Appendices

“Non verbal expression of emotions through desirable Techno-Fashion”

Hugo Out
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1. Context factors

1. Metallinou et al. (2011)
   Body language features that describe relative positions, orientation and approach/avoidance behaviors of the participants towards their interlocutor in an interaction, reflect their level of activation and dominance but are less informative about their valence (positive vs negative).

2. Metallinou et al. (2011)
   Actors tend to walk more when increasing their activation, as compared to decreasing or keeping it stable.

3. Metallinou et al. (2011)
   When decreasing activation, the actor tends to withdraw more and hold hands together.

4. Metallinou et al. (2011)
   Increase in activation is often displayed by more walking and more approach behaviors towards the interlocutor, compared to stability or decrease.

5. Metallinou et al. (2011)
   Body language has been shown to convey emotional information.

6. Marianne LaFrance (1976)
   Nonverbal behavior indicates something about the psychological state or trait of an individual, the nature of the relationship between two or more interacting individuals, or the regulatory and maintenance aspects of a communication system per se.

7. Amy Cuddy, TED talk (2012)
   Body language is all about poses and expressing power.

8. Amy Cuddy, TED talk (2012)
   “Getting no non-verbal feedback. People hate that. It is like standing on social quicksand.”

   We remove ourselves from grief and our daydreams, and we go into our phones.

10. Sherry Turkle, TED talk (2012)
    Technology enables us to present the self that we want to be. We can delete and retouch everything we want to say.

11. Sherry Turkle, TED talk (2012)
    We sacrifice the conversation for mere connection.

    Good relationships keep us healthier and happier.

    We’re lonely but we’re afraid of intimacy.

    Being alone feels like a problem that needs to be solved.

15. Nielsen.com
    Overconsumption is deeply rooted in our culture.

    Solitude is where you find yourself, so that you can reach yourself out to other people and form real attachments. If we are not able to be alone, we are going to be more lonely.

17. Sherry Turkle, TED talk (2012)
    Technology appeals to us most where we are most vulnerable.

    It’s when we stumble, hesitate or lose our words, that we reveal ourselves to each other.

    We expect more from technology and less from each other.

20. Holman, 1980
    The literature of consumer behavior provides numerous comments upon the phenomenon of products serving as a means by which consumers express something about themselves.

21. Rosenfeld & Plax, 1977
    “People select fabric and color to help them conform to their image of the ideal self.”

22. Holman, 1980
    Exposure of the body has been informally linked to perceived sexiness.

23. Holman, 1980
    Cars and clothing are both products which are high in visual display and recognized in our society as “saying something” about a person.

24. The future 100
    “Fashion and beauty brands are blurring gender lines.”

25. The future 100
    “It’s time to make amends by presenting a more nuanced version of masculinity.”

26. The future 100
    Global consumers are now operating with a sustainability mindset. Products and services that provide convenient, effortless ways to contribute to regeneration efforts, will find favor with the mindful consumer.

27. The future 100
    “The number of single adults is growing across the globe.”

28. The future 100
    “Adulthood, and the way people experience it, is shifting towards something much more individual as people choose different paths.”

29. The future 100
    Adulthood now is about putting yourself on the map, by achieving something noteworthy.

30. The future 100
    “Cultural shifts are dictating the colors of tomorrow to connect with the consumer on a deeper level.”

31. The future 100
    34% of generation Z were quitting social media permanently, with 35% saying there’s too much negativity and 29% stating that it “tears apart their self-esteem.”

32. The future 100
    Technology is becoming more intuitive than ever, with new products and devices that can instantly adapt to their surroundings.

33. The future 100
    More and more tech companies are realizing the order of magnitude that their products have on societal issues like mental health, isolation, cyber-bullying and suicide.

34. The future 100
    Technology is becoming more intuitive than ever, with new products and devices that can instantly adapt to their surroundings.
The future 100
Tech companies are shifting the dialogue away from the idea of giving up part of ourselves to a machine and towards services that are made to smoothly and reassuringly reconcile themselves to the user.

What beauty represents is being redefined and brands need to take note of the “imperfect” aesthetic highlighted by a subculture of experimental artists.

The world of beauty moves beyond the human form.

It’s 2018 and there’s so much technology that enables us to truly make custom clothes for people and bring an entire new experience to market. This is the new era where clothes adapt to people.

An increased awareness of mental health is giving rise to public spaces designed to recharge and rebalance in hectic cities.

Big Tech brands are increasingly favoring an impeccably designed visual language that celebrates imperfection and tactility. The overall aesthetic is human, soft, fun and refined. Rather than using primary colors, it relies on a more muted digital palette.

2019 trends by Ford
Adults:
- 84% are driven for change by hope
- 48% are driven for change by fear
- 71% are energized by change
- 33% are scared by change

2019 trends by Ford
"I would like to undo some behavioral changes that have occurred because of technology."
Generations who agree:
- Gen-z: 68%
- Gen-x: 62%
- Millennials: 60%
- Boomers: 53%

2019 trends by Ford
"Artificial intelligence will be stronger than the human mind within 10 years."
Generations who agree:
- Gen-z: 68%
- Gen-x: 62%
- Millennials: 60%
- Boomers: 53%

2019 trends by Ford
Of the 36 percent of Gen Z and Millennials globally who said they have not tried meditating, 54% agreed that they should try meditating.

