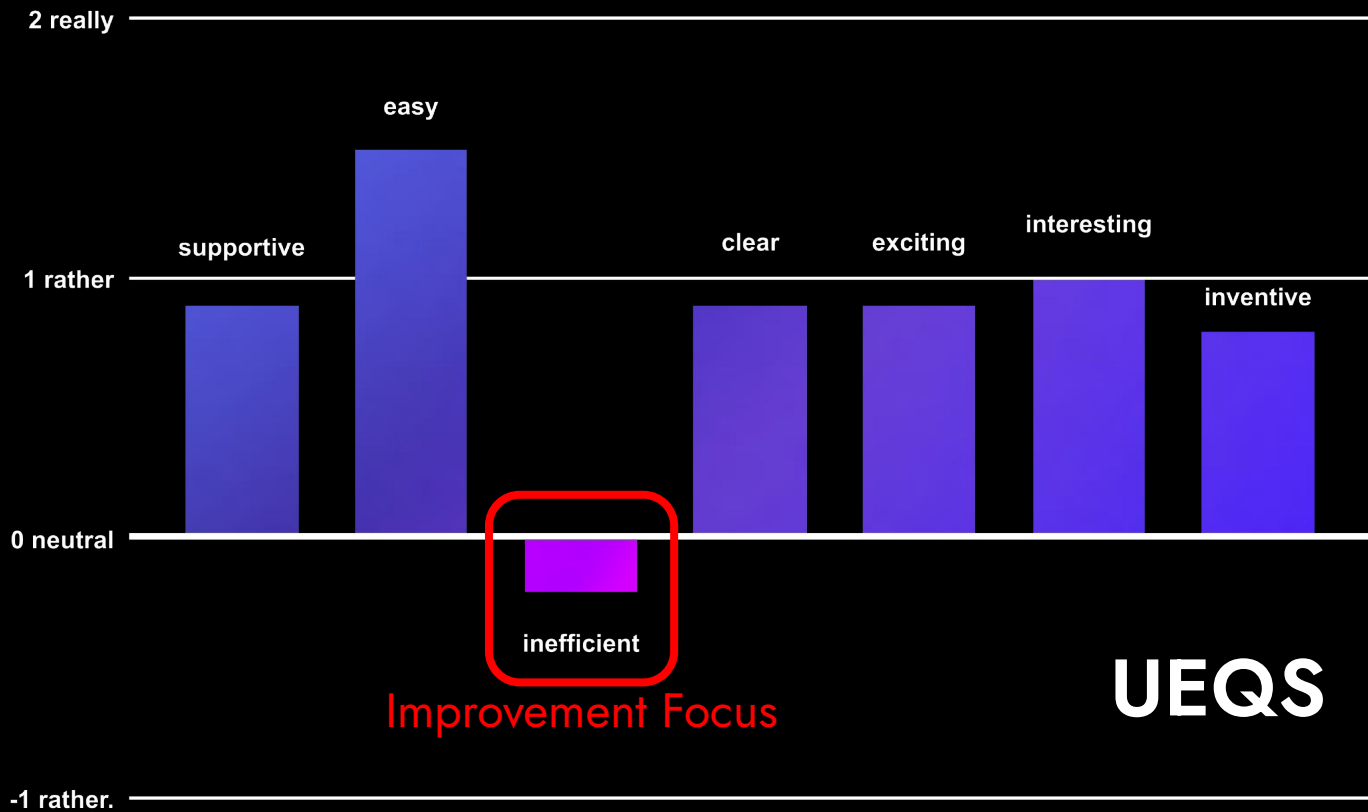
Good for SOC, range & charging time.

Intermediate, 26 F

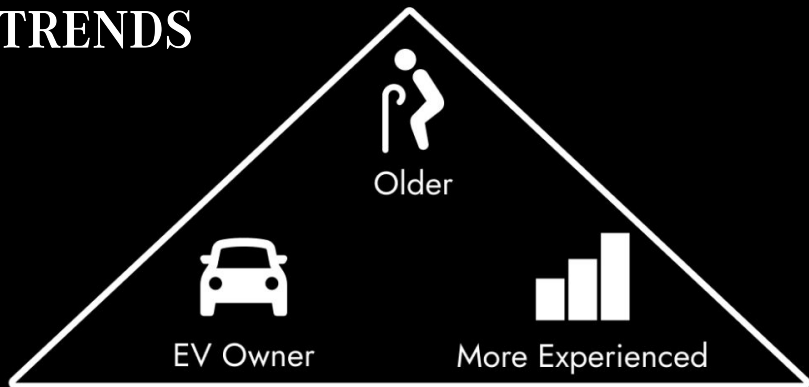
Not necessary! I have good hearing.

Unexperienced, 24 M

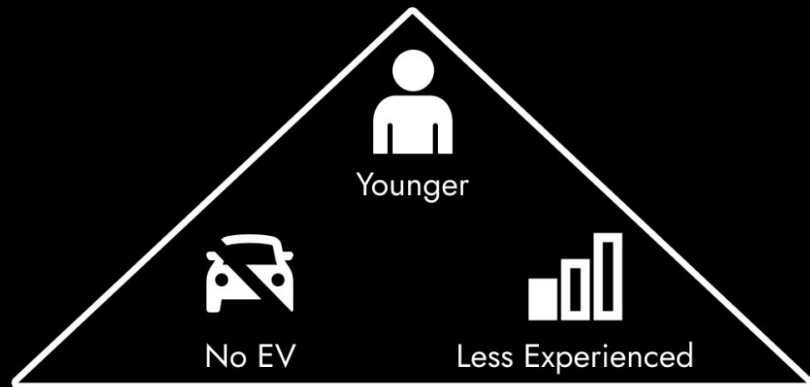
Keyfacts at a glance!



TRENDS



Less Satisfied



More Satisfied



OUTLOOK

- **Additional Screen with supporting Application**
- **Node.js Prototype is working, when is the API fully available?**
- **Instruction Finetuning for different Levels**
- **Advanced Personalisation**
- **How to monitor the Progress of the Driver and check their current Level?**

