







User interview Jacopo

 Meeting Tags	User Interviews
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Research Questions

- Is the presented prototype easy to understand of what you can do to control our device?
- Does the terminology make sense?
- Is everything that we provide sufficient enough to start building things on top of it?
- Which style should the application follow? (after presenting mood boards and colour schemes)

▼ Interview Script

Interview Script

Introduction

- Doing an user interview, helps us to find out what and how we want to design things early in the creation of a new product
- We ask questions, not directly about you or to test you, but rather to gain insights for our design process
- If you don't know how to answer a question let us know, we're here to help you guide through the process, if you don't want to answer a question that's also fine, just let us know

Warm Up

- Tell us about yourself

- What do you do as your job or hobby?
 - Go into more detail to ask about the context and connection to IDUN
- What is the greatest pain at your current job/hobby? OR with what the person has mentioned in context and connection to IDUN?
 - Go more into detail and find out the WHY
- What are you currently building? Can you describe the idea and especially technical challenge behind of it?
- Have you heard of brain-machine interfaces – what is a brain-machine interface?
 - Can you describe what a brain-machine interface is and how it works?
 - Have you ever worked with or thought of working with a brain-machine interface?
 - Do you have an idea to create something with a brain-machine interface based on your understanding? Is it maybe something that would integrate into something that you're working on at the moment?

Context

At IDUN, we are building a brain-machine interface that can read your brain's electrical signals in real-time. We are not the first to do this, others have been doing it for many decades. The difference between our product and others on the market is the form factor. Our brain-machine interface is the size and shape of a normal in-ear headphone such as Apple AirPods. Compared to e.g. a state of the art system in 2022 our device has similar signal qualities in a form-factor which has the potential to be mainstream and the setup speed that is not comparable to any other brain-machine interface as of today (show some charts).

Our goal is not to develop the headphones themselves (building the brand, marketing, packaging design, etc.), but to integrate our technology into existing headphones. And why? Because we want the brain to be another API for developers who create applications. For example, as of today, you can pull GPS data from a mobile phone or computer in the form of an API that users can plug into, so you can, for example, create something with the users' geographic location, for maps or games like Pokemon Go, automatic time tracking software, sharing location with emergency contacts, etc. The possibilities are endless, as

history has already shown us. What we want now is another API for developers to access the brain.

- **To give you some examples of what's possible and will soon be possible in the near future:**
 - The users general focus in a range from 1–10
 - The users tiredness in a range from 1–10
 - How long, well and in which stages the user slept
 - Where the user is looking at (top right, bottom left, centre up, centre down etc.)
 - If the user is squeezing their eyes together or not or blinking and how long is blinking
 - If the user is hearing sounds in certain frequencies or what for profiles the user is able to hear
 - If the user is eating something, talking or chewing something hard or soft
 - If the user is hungry, tired, asleep, bored etc.
- More things will be possible soon. Before we continue we want to hear how you feel when you hear what's possible with our device?
- Do you already have an idea of what kind of app you could build with such an API?
- We will give you two examples of what is possible to build with our device:
 - A music app that recommends music based on your mood: if you're tired it will show you two auto-generated playlists; one that makes you more awake and one that helps you fall asleep. Same with being focus, bored etc. You can replace the music playlist with basically any recommendation engine you could think of. (show example slides)
 - Another more complex idea: A user is wearing a AR/VR device and you track where the user is looking at in the 3D world and based on the focal point of the users attention you increase the volume of the source and decrease surrounding sounds (also known as the cocktail party effect). (show example slides)
- What are your thoughts when you heard these two ideas?
 - Ask more questions so that the user elaborates

- How would you build the first example?
 - What for technologies would you use and how would you combine them?
 - Can you describe the architecture?
- How would you build the second example?
 - What technologies would you use and how would you combine them?
 - Can you describe the architecture?
- How would you ensure that the users' brain data is safe and secure?
- How would you protect the users privacy?