David Matsumoto (n.d.)
The ability to have facial expressions of emotion is something that is biologically innate and that we are all born with.

2019 trends by Ford
"I’m more outgoing on social media than I am in person."
Generations who agree:
- Gen-Z: 56%
- Gen-x: 36%
- Millennials: 53%
- Boomers: 17%

2019 trends by Ford
Today, self-improvement is having its moment, driven in part by a growing set of tools that make it easier to set, track, and achieve even the most ambitious of goals.

Some may find the operation of a system that employs non-traditional on-body interactions uncomfortable to perform in a public setting.

What is considered socially acceptable today may not be common practice in 5 to 10 years.

Within cultural settings, there are outfits deemed appropriate or inappropriate for particular social situations.

Social acceptability is culture- and time-dependent.

Wearable technology usage can be heavily influenced by its perceived level of social acceptability.

People of all cultures and throughout the ages wish to stand out from others.

Fashion is beneficial to our wellbeing, it helps to shape and reflect our personality and our identity.

Clothing concerns all of the human person, all of the body, all of the relationships of man to body as well as the relationships of the body to society.

Designers explore the limits of the human body and play with the fluidity of the wearers identity. In that way, characteristics of the wearers body will become more like the characteristics of clothing itself: dynamic and fluent.
For those willing to spend more on clothing, the findings show that personal values are more important than personal benefits, such as cost or convenience.

Yearly, in the Netherlands alone, 688 million pieces of clothing are being thrown away by the consumer.

Expressing yourself nowadays is all about flexibility, and the freedom to express who you want to be.

Body language may account for between 50 percent to 70 percent of all communication.

A study which shows a person’s commitment to dressing and his or her personality.

Posture was informative not only about one person’s feelings toward another, but about his status as well.

Females, but not males, who display leg and arm openness communicate positive attitudes.

We use conversations with each other to learn how to have conversations with ourselves. So a flight from conversation can really matter, because it can compromise our capacity for self reflection.
Please explain to me what items you brought with you, in terms of colours, materials and styles.

My shoes are bought online, and are from a sustainable shoe brand, are off-white, and are my main easy to-go-to sneakers. My trousers are from levi’s, and have been adjusted to become a little bit slimmer than they originally were. I always wear pants very skinny, that’s where I got my nickname “Slimfit” from. The T-shirt is a vintage bought Real Madrid football jersey, in bright blue. It’s fabric assumes it is a regular cotton t-shirt, but it’s typical sports jersey fabric makes it very pleasant to wear. I was already in search of a sports jersey, but I bumped into this shirt randomly by passing by a vintage shop on my way to the train station. It was from a nice football club so I just bought it. My vest is bright red, fleece fabric and in a loose fit. I bought it in a vintage store in Rotterdam, and I wasn’t particularly in search of something specific. When I saw this vest I felt in love with it, and in the forthcoming months I wore it day in, day out. Finally, I’m wearing a waistbag in brightblue, to give the outfit a more street style look. But I almost forget my golden Christian cross earring. Normally I wear a regular ring, but this makes it more special and more outgoing.

When was the last time you wore this outfit? What was the occasion?

The last time was when I went to the skate park, about a week ago. The bag was used to carry my portable speaker and a small bottle of water. The jacket is easy to take off and the sports fabric jersey is of course usable when you work out, during skating.

When you think about these items, what feelings are triggered? What emotions are best to describe these feelings?

I have a particular strong feeling towards the items of this fit individually. About the fit totally, I have a strong feeling of freedomness. That is because I don’t feel that people have to take me seriously, which is why the randomness and weirdness reflects that freedom. I like it when you take life not too seriously. I like to be a little eccentric in the way I dress myself. My friends don’t have that, but I like it when it doesn’t matter what you wear outside in public during your day off. I think that people, who think too much about what matters when you wear something in public, on your day off, take themselves and life too seriously. Of course you have to think about your appearance when you go to specific social events, but I think that doesn’t matter when you are able to do whatever you want on your day.

About what emotions it triggers, of course it brings happy emotions. But what’s interesting is that it brings a large dose of calmth. That is because for example when you go to a funeral, you have to wear rather tight and neat looking clothes, which can easily sloppy when not worn right, which brings a certain need for attention. This outfit I’m wearing right now can’t fit tight or not tight, which doesn’t need a lot of attention, and that brings calmth. Finally, when your outfit triggers angry and sad feelings, you have to wear another outfit!
When you think about the moment you last wore these items, what feelings are triggered? What emotions are best to describe these feelings?

