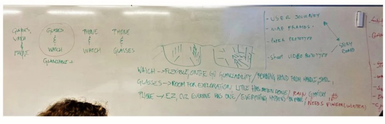
berch730 · 18 minutes ago · 3 min read

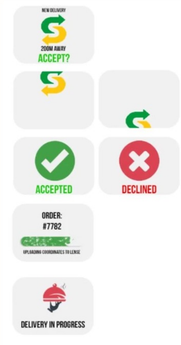
TEI Journal Week 1 : Glanceability

The following weeks of this new class, 'Tangible and Embodied Interaction' throws us into one-week-long crash courses regarding different topics: *glanceability, smell, soft,* and *IoT & AI design*, in this order.
The Monday lecture was introductory to the class and what we can expect for the following four weeks, respectively what is expected of us for a Friday presentation. We were assigned to make groups of four, to which we'll stick with for the following 4 weeks.
All along interesting discussion about the way we perceive things from a physiological- and psychological standpoint.
The information to keep in mind is:

- Glanceability : *[...] enables people to get the essence of the information with a quick visual glance.* - Gouveia et al.
  - Main Characteristics
    - Learnability
    - Error visibility and recovery
    - Usefulness
    - User satisfaction
    - Awareness
    - Distraction
    - over 70% of the usage of physical activity trackers to be driven by glances
    - glances last ~5 seconds
    - reduces power consumption (iWatch 18h battery life, Sony Smartwatch 1,5 days)
- Fundamentals
  - Target a single feature or task
  - Enable quick interactions
  - Design and build for independence
- Do not confuse *peripheral vision* and *glanceability*.
- The Triune Brain (reptilian, limbic & neocortex classification) was a lie.
- 3 schools:
  - COGNITIVSM
    - separates cognition from consciousness
  - CONNECTIONISM
    - consciousness emerges from the interaction of thousands of neurons
  - ENACTIONISM
    - separates perception from cognition, the earlier is body-dependent (therefore embodied), the later results from patterns of perception
- Different peripheries of vision
  - Central = 5°
  - Paracentral = 8°
  - Macular = 18°
  - Near, Mid, and Far peripheral = 30°, 60°, 100-110°
  - Cool to know, well see if it helps
- The ear is weird but cool, learned something there!

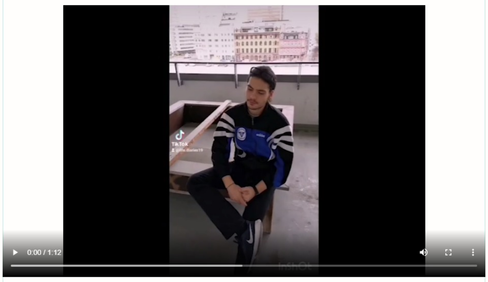
Concerning the assignment, we were told to design a multi-screen UI through bodystorming and paper prototyping. We produced a wireframe of a problem and created a paper video animation/mini film showcasing a prototype idea of how glanceable multi-screen UI could solve our problem. We chose to focus on food deliverers and how glanceable UI could smoothen their job, safety-wise mainly, but also ergonomically speaking.
One of the texts we were introduced to, Matthews (2006), points out an interesting perspective on having primary and secondary tasks always going on live when someone works on a job, and that glanceability aims to smoothen the transition between these different tasks.





One of our main focuses was to get the driver away from his/her phone by replacing that screen by more glanceable UIs. By discussing with the group and making educated assumptions, we figured out that smart watches are a great source for glanceable interaction, for reasons like it's always on your wrist, it's accessible, it can be placed directly in the most central periphery of vision without having to move the eyes much. Furthermore, we chose to go for smart glasses, because the design space is very open there and gives a lot of possibilities of imagining completely novel UI.
In the end, I believe we managed to create a meaningful conceptual UI for the smart watch, but perhaps if there was anything to do better, it was the designing of these smart glasses UI, which kind of fell behind. It feels like the watch could probably get the job of displaying the meaningful information in a glanceable way done by itself and that the glassed could be made more significant or be ditched completely.