Example Scenario (Exercise)

We now want to go through another example scenario where you will build a simple web app game based on the output of your brain (show screenshot):

- The paddle follows where the user is looking at, it ignores if the user looks up or down
- The paddle becomes bigger when the user is focused to reward him for playing concentrated
- Can you describe how the REST API would look like of the endpoints that you'd need from our API to create such a game?
- How would you create this game? Can you describe the business logic, your code a bit and why you're doing certain things?
- In order to help developers like you use our API we create a web app with examples, demos and interactive explanations on how to use our device and what's possible with it. It's basically a GUI for everything that you can do with our API as well. It even let you decide your custom API endpoints. It can also be facilitated to record experiments and analyse the data.
 - What do you think of such an application?
 - Would you use such an application even if the API documentation is fairly easy to understand?

Prototype

We have designed a prototype of this web app to help developers like you understand how the device works, control the device, record data/experiments and use all API endpoints for experiments via a graphical user interface. We want you to let it go through. We don't want you to break anything, and keep in mind that this is a prototype that is not 100% finished or thought through. If you have a question or something is unclear, let us know. We encourage you to think out loud about what you are thinking as you go through the prototype.

These are the exercises:

- You bought a new headphone with our technology inside of it, while doing so you received a personal access token. Now you want to create an account with this access token on our platform. This can all be done through the API, but for demonstration purposes you're doing it via the GUI on our web app's platform.
- Now that you registered the new device to a new user (which is in this case you) we now want you to get the brain data in real-time from the device. How would you do that in the GUI?
- Now that you're looking at the livestream you want to leverage some of our provided classifiers which you then need as API endpoints for your mini-game application. We want you to apply the eye movement classifier to the livestream. How would you do this?
- In order to go back to certain data sets that you created as an example you want to record a session. How would you record the eye movement classification in the GUI?
 - Please now access the eye movement data
- Now you want to apply the focus classifier on the livestream as well, preview it and then record it as well. Please do that
 - Please now access the focus classified data
 - You would now want to compare eye movement with the focus classifier to see if you can classify both at the same time and if both work at the same time. How would you do that?
- Now that you saw that everything works you want to consume the actual API, how would you proceed from the web app's GUI to the API

documentation?

Style and Moodboard

Thank you so much for helping us understand how your mind works. In order to conclude the design questions we present you with a few example designs and moodboards from other apps and/or competitors and you need to choose your favourites. Please keep in mind that we encourage you to think out loud. There is no correct answer, we just want to see which style you prefer and why.

Competitors/Examples

- Can you describe and tell us about an API documentation that you think is brilliantly made?
 - Can you describe why this example is amazing and what they're making differently?
- Can you describe and tell us about an API documentation that you think is really bad?
 - Can you describe why this example is bad and what they're making badly?
- What is the most complex API that you've ever used?
 - Let the user elaborate
- What is the most complex API that you've created on your own?
 - Let the user elaborate

Conclusion

Thanks a lot for participating in our user interview session. You were very helpful and provided us with a lot of interesting insights. We will keep the provided information from you private and we will delete the recorded files in the next two weeks. You don't need to do anything anymore. Do you have any questions?

▼ Interview Notes

evaluating eeg systems, when looking at new products, how to evaluate: wants to have a look at raw data, he's a data scientist, wants to build his own algorithms, raw data is a must for him

comparing eeg data: create correlation with a more conventional system, ceegrid etc. also dry vs wet electrodes

very important for specific use case: no real reference with emotional states/classifications, very good and robust experiments by very smart psychologists, needs some external validation

he works with python, uses available tools, mni tool, eeglab from matlab but for python, labstreaming layer, he says it makes it more simple, because so many eeg devices use it, can also be a streamer on TCP, but would require more work on his side based on a different protocol

combining different data streams? yes he is interested

interested in other platforms to collect the data? prefers to bring it in into a local machine, says his way of collecting eeg signals is a work of progress, tries to build a system for 2 years, but only sees now the interest

types of experiments, are they established paradigms? both, usually designs his experiment and then does a test

whitepaper gives him a good idea on what participants you can train this one, how much confidence does he put it into the algorithms

product managers require a real demo and real output, they won't read whitepapers, demo of performance can be tricky

thinks for product managers might not even be good to see raw data, abstract the experiment and data collection and show results afterwards

product managers as next personas

=> mark talks about demo room experiences

highlight next steps with spatial audio, product managers need a roadmap => creativity insights for the future roadmap