I wore this outfit when I went out for skating. We talk a lot about skating, like that dictates my life and like I am a professional skateboarder, which is not true. I just started skating, but what I like about the skating lifestyle is that, even though those skaters are office workers during their daily lives, when they skate, they don't take life too seriously. We talked about this earlier, and I very much love that mindset. They are driven by this lifestyle and it brings them passion. I don't like people who are driven by making a career and bring passion to the second place. I think passion should come first, and making a career out of it comes second place. Finally, skating of course is an active, open air hobby, which triggers yourself to go outside instead of laying down on the couch. Don't think that I am a very rebellious person, because I also study, and follow multiple tracks laid down by society, but I just love that mindset of not taking life too seriously.

Can you go back to the day you first assembled this outfit? Did you buy these items in one go or where they assembled later? What feelings were triggered in that situation?

What I stated after the first question, is that the items have been individually bought, without the thought of coming together in this formation. I have worn this formation only ones or twice, and could easily be combined with other favourite items. It doesn't necessarily have to be completely matched, which is why it is easily combinable. The first time I assembled this outfit, I can't really remember what feeling it gave me. It was when I was planning to go skating, and I kind of grabbed together a few of my favourite items. When I was ready to go, it gave me a kind of complete feeling, like I was indeed ready to go.

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I have worn this outfit only ones or twice, and I liked the look because it gives a "street style" vibe. I actually don't know the definition of a streetstyle vibe, but I like this fit because, for example with the football jersey, it gives a certain "I don't care" attitude. I like that. The fleece vest is a very non-stylish 40's dad vest from a non fashion style brand, but I very much like that, also combined with the Real Madrid jersey. It's just weird. And the waist bag, well, it will probably make the whole outfit very much wannabe street, but it's very comfy. The whole fit has a certain randomness, and weirdness, but I like that. My friends will probably wear only one of these items, as their crazy item. I just wear all three of them.

Finally, to finish off with the golden cross earring, I bought that because the old regular golden earring felt too normal. I wore the earring to formal activities, so I needed something more special. The reason I chose a cross is because it reflects, something, something "tough like", and it doesn't reflect my believe in Christianity. I am 100% not Christian. It's just the typical tough like person it reflects what I like about it.

When I assembled an outfit for that funeral, I was more looking for an outfit that was better matched. The trousers matched the shoes, etc. Next time, I would assemble the exact same outfit, because it was matched, but it still had a small portion of eccentricity. That outfit gives me more of a "first time" assembling feeling.

That is also the way I style my outfit for a more formal situation. The whole look has a more neutral look, but with a focus on for example my trousers. The trousers in that case reflects that bit of eccentricity.

That outfit also gives me a more sophisticated and smarter look, in order for people to take me more seriously when I present myself. But still, I want to stand out from the others, and I want to be remembered by that.

Interesting last few minutes of the conversation, that really reflects Xander's way of dressing motivation
Interview Julie 11-06-19

- Please explain to me what items you brought with you, in terms of colours, materials and styles.

The first part of the outfit is a white turtleneck. It fits really well! It’s elastic and tight, and has little ridges in it. The second part is a dark blue jumpsuit with wide trouser legs. The jumpsuit has a small part which is brown. I don’t actually really like the colours. I will never choose something blue, because I have brown hair and dark eyebrows, and a white skin, and blue just looks really boring on me. The brown part on the dress gives it something special, which I like, and fits together with the white turtleneck does make the whole outfit really nice and special. Wearing something like coloured underneath the plain blue makes it better matched with my appearance. It breaks the plain appearance of the blue jumpsuit.

The fit of the jumpsuit is one part loose, which makes it easy and relaxed to wear. On the other part, it’s also tight and fitted, which makes its appearance also a little neat. For me it’s important for the item to feel relaxed when worn, but should look fitted and tight, and not sloppy. The outfit, and especially the jumpsuit, is a little crazy. When people give bad commentary about this suit, something like that’s weird, and I very much like it myself, I am going to love it more and more.

When was the last time you wore this outfit? What was the occasion?

I wore this outfit to a social event of the company I am working for. It was quite fancy, with a lot of people, so I had to present myself quite well. People at my work always tell me I wear weird clothes, but I never have the idea that they mean it in a bad way. That event was 2 weeks ago.

I chose this outfit on more special occasions, when I will probably have to present myself in a nice way. I would wear it on normal occasions as well, but not often, because wearing this outfit needs to stay special.

When you think about these items, what feelings are triggered? What emotions are best to describe these feelings?

I don’t like to wear suits or other very trim items. But this suit can be worn as trim, but still has a something a little eccentric. I like clothing that is quite eccentric. The funny thing is, my hair normally is curly, but wearing my hair eccentrically that way is not something I like, because that is something about me that I can’t change. That is why I straighten it to make it less eccentric. Choosing clothing that is eccentric and wearing it eccentrically is something I can change, which for me creates a pleasant effect. It that way I can be a little weird. People often think about this jumpsuit that it is a little weird, and they would never wear it themselves. I like that, because that makes it special. People comment about me wearing this jumpsuit a little like that, which I think is cool!

