User interview with Martin

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 of 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.
  - 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).
- 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?
        - Can you describe where and how you would deploy your application?
    - 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?
- GraphQL over REST?
- 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 chose your favourites. Please keep in mind that we encourage you to think out aloud. 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?

▼ Notes

Works at SAE already since 5 years

asking how we put the tech in an in-ear bud, martin has no experience with neurotech or neuroscience, he thinks it’s amazing

What’s brain-computer intrface?

A product that helps a human interface with a computer, not using a mouse but brain-waves, and humans can give inputs and signals to computers.

Nerver thought of useing BCIs before, had seen projects in the past where thiere was a website controlled by a BCI, but not directly involved in the development.

What could you create with a BCI, dow ou have an idea?

Has ideas, not sure if they are righte, in the future it wll be possible to creae an interfaces that lets people input into a deivec whatever they want with a rbain, but thinks it will be much furhter in the future, discrete actions like buz stuff from amazon, Google assistanet without having to talk

Where do you think we stand right now?

Thinks we are trying to undersatnd it right now, he thinks neuorsicen is still very early, lots to discover in that area, a lot has been done but hteres a lot still to do and to undersatnd, are we where we can have a computer buy 15 things from amazon right not?

How far are we in years?

Shit man, we’re very close, 5 to 10 years seems reasonable, 10 seems ok.

Here’s what’s possible., we are making a general purpose brain API, native app has apis like IMU, camera, etc and here ‘well have another API and do tinkgs in your application, get focus of a person, tiredness, etc.

It sounds amazing and incredibly scary and amazing imagine what google analytics can do with that, targeted marketing sounds amazing, and very cool things.

Google analytics, targeted marketing, because developers know how they work, and how they track what we do in websites, mouse movements, if the rperson is there or not, its never 100 percent, but program doesn’t know I’m eating so it’s not pushing eating ads, my head went there since a lot of

tracking is being done, and brain traking sounds like another step in that direction but a VERY BIG addition.

The plusses outwithg the negatives. Imagines an opt in process that makes it simple, and the brian api is similar to geolocaton or push notifications. Same way the are implemented. Do you want geolocation, you say you allow, thats the most ethical way to do it,

I was amazed because in web dev were limited by the user inputs that we have it ahs improved but is baseially mouse and keyboard, adding a whole new thing to this is a new interface, many thing sform brain, imagines so many applications will be possible thinkgs its a maiing the way into the future a whiole new way for humans to interact with machines.

Two ideas - music app that recommends music based on your mood, a recommendation engine. - in VR and in the envieronment lots of sounds are coiming and based on your gaze the audio focused on that source.

It’s not limited to only music apps, how will componies use it, when to push ads on puppies, or hoildays, etc. having info on how someones feeling is a door that opens may opporutnies, ies a very cool ida at te end of the day

the plusses outweih the minuses

it deossn’’t have to be scarey, can be very coool, odoesnts see many doenwides to the VR scenario prestned, if iporves a prodct that needs imporvement it’s cool

Why less downsides with VR?

probaly becasue hes not thiking about web applications, VR for him is gaming, very limited right now not available to everyone in the world, but everyone can go to a website, veiry products, etc. VR is devined UX envieronment, won’t affect as many people

What if your on amazon with your headphones, and they ask to get access to device to imporove sopping experiences

he thinkgs about targeted ads and advertising, knows that what they do with it all, improving the experience just menas more info by the user to target ads to the screeen, it could be about imprinve the product, but mainly its for ads. his brian things of ads

would he accept the pop up?

needs to know exaclty what they do with his brainwaves, what does improving the experinece means? probably wouldnt accept it, but would go into more info and then accept if ok

but his girlfrined would probaby click on accpet as she deonst' read the popups.

How concerd are you about the recoreded data of the brian?

it's the first time he thought about it, its converning but in the EU laws they heldp to mainage the data lwas, knows what they have gathered, concerned but not as muh or very converned becase of the EU laws if theres a way to manage the datt, it's always optin , if he can swee what was gathered its ok

you have aces to api, and earbuds, you build a breakout game you can use eye gaze and concentraion to move or change paddle size

would use JS with p5.js because he knows it, use canvas, and thats it

to interact with the API, would read documentation it hilgy depends on the API, ineractions sill with JS. thinks of http because he knows it, also websockets for realtime steams, nver used mqtt, get request on http.

has worked with websocket apis, did that in columbia,

if you only had Graph QL, hes fine with it, but it limits to GQL, what they can access, but totally fine with it

REST vs GQL? Would not care, probably ask for the recommendation from IDUN, via documetaiton REST probaly as more fimilar

what about SDKs? would prefer an API, not great experience with SDKs long to learn and setup, api better, but if actually doing hardware based stuff probably SDK, API better, but nice option

Great API examples?

can get back to us later

bad documentation is a better marker, where searching for something in the docs only give exact results, like JQuery, the docs is old and not timely like from 15 years ago, looks old, for exmple only one word used to search for problem, had to search via Google to find right answer

Whats the most complex API?

can’t think of one, but hates poorly documented apis, cant use it if not well coumented will looki for alternative if it’s not well documented

Architecture

has no idea what the data flow looks like or imagine, as long as it works hes fine with it, and can understand the architecture, can’t think of a speciic way to strucutre it

Offliine solution?

thinks of progressive web apps, how big would API be? Do we integrae wiht browser? If API and SDK are there, SDK works offline, then...only imagines the device connected to a server and processing data, can’t imagine if tis just the computer processing but really has no idea, doesnt’ konw about BCI data processing

huge range of devices in the world. not everyone has a super good computer, never worked with brainwaves before, do we need a quantumm computer or an apple watch? thinks it needs to be offline on a device, but doesnt really know

Back to breakout

where would you deploy it?

build wiht JS, if paid you have the whole backend to it, so Node.JS application small database, deploy on any node.js server, depends on the audience size

for 1000 users, heroku servers as he kows it

what would change with 10 millino users

would get someone else on board but the game would be the same, client doesnt’ change but back-end does

Both front and backend API

what about latency?

billiions of reactions, JS and promises, good question, needss to beprcessed before getting data back, would the game even work?

whats acceptable? max 300-500 miliseconds, ideally 20-100 ms

how impoarnat is the raw brain data?

would not be able to anything with it, unless it’s translated to a form he can understandable

has no idea what it is, brain waves, numbers? what does it translate to, thats what he wants, the classifer output

would be amazing to have his own classifier

only imagines what someone could do in interactie design projcets, could see someone using the raw data

would be amazing if he could train his own models, thinks of coding with ML is mentioned

No and Low code tools

not familiar with them

like webflow, calls it visual coding,

for him he uses the a lot but moslty prefer coding by himself but would use webflow for something quick

but for 1 million users thers a lot more to consider than webflow can provide, but webflow would work, other site builders then no as they are limited by their pre-made templates

can also build everything from scratch

You have app, api, etc. how to protect user privacy?

you have to prodct your data collected on users, where the Database is hosted, how the data inside is managed, enrypthing, industry standards

imagines google follows standards, but not one central voice

Would not save data in plain text or vulnerable websites, sql injections, with 1 million plus users this is something to get assessed and audited. 1 thousand is ok, would hire an expert.