All in all, though, the presentation went pretty well, our video and wireframes worked. The critique we received from the class was that, from one's personal experience, the phone worked pretty was as it is. While this is true, it is still arguably an advantage in terms of glanceability during deliveries to have the quick access and the mobility of the wrist to display the bare amount of information that is necessary during the process of delivery.



Related Works
Tara Matthews, *Designing and Evaluating Glanceable Peripheral Displays*, DIS 2006, June 26–28, 2006, University Park, Pennsylvania, USA. ACM 1-59593-341-7/06/0006.

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Week 15 – Disambiguation - Nuance

As of this second week of Module 2, the group has established certitudes on some levels, while new realisations have driven us...

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Week 14 – Nuanced control with sound - Experimenting with sound

The new topic for the following 3 weeks is about using sound as an input in order to control an output in a nuanced way. A few...

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TEI Journal : Week 2 - Smell and discussing Vortex Propagation

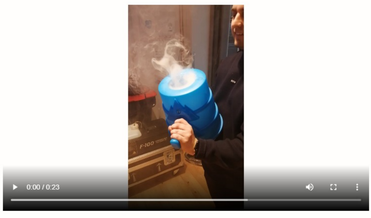
This week's module focuses on the sense of smell and how to interlace it in the field of interaction design. From what was gathered from Monday's introduction, the research in the field of smell is relatively limited.

While experiments have been made with select smells integrated in physical games like board games, one of the most prevalent uses of smell games is learning and training purposes.

Indeed, the digital world slacks a bit behind in this field because of the nature of smell propagation. There are several methods to propagate smell, which we experimented with on Wednesday's workshop.
This connects with the conference paper by Yanagida (2012), which describes the most prevalent methods of delivering scent.

Without expanding in detail, the essentials are, regular vaporisation of scent, accelerated or not by diverse processes like air flow, heating, bubbling. Can also be applied to an absorbing support. A scent can be atomized, like in a scent diffuser, by having a vibrating ultrasonic membrane vibrating, by air flow modulation as well as by jetting it like an ink jet. Other methods can use a fan to direct an odour, tubes can be used to send a smell to the nose, and one clever one is the use of vortexes, a.k.a. smoke rings (can also transport smell in a precise way without having smoke, smoke just makes it visible ofc.).

We experimented with these in the workshop, and here's what I gathered from it.
It's probably the most interesting method of propagation so far in my eyes, because it potentially affords the capacity to have a fixed smell vortex station somewhere shooting these rings directly in someone's face, in contrary to other devices which lack comfort (like tubes in the nose) or precision of diffusion (vaporisation). (Vertical video, I didn't film, sorry.)



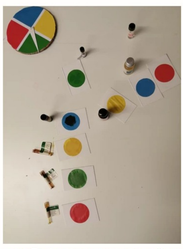
Something which I ask myself is how viable of a platform is a vortex machine for staying clear of cross-contamination of smells? Also, something which directly pops up in mind after the body detection AI, could surely couple the two techs to make interesting things like automatised multiuser smelling experiences and training among others.
If I had to describe the essence of Wednesday's workshop one sentence, I'd say it was all about sparking creativity in the domain of smell in games in order to put us in the right mindset for the project. The experiment of the egg was about finding a cool way to do something with it. Our work group's egg video below is self-explanatory.

Due Friday:
> Modify an existing game and add a smell dimension
> Produce: a brief (5 slide) Powerpoint in which you document your design process
> Be able to: explain your game, including any rules, special equipment, narrative etc.
> Briefly demo the gameplay characteristics of your game

Group work starts here, and in brief, we thought about some kind of battleship game with integrated smell, but it seemed to complex to integrate smell in that game in such a short span of time. One option was either to integrate a bunch of little perfume sample bottles in a grid for each player but no time. Another possibility was punishing each bad answer with a bad smell and vice-versa, but that made the smell kind of incidental to the game and not really a game mechanic. You don't use your olfactory sense to figure anything out, it's just a punishment and that's not interesting for our purposes.

On Thursday's seminar, the information which stuck out to me the most is the limitation of smell compared to let's say a display. Light works in a completely different way to smell. There is no RGB in smell, every sample has to be collected individually and even our perception of it is very comparative. In contrary to colour, where the comparison is more flexible, like an apple can be red, but a ball can also be red and nobody will confuse it for an apple. With smell, it can be somewhat categorized, like sweet smells etc, but something that smells like strawberry doesn't smell like anything else and can't be made by mixing primary smells, unlike colours.