In terms of feelings and emotions it triggers, I get really happy and excited. I wear this outfit when I am already happy, and it very much reflects that happiness. On the 5 emotions skill, this outfit is very happy. I am already happy, and the outfit makes me even more happy, so it’s very much on the top of the happy scale. It’s all out crazy and happy, and reminds me of the fun stuff I am going to do.

When you think about the moment you last wore these items. What feelings are triggered? What emotions are best to describe these feelings?

Compared to other outfits I can chose, this outfit gives me a little more eccentric look, and I want people to have thoughts or comments about it. That is really something I love about this jumpsuit. It has really wide trouser legs, and it flaps around my legs. In that way I stay conscientious with what I am wearing. It makes it fun! People have their attention on me and comment on this fit a lot, which again I like!

Getting that attention makes me happy, and wanting that attention reflects my happiness. I think I particularly wear this outfit when I am already happy. So, it reflects my happiness and getting that attention is a kind of confirming.

At the company event, I get feelings of enthusiasm, feeling like getting social. On that event, my project leader asked me to walk on stage, and he is a little weird. But I felt quite comfortable doing that, which I normally wouldn’t be. That is because the combination of the outfit, and what it triggers in myself, combined with my already happy feelings.
Can you go back to the day you first assembled this outfit? Did you buy these items in one go or where they assembled later? What feelings were triggered in that situation?

I bought the jumpsuit at first, quite randomly. I was late for a meet-up, but I walked past a cute shop and felt the need to do a little bit of shopping. I saw this jumpsuit, which I thought was really cool, but the lady in the store told me it was 150 euros, which is a lot. I still liked it, and I send pictures to my friends to ask what they think. A moment later, the shop lady came back to me to tell me the suit was 80 euros instead of 150, so it was meant to be! Of course, 80 euros is still a lot to spend randomly on clothing, but I really felt like it. But I had to find something to match with. I had something white-ish to match, but I already liked turtlenecks, so I looked for something like that to match the suit with. I found one, bought it, and the outfit was complete. The first time I wore this outfit was when I went back to my hometown Eindhoven. Together with my parents I went downtown to do some shopping and to have a few drinks. It was a very sunny and relaxed day. There was one moment I walked into the Scotch & Soda story, and 3 shop ladies complemented me on the outfit! They asked me where I bought it, what brand it was, etc. That was so cool! The feelings it triggered was happy, relaxed, and excited to visit my hometown and parents again.

What would be the ideal situation in which you would wear these items, thinking about it right now?

I would wear this outfit on somewhat special occasions, when I really want to look nicely. That can be when I visit my boyfriend’s parents, or when I have another event at the company. A specific moment I would like to wear this outfit is when I will go to downtown Rotterdam, which is a city I just moved to. I would like to have some drinks, and end up going out with my friends to some cool place. I definitely would love to dance in this jumpsuit, that would be so cool. That would be my perfect day, and it has to be very spontaneous, just like my outfit.

Final comments

What became apparent is that I would also choose this outfit when I have to present myself nicely, and formally. Other options are for example gala dresses, but I don’t like those. It gives me a look which is too cute for me, sweet, and I don’t like that. The eccentricity of this jumpsuit has something a little more badass. It reflects everything I want to express. I would wear this outfit when I have to study, but afterwards would go out. I would wear this when I have to attend a serious event at my job, but also when I visit my boyfriend’s parents for a night out.

When the event is going to be chicer, I would maybe swap the white turtleneck for something less playful, something neater. Something that fits the chic occasion, because I still want others to think that the outfit is a little more chic than normal.
Interview Jasper 12-06-19

Smart outfit

Please explain to me what items you brought with you, in terms of colours, materials and styles.

For the smart look, the colours are very basic, light blue, dark blue and white. The trousers is very soft, almost like a sweatpants, but they are quite presentable and smart, which I like. I often get remarks on the fact that they are interesting, because they are smart but still look very comfortable. I wear them as a part of my more presentable outfit. I like them because of getting those remarks. Moreover, they are very comfortable, but I use it as my smart trousers.

The T-shirt is a very basic white t-shirt, because you can’t get wrong with a basic white t-shirt. I close my shirt, and you can’t see it, except for the collar, which is nice. The t-shirt has a few stains and is old, but that doesn’t matter because it’s hidden underneath my shirt. I would never wear this t-shirt when it’s shown. It’s purely functional.

The shirt is casual and light blue. Is has a thick fabric which adds to the casual look. Light blue is a colour which is easily accepted, and a safe choice. The shirt has no logos. I wore it the first day at my new internship. I use this outfit to present myself as a neat man, and show myself how the people so they could have high expectations.

I want people to have expectations like he’s smart, neat and well groomed. Wearing a suit would be too much for me, too much standing out. At my application day I wore a white shirt from my suit, that is less casual and which in my opinion gives me a smarter look.

I sometimes roll up my sleeves, to make the look less neat and more me. But I only do that after I’ve had the meeting, or I roll my sleeves back down when I am about to meet.

When was the last time you wore this outfit? What was the occasion?