GN is not really ready for building their own ecosystem, to see that the use case works, GN is profit oriented, the ecosystem is a great investment, show nice use-case for the technology

GN might only provide metrics, but they build the ecosystem, **might need to consider this**

interested in low code? GN would probably outsource for a first proof, maybe even to IDUN, becoming an actual product, either collaborate or they would do it themselves

big tech might want scientific validation etc. might make sense to collaborate with universities to get "proof" for classifiers etc.

integrate it with these platforms for these researchers, **two tier platform?**

scientific community do some of the research with our device, how we can rent out devices for researchers

personal interest: universities, cheap labour researchers

IDUN validates prototypes, researchers working about classifiers, GN is collaborating directly with the universities, and then working with us to collaborate on prototypes and use-cases

thinks that sleep is a good focus for IDUN

Working with API, storing data over the internet, only use it via API?

As long as we get the raw data and can use IDUN signal processing packages it's ok, collaborating with another company that does this, understand that we all get the raw data from the experiment, but if the participants come from GN they are contributing to their algo improvement, has to have negotiation on price and data sharing.

If we provide end to end encryption is it of interest,

yes, of interest, valuable to have data privatized that way

For different API endpoints, don't need to provide all the code, just to have an endpoint for the raw data or metrics, or classify output is ok.

For an endpoint with processed output

good sense for API, signal processed and one for usecase metric

With signal processing, how much do you trust them without the source code

Admits that he's skeptical so he wants to test it all the way through, have to do experiment design, try out the participation in the right EEG experiment form, just the metric on its own there's skepticism,

can provide metric with an experiment that is validated to give confidence metric, good way to do it

without raw data access but you have a python editor, is that good?

that's interesting, if he wants to make his own algo his algo is in our system,

if he can visualize in our editor and wants to build on that data, would we own his classifier?

No, we don't own the classifier, you own it,

trying to figure out in trust end to end encryption, then he's ...its hard to say, just say that confident that GN could want the raw data themselves and not be dependin on anotehr system or editor

but would make sene for a smaller company o r not so invested in the technology, but hard sell for GN for larger companies

how important is latecy?

think even a ltecy up to 20 or 30 sec they can build great usecases because it depends on the application, and better that the users dont see the data in realtime

latency not that important

Deployment, where do you run stuff, have to get cloud resources

they use cloud computing also have local pcs that are powerful

for lots of dat cloud makes the most sense

Uses azure and aws but not sure what is use for what

who makes the cloud decision?

knows a guy that says what to use what, its a big org so making the decions are difficult to konw

could refere use to the cloud contact to discuss with

If you run on the cloud, concerend about data privacy?

it makes sense to have some concerns, but when we are gathing lots of dat in the future, illmake sense to have cloud secritz and control out data so not to be dependedn too much on them

would be fine with it on the cloud

When working with APIs what are you comfortable with?

REST and websockets

Do your own experiemtns

Sets up mostly manually not using other packages

reproduced some signal processing classifiers from literature

pschopy, just learned about it, looking into it

Tried neuomore but they only give a limited view and difficult to go deeper into the daata, likes to do thing s imself

Neuromore

Also with openbci, the interface is nice to work with and claffiery with it, but he doesn't know what is behind those algos, how many people was it trained on? he's skeptical that it was trained on too few people or made a rigid simple classifier without machine learning

Mostly about trusting the algos, so he does it himself

Low no code

if you can see the code what would change?

if you could see it and maybe change it, possible to have comments that explain how it was trained, and trace back to the validation

if it was a notebook, with comments

it would change his perception, trust it more

would prefer references to literature

Another idea

like neuromore, and out pops the code, that even with comments, he wants to see it came from a certain article, but wants to build on top of it, would feel limited in his work.

would like ability to take what they have and then build on top of it and expand start as a base,

Into transfer learning, would limit, it would expand it go forward in a streamlined way

would be fine with some pseudo code instead of actual code as long as they understand what is going

We produce new algos, we need to protect it, that's understandable.

will leave GN, doing something on his own

mission is to set up something healthy for GN, uni collab, may not be there for user testing