What we ended up settling on is an olfactory version of 'Beanboozle' (Google it).
It's a game where the player spins a wheel which points at a colour like Twister. Then the player picks one of the multiple cards with that colour. A smell is contained on this card. Either the smell absorbed on the card is good or bad. The first one to pick 3 bad smelling cards loses the game.



While our presentation went fairly ok, some things could've been improved, which we were conscious of. Too few cards, but on the other hand that's easily remediated by just making more. The other problem was also the fact the smells we chose were not unequivocally bad- or good-smelling to everyone. One classmate who participated in the demonstration didn't like the smell of peppermint, which is generally not associated with bad-smelling stuff. That's a point which is actually very, very valid and that tells a lot by itself.

If there's anything to hold for the future is that smell if very relative and we can hardly overgeneralize how someone perceives a smell. That's why there are a million different types of perfumes for everyone, every individual likes something different.

References

Yasuyuki Yanagida, *A Survey of Olfactory Displays: Making and Delivering Scents*, Conference Paper, October 2012, In Proceedings of IEEE Sensors 2012, Taipei, Taiwan, pp. 1013–1016, October 28–31, 2012. DOI: 10.1109/ICSENS.2012.6411380

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TEI Journal Week 3 - Soft

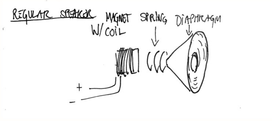
Module 3 – Soft – Designing Interactive Fabric

This week's module starts off by reading day. No course introduction this week as the teacher is sick and unable to hold class till Wednesday. Not a lot of material to write about this week so the entry might end up a little shorter than usual.

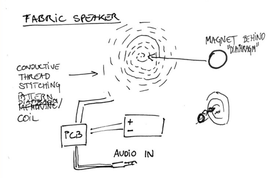
The text I chose to focus on this week talks about something I find quite fascinating from the get-go. It's a paper dedicated to making speakers out of a soft material like fabric or leather, a magnet, and a small circuit board as an amp. Being a man of the guitar, this topic piqued my attention.

This paper seeks to further the research in the field of *e-textiles, soft interfaces,* and *wearables'* design. The main idea is to showcase the possibility of making these soft materials more wearable than their already existing counterparts.

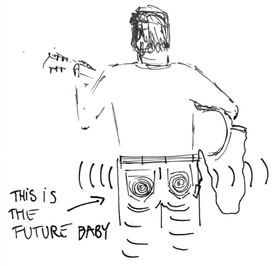
What intrigued me most is the construction of the speaker. I vaguely have an idea of how a speaker works but I didn't know you could just sew a conductive thread diaphragm onto a piece of loose fabric, and it would work.



If we compare the inner components of a regular speaker and this one, one thing which is striking is that the coil is not wrapped around the magnet but instead constitutes the diaphragm in a way. The magnet is fixed behind and unpowered, while the magnetic response is made directly by the stitching pattern in the fabric. It's fascinating that you can turn around the process like this.

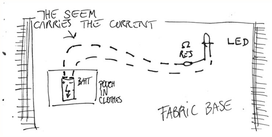


One thing I'm curious about is how it truly sounds in real life, since it's said that diaphragms are supposed to be made of really hard and stiff materials to convey a clear sound. The sound coming out of it must be interesting for sure. Imagine plugging your guitar into your jeans and playing with sound coming out your behind, that would be magical, wouldn't it? You know it would.

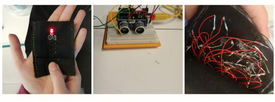


Sadly, I haven't been able to participate to the Wednesday workshop as I caught a bit of a cold myself. In these times of low immune systems for everyone, its perhaps better to call it a day and stay home. Therefore, instead, I'll engage with the material given for the course explaining how to use conductive thread and soft interfaces.

In essence, conductive thread is rather self-explanatory. It's like thread for sewing but it can carry a light electrical current, enough to power an LED, make a button switch or other simple circuitries. It's hooked up just the same as regular wire, no surprises there.
To connect it to Arduino, you just connect it like any other circuit to a breadboard as well. Given the very limited amount of time to carry out this project, the group has decided to stick to simple Arduino solutions and simple circuitry.