The last time I wore this outfit was when I was about to meet a new colleague of mine. I knew he would be around, so I wore this outfit to be a little smarter than usual. The reason I chose this outfit was because I didn’t want to risk any bad opinions about me from the people I had to meet. The outfit is very clean. I also want the outfit to match with the person I have to meet.

I want to show the people that I know what I am doing and that they can trust me with their work.

When you think about these items, what feelings are triggered? What emotions are best to describe these feelings?

This outfit gives me the feeling of going to work hard today, and that I am presentable. That I am about to talk to people that I don’t speak to very often. This outfit gives me the feeling that I have everything under control, so I will be performing well with what I will be doing that day.

On the emotive scale, my emotions are more on the calm side. 80% calm, 40-50% happy. That is being triggered by me waking up in a good mood and by my expectations of having a nice and productive day. I also sometimes force myself to wear this outfit when my wake-up mood isn’t that good, to be sure I look smart. Other moments my wake-up mood isn’t that good, I choose to wear a sweater, that triggers less energy. The outfit gives me peace.

When you think about the moment you last wore these items, what feelings are triggered? What emotions are best to describe these feelings?

I find this hard, but I guess it’s positive. The day went well, because the conversations went well, and I positioned myself as expected. I think about those moment positively, and that I succeeded in my expectations. I gave the right impressions.

On the emotion scale, my emotions are less calm because I was a little bit nervous. I’ve had a little more happiness thinking about it.
Can you go back to the day you first assembled this outfit? Did you buy these items in one go or where they assembled later? What feelings were triggered in that situation?

I was looking for a casual but smart shirt like this. I bought this very considered, especially for these kinds of occasions. The trousers I bought a couple of years ago. I can't really remember when and why, I just bought these trousers because I needed a new pair of trousers. I was searching for a more groomed pair of trousers, that made me look a little bit smarter. The pants were brought into this outfit because they had a smart look, and because people complemented me when I wore them. The funny thing is that I don't want people to complement me on my clothes in these kinds of situations. But people who are close to me saw the special characteristics of the pants after a few times, but thought it was a smart pair of trousers the first time. That's perfect. The first time I want to look smart, but after a few times I want people to notice I don't always wear these kinds of outfits.

What would be the ideal situation in which you would wear these items, thinking about it right now?

When I have to give a presentation, for example next week

Casual outfit

This time, for the more casual look, I a chose a more presentable white T-shirt with a blue logo. I wear a pastel pink identical shirt on top of it but unbuttoned. In this way, you can see the t-shirt I am wearing underneath. And, I chose the same trousers.

The first day I wore this outfit to my job, I immediately got a remark, about if I was feeling loosely that day. I thought about the remark, but I didn't care about it very much, because it was my free outfit. I wasn't expecting a presentable moment, so I deliberately chose my free outfit. Still, because I take my job quite seriously. Its not desired to get any remarks on what I am wearing when I'm working. That is why the remark was unexpected and uncomfortable. I realized after the remark that it was my free outfit, so I understood where it came from. I thought about if I should change my outfit, but I then I realized I don't have to look smart every day, so it was all right. I can easily decide for myself to look smart or not.

Also, the weather was quite sunny, so I chose an outfit that matched the weather and that was more comfortable.

Normally this would be the outfit I choose when I am going into town on my day off. That gives me a feeling of freedom. I want people to see that it's me day off kind of outfit, and that I care less about what people think about me.

My ideal day off, I go into town with my girlfriend on a sunny day during the weekend. The weather is never too hot, nor too cold (typically Dutch). The shirt can be buttoned when it’s colder, unbuttoned when it’s warmer, and I can even take it off.

The outfit gives me a happy and satisfied feeling, like a day without worries, stress free. On the emotion scale, is gives me a 80% happy feeling. All of my outfits are quite calm, in general. But, compared to my smart outfit, it’s less calm because it’s a little more outspoken (40% calm). It creates more emotions than the smart outfit, because of the outspoken color and the logo.

I also have a woolen Scottish fabric like shirt, which sometimes is fun to wear. But it is a little too outspoken for me to wear on a regular day.

I want to look like a man who is dressed well, but is not taking part of the whole fashion trend thing. A little basic, so it is easily accepted. I don't want to make a statement with my clothes. I think some more outspoken items are quite cool, but I don't think it matches my style. I would love to see others wearing it.

Desired techno fashion

I would love the clothing to be dynamic in creating nuances when I have to dress smart, on a presentable day. When you have one moment on your day when you have to be presentable, you have to dress according to that one moment. It would be nice if you could make a switch in your outfit, from presentable to a free form. I have to be more conscious about my outfit when I'm looking smart.
Interview Hanneke 12-06-19

Please explain to me what items you brought with you, in terms of colours, materials and styles.

I am wearing a black pair of skinny jeans, that are tight, but they have a lot of stretch. The stretch makes them comfortable to wear. They also have a high waist. On top of that I am wearing a wide fit basic white T-shirt. Over that jacket I’m wearing a wide fit dark blue blouse, made from a soft corduroy fabric. I much like the tight stretch of the jeans because it gives me all the freedom to move. That makes it comfortable to wear in all kinds of different situations, like cycling, but also relaxing on the couch. Also, because they are tight, they look well to because it doesn’t hide my figure. My oversized blouse also gives me all the freedom to move, which makes them very comfortable, but also I can take them off easily.

When was the last time you wore this outfit? What was the occasion?

The last time I wore this outfit I was studying at the faculty of Industrial Design Engineering at the TU Delft. The reason of wearing this outfit also when I go studying is because the jeans are comfortable enough for when I’m seated all day. But, they are also comfortable when I have to walk a lot, when I’m going into town. I also have other outfits that are comfortable when going into town, but they aren’t comfortable enough when I have to sit all day. This chose outfit is very suitable for both activities.

When you think about these items, what feelings are triggered? What emotions are best to describe these feelings?

If I think about wearing a tight t-shirt and top, I don’t feel that comfortable because it gives me the feeling I am too exposed. Wearing a skinny pair of jeans, but an oversized top, makes me feel more relaxed and comfortable, and also gives me a cozy feeling. Also, the combination of half skinny, half cosy/oversized gives me the correct dose of comfort and femininity, whereas wearing both parts skinny make me feel too exposed, but both oversized too sloppy. I always chose this tight bottom, cosy top combination when my day plans are still uncertain. It’s nice for getting a coffee with friends, when I go into town, etc, and will always match my mood. When for example I chose to wear a tight turtleneck, that is very much dependant on my mood. The feelings that are triggered when choosing this outfit are easiness and comfortability, but also self-assurance. Sometimes, when I choose something else to wear that they, during my breakfast, I get the feeling of discomfort and it being a mismatch. When I’m trying to wear something else, most of the times I will choose this pair of jeans. These pair of jeans are always right, it makes me feel good, it accentuates my figure, and the black colour is always easy to wear, without compromising on style. Those things help me feeling more secure. The same goes for my blouse, also because of the option of taking them off, which gives the outfit a different vibe. A different mood gives me also other options to choose from, like for example when I am planning to visit a museum of go to a birthday party, which all makes me feel self-assured and all. But, again, those are much affected by what mood I’m in, and the outfit I’m wearing right now always hits the right spot.

Talking about the 5 emotion groups, this outfit got a high score on the calm side, because of the self-assurance, and because of the safe choice. It also triggers a fair amount of happiness of course.

When you think about the moment you last wore these items. What feelings are triggered? What emotions are best to describe these feelings?

Comfort. I’m not sure if that’s a term for a feeling. Just what I’ve said earlier, comfort, assurance. I’m also getting the feeling of that it’s also a little pretty cool and sturdy. I also think I kind of look cute, but I find it a little bit awkward to say it like that. I know it looks good, which makes me feel secure as well. Of course, you wear stuff because you think it looks good on you, but when saying it like that to you makes me feel a little vulnerable too. That is because I think people can easily make judgements when you are making statements like that, and that makes me feel judgeable, and therefore vulnerable. The funny thing is that this outfit is a bit plain. Again, I am feeling very well in this outfit, but it’s plain, and therefore less judgemental. Therefor I find it awkward to feed those judgements by stating I look good. Controversially, when I’m wearing an outfit that is more outspoken, I feel like it’s more judgemental and I am more willing to be more outspoken about the way I feel about this look. That also makes it easier to receive judgements, but I does not affect the way I feel about it myself. This is also based on my opinion about when I’m looking at someone else wearing these outfits, and the level of making judgements I have about it.
Can you go back to the day you first assembled this outfit? Did you buy these items in one go or where they assembled later? What feelings were triggered in that situation?

This blouse was stolen from my boyfriend. It was a little too small for him, so he never wore it. I quite liked it, and therefore I took it with me. The pair of jeans I already have for a long time. I don’t like to wear this blouse with light trousers, which is a pity because these black jeans are getting quite worn out. The white t-shirt and the jeans are the basics, and the blouse finishes the outfit with something interesting.

We didn’t talk about my jewellery yet, but I just have 2 sets of earrings, a few necklaces and they are all easy to wear and interchangeable.

What would be the ideal situation in which you would wear these items, thinking about it right now?

The ideal situation would be when I’m going out of the house and I don’t have a clear plan yet what my day would bring!

Now talking about the more fancy kind of outfit

The fancy outfit I chose is a tight red jumpsuit, with a red ribbon around the waist.

I would wear this outfit for occasions like dinner parties, weddings, other parties, when I’m going into town for getting drinks or other celebrations. Compared to the other outfit, this outfit makes me feel more lady-like. I feel pretty, feminine and sexy, in a way. It makes me feel more special than the previous outfit, but it’s still quite comfortable. That is why this outfit goes a little more towards the happy side of the spectrum, compared to the other outfit being more calm and secure.