We'll focus on hooking up a distance sensor to an LED - The closer you get to the sensor, the brighter the LED. Simple and effective, our idea was slowed down by the difficulty of sewing with the conductive thread we had at hand in combination with the kind of stiff fabric we had to sew onto. Had there been more time and materials, the group could've focused on these but the wearability aspect of our project but given the technical problems of the thread and fabric, it kind of degraded from there on.



Thursday's group work went remote for me too, and it was mainly focused on making the prototype presentable and trying to establish a kind of storyboard we can present on Friday. I made a good part of the PowerPoint on that day except for some last-minute changes.
In one sentence, the project's idea was to place that LED in a mouth mask, and have it blink when someone comes close.

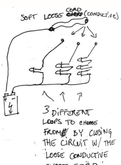
The reasoning behind this is that, when nowadays you see someone with a mask, you generally assume that person wants to be extra careful, for personal reasons, or he/she might be sick at that moment. The mask is in the middle of the face and having an LED blinking there will perhaps interrogate whoever might be looking at it.

We tried to hook up more LEDs to create a kind of light-up heart motif on the fabric, but we were confronted with some major wiring issues due to the number of LEDs and the unusable conductive thread. The result never worked, sadly. So, we had to improvise for Friday's presentation by simplifying the design to a single, bigger LED. For demo purposes it's good enough though.

If there was anything to change about this project in the future, it would just be about taking the time the properly, clearly sew the LED(s) on an to have a better, softer, and overall, more wearable concept. Also, but that's my personal, conceptual opinion, the distance sensor should be placed in the user's back. One can see in front of him/herself but having it behind would make a fun blind angle intruder detector and if I was doing the project alone, I'd have probably done it that way.
A bit useless, but so is our concept to be honest. In hindsight, it was more about exploring the material rather than coming up with a solid, viable concept.

The presentation went okay apart from the fact that our light-up heart didn't light up. We said what we needed to say and given the little time we had to work on that project, it was not that bad. It worked, at least conceptually.

I really liked one of the projects presented by group 4-5, can't remember exactly, where they made a few different electrical loops, and you could change which one is powered by buttoning up a little chord on the fabric itself. I made a little sketch to explain and remember because I liked the concept a lot.



Reference
Sara Nabil, Lee Jones, Audrey Girouard, *Soft Speakers: Digital Embroidering of DIY Customizable Fabric Actuators*, TEI '21, February 14–17, 2021, Salzburg, Austria. ACM ISBN 978-1-4503-8213-7/21/02. https://doi.org/10.1145/3430524.3440630

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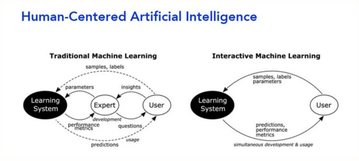
TEI Journal Week 4 - IoT & AI

Monday's introduction set in motion the new module about linking IoT and AI. It sounds like a topic of the future and therefore I kind of respect it. It sounds like a handful though, for the short time we have at hand, as usual.

One of the main points that stood out for me was about how Interactive ML (IML for now) sets itself apart from more traditional ML. To be fair, the graph from the slides is rather self-explanatory.



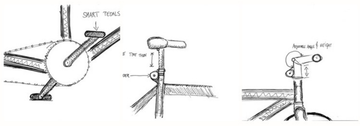
What I found interesting about IML is that the relationship between the user and the machine is unmediated, which can open more varied patterns of responses from the AI. When an expert traditionally sets parameters for AI, the computer's understanding is guided/limited by said expert's understanding. This seems, from my understanding, to be somewhat mitigated by the IML, although the most subjective part of that process is it's labelling system. What I'm saying might be wrong, but it seems like putting a label on something and making sense of it are two different things, in terms of proper learning. On one hand the ML afford more stability and render the results more expectable, but on the other hand the IML feels like it affords more flexibility from a standpoint of interacting with the user directly.