I would not wear this outfit every day, because it needs to stay special. That feeling is best described by making the comparison with the use of make-up. When you are never wearing mascara, and only use it during the weekends, people will compliment you on the use of make-up. When you are always wearing make-up, but a little bit more during the weekends, nobody will notice. That is what I like about wearing clothing. When I’m dressing up, I want to feel special and I want people to notice that. Some people want to feel special every day, but that doesn’t go for me.
Gesprek Hanneke en Maaike 12-06-19

Problems

- Clothing that you can only use for one kind of event, which 99% of the time will not be used
- Clothing that looks nice but doesn’t fit comfortably. The feeling that is matched with that item isn’t a good one, so negative feelings are matched.
- The problem with sexy or nice looking outfits is often that it asks and needs a lot of attention. You are constantly checking and adjusting to make sure it stays nicely, or that there are no flaws. You are over conscientious.
- Maaike and Hanneke both would like to dress sexier and nicer when they go for a day of studying, but the discomfort makes them wearing different clothes.

Ideas

- A person wants to dress himself comfortably, but wants to look great as well.
- Clothing should change dynamically according to a persons’ mood. One mood can decide for me to wear a stiff/rigid pair of jeans, but the other mood wants me to wear a stretch denim that is more comfortable to move in. A piece of clothing should feel what mood the wearer is in and should adapt to that mood.
- Some days you want to wear control the clothing, but other days you want to be controlled by what you are wearing. A good mood vs. a bad mood. A clothing should dynamically adjust to that. The same piece of clothing should fulfill both needs matching both kind of moods.
- Sometimes a mood does not always match what is comfortable to wear on that particular day. For example, when a girl wants to feel sexy during the day, but they go for a day of studying, it is not always desired to wear revealing clothes. When having a break, it is desired to wear sexy clothes, but when actually studying and going to the toilet, it is not always desired. Those little nuances in moods should be reflected in dynamic clothing.

Insights

- Whether a piece of clothing, for example a pair of jeans, will make you feel styling or sexy depends on the mood you start your day with. When a day is started with a good and fresh mood, a pair of jeans can make you feel pretty and stylish. On another day, when you wake up with a bad mood, the pair of jeans all of a sudden feels sloppy. On such a day, a regular stylish kind of pants, like thin fabric wide legged pants, is an easier option to feels stylish than jeans.
- That is why some people can’t think about what they should wear the day before the actual day, because it’s very dependent on their mood.
- When the waking up mood is like feeling good and happy, that creates more mind space. More mind space gives the environment more room to affect you, so a rigid pair of jeans doesn’t have too much impact on your mind. When waking up with a bad mood, there is not a lot of mindspace, so there isn’t much room left for the environment to affect you, so there is a need for a more fluent and easy-to-go-to pair of trousers.
- A rigid pair of jeans needs to be worn by you, and you have to feel like it. You have rock the jeans, in a way that your mood controls the way you feel when the jeans are worn. But, the more accessible thin fabric trousers wears you, and there is not much need for you to control those trousers.
- Some people have the attitude that they are wearing and controlling their clothing. Those are the more expressive kind of people. Others, who may find themselves less expressive, have more difficulties on wearing and controlling their clothes, so they are in need for more accessible pieces.
- Sometimes you buy a piece of clothing, and you are not sure whether it is going to be something that you are going to like to wear in the coming times. You have to start learning how to wear it and experiment with it, because on the one hand it needs to match your personal values in style expression, but on the other hand it needs to change your current style a little bit, or you need to find ways to combine it with other items. Sometimes it works out, and you will grow into that item, so to say, but with another item it just doesn’t work out. Sometimes you really like an item, and the way it looks, but you can’t find ways to wear it so that it suits you.
2. Design characteristics

2.1 Calm/subtle

**Bedsheets**
The softness and light colour of bedsheets visually create a feeling of relaxation, because it reminds of laying comfortably in bed.

**Dimmed sunlight**
The dimmed sunlight gives a calm feeling and evokes positivity, because it reminds of life and invigoration.

**Cold nature surroundings**
Cold nature gives a visually calming effect, because the scenery is wide and open, without a lot of urban distractions. The nature and the cold also reminds of the desire to get active, which gives a calm, healthy and fresh feeling.

**A warm bath**
A warm bath gives a visually calming effect, because of the fresh water, the possible bath soap, maybe candles, and because of the-ly air around it. It reminds of a relaxing time with no distractions.

**Mood lights**
This mood light brings a feeling of calmth, because it represents nice moods and it presents a dimmed hue, which colour can be changed, according to the need of the user.

**Dimmed lights**
The dimmed hues and colours of these lights give a calming effect, because of the fact that the lights are peaceful for the eye, being the opposite of flashy and undesired.

**Taylored garments**
Taylored garments can give people a visually calm feeling, because the clothing fits the wearer perfectly, and it looks well groomed.
Asian-inspired interiors give a calm and airy visual appearance. That is because of the very aesthetic and minimalistic interior, and because it reminds the honourful asian traditions.

The soft and moist texture, and the healthy deep green colour of grass, when laying in a park, has a calming en stress free effect, because it reminds of a healthy and relaxed environment. It also creates nuances of happiness, because of the freeing effect of fresh nature.

The flickering flames and the orange colour of the fire in a fireplace has a calming and relaxing effect, because it reminds of coming home and relaxing in the cozy and warm living room.

This bike lane, designed by Daan Roosegaarde, bring a feeling of calmth, because it enlights the dark surroundings, it gives guidance, but foremost it reminds people of the stars.
2.2 Happy/expressive

**Bedsheets**
The softness and light colour of bedsheets visually creates a feeling of relaxation and calm, because it reminds of laying comfortably in bed.

**Christmas tree**
A Christmas tree gives people happy feelings, because the colours and the lights remind people of good times with family and friends during the Christmas holidays.

**High contrast**
The large contrast between the black and neon green colour gives excitement, and therefore evokes happiness.

**Leaves**
The shapes and colours plants, leaves, and other green nature evokes happy feelings, because it reminds people of life, freshness and healthiness.

**Rainbow**
The combined colours of a rainbow gives people happy feelings, because it’s special and unique, and it reminds people of good weather, and fairytales.

**Hearts**
The red colour and the shape of heart brings joy and happiness, because it reminds people of love.

**Round puffy shapes**
The round, puffy shapes of these lights give a joyful and happy experience, because of the playfulness and childlikeness.
Flowers generally evoke a happy and energetic feeling, because of its bright colours and liveliness.

Exotic fishes
The colors of these exotic fishes gives a happy and joyful feeling, because of the small and curved shapes, the innocent expressions and the lively colors.

Expressive artworks
The combination of the artcity and the expressiveness of this artwork wall gives happy feelings.

Balloons
The balloons, with its filled and round shape, and the often bright colours that are used, evoke happy feelings, because it reminds people of parties and other fun festivities.

Disco ball
The disco ball, and its reflection of light, evokes a feeling of happiness, because of the bright lights and the reminder of fun parties, dancing and disco music.

Stage lights
The flashiness and colours of these stage lights gives an euphoric, energetic and happy feeling, especially in combination with the intense experience of music.
Playfull shapes

The soft organic shapes of the objects, combined with bright colours, express playfulness and evokes happiness.

Lace fabric

The embroidered flowers and the partially see-through of lace fabric gives a happy feeling, because it reminds of intimacy and lust, and makes a person feel sexy.

Soap bubble

A soap bubble, especially with kids, brings a very happy feeling because of its shape, colours and playfulness. For older people, it can evoke the same feelings, but foremost nostalgia.

Non matching pair of shoes

The combination of two different shoes, with different colours, but worn together, brings joy and happiness, because it looks funny and weird in the first place, but when styled right, it looks good and shows not taking life so seriously.
2.3 Animal expressions

Blue morpho butterfly
Characteristics: The large blue wings aren’t actually blue, but reflect light in a certain way. The other side of the wings are brown and have a print with eyes, which is a way to misguide predators by letting them think the wings are from a larger animal.

Buff-breasted sandpiper
Characteristics: The sandpiper shows the underside of their wings, which are silver coloured. When wooing a mate, the male birds flash their wings and show off their “armpits”. The female then can decide whether to mate or just move on.

Peacock Spider
Characteristics: These spider have long third legs and a very shiny rear flap. When trying to impress a female, they raise their third legs and send out vibratory signals. Moreover, they lift their rear flap and show off their decorations, trying to impress.

Hooded Seal
Characteristics: The hooded seal have a large inflatable balloon on top of his head. When showing off to a mate in order to win the female, they blow up the balloon in order to scare away the other male. The stronger the seal, the bigger the balloon. The less chance the other male will want to fight back.

Poison dart frog
Characteristics: The poison dart frogs are very small, but have a smooth and very colourfull skin. The patterns warn their enemies of their toxicity.

Swallow-tailed hummingbird
Characteristics: The colours of the plummage of this hummingbird is a mixture of green, blue and purple, and the bird has long forked tail and a long and sharp and long beak.

Bird of paradise
Characteristics: The bright coloured birds try to impress a female by performing a dance before mating, they push their feathers up to form some kind of skirt.

Mandrill
Characteristics: The mandrill has a very colourful nose. The colours are used to show excitement and become brighter once the mandrill gets more excited.
Greater Sage Grouse
Characteristics:
The Sage Grouse comes together in a group with 70 others to compete for female attention. They do so by fanning their tail feathers and filling air sacs in their chest. Finally, they produce sounds of vocalisation to also gain attention.

Great frigatebird
Characteristics:
The male flocks together to attract females. They display by inflating their red throat sacks with air in order to attract the attention of the female birds. When they succeed, she will fly down and land alongside the male bird.

Tiger
Characteristics:
The long and long, white and black, and the white fur. These are meant as camouflage in warm countries where they hunt. In this way, they can get camouflaged in long grass when approaching their prey.

Candy crab
Characteristics:
The pointy and sharp shell of the candy crab can change of colour, like red, white, yellow and pink, so it can camouflage itself between the