Tuesday's been spent on the readings, where I reviewed the second paper: *Exploring Intelligence as an Interaction Design Material*. What I liked about this paper was that there was an in-depth contextualisation of AI and IoT's history, to compile a clear point of view generally accepted by the experts in these fields to initiate form-giving of an artefact. Consequently it 'filled the gaps' between these generally accepted logics to introduce *familiarity, authenticity,* and *sociability* as additional aspects to consider when giving form to an interactive object. While the theory part was very solid, the paper's weakness lied in the actual field work, because it relied too much on small-scale, anecdotal-feeling student work. It lacked a little bit of hard data to get out of that anecdotal state in that aspect.
On Wednesday we reviewed the papers in class, I can't say anything too surprising happened there, it was a little short and didn't extend much beyond the content of the three papers.

Anyhow, afterwards, the group met up to conceptualise the next project for Friday. From the four modules, this one, for me, felt the most difficult to come up with a viable idea.
This is partially because of me I think, because unbeknownst on my behalf, I'm a little bit of a boomer at heart, according to my group mates. Do I want a drill to tell me how to drill or do I want it to spin and stop asking questions? Would I like it if my fridge spied on my daily diet to judge my calories income or whatnot? Do I find IoT and AI useful in most everyday objects that benefit from that tech currently? I must say, not really. Things like Smart Home speakers and such are a little bit of an abomination in my eyes, for different reasons mentioned above. If I read this again in 10-15 years, I might be laughing/crying reading this, but I honestly don't see a huge amount of future for widespread application of AI and IoT in the public market of everyday objects beyond what we have today. Sure, there might be attempts to, but really, so far, a lot of these appliances like Alexa feel gimmicky and a little useless. In the end, most people I know who own a Smart Home speaker mainly use it exclusively as a radio/speaker and put very little attention in the speaking aspect of it. Perhaps I'm wrong but only time will tell.

To follow up on the projects, we have 3 main ideas:
The first is an AI machine which extends to wearable bracelets and serves the purpose to triage ER patients at their arrival at the hospital. The AI would analyse what the patient has and depending on urgency, put him higher or lower on the priority list. The reasoning behind this is that it would lighten the load for hospital staff and doctors, while keeping track of all patients simultaneously. But we fluked out of this one because of a very simple reason: health and life and death situations like these are too controversial and dangerous to be messed with like this.

The second one was a smart bike that would remember your settings for seat adjustment with pedals which would sense the pressure patterns and rhythm coupled with the general bike parameters like speed, gear, climbing rate, etc. With this data and the user's initial 'mood' input, it would then choose music for the biker to keep up to, tempo-wise. This would motivate the biker to subconsciously surpass him/herself and exercise a little more.



The last one and the one which we stuck with is about having a smart kitchen which considers what you like, and dislike based on what it learned about you through user input as well as feedback after eating, to propose nice new recipes for the user to try out. It would automatically scan the different food introduced in the fridge and shelves and make shopping lists for you. One of the objectives is to reduce food waste by proposing recipes which use 'bottom of the fridge' articles and adjusting the optimal amount of food you need every week, i.e., if you only ate 6 of the dozen eggs you bought 3 weeks ago and didn't follow the AI's egg recommendations till they went bad, perhaps the AI can propose to buy a smaller box of eggs next time.

The idea seems conceptually pretty solid but from a standpoint of materialisation, I wonder how we would really proceed in the future. This project was rushed and there are still many holes which could/should be filled but were kind of left to the imagination at the moment of the presentation. From a standpoint of real feasibility, the whole scanning and ID'ing of food could be a bit tedious if done too simply. The AI would have to be really robust to identify everything.

The presentation went alright, and the feedback we got was mainly fairly ok. It was perhaps not the most robust project ever but since it was fully conceptual this time around, it could be a little looser and that's fine.
All in all, the group's struggle to settle down on a single idea meant that it didn't go so much in depth in the technical details of the thing. That's a shame, but it's part of the game.

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M. C. Rozendaal, M. Ghajargar, G. Pasman, & M. Wiberg, *Giving Form to Smart Objects: Exploring Intelligence as an Interaction Design Material*, Chapter 3, Interaction: Volume 1 - Technologies, Human–Computer Interaction Series, 2018, https://doi.org/10.1007/978-3-319-73356-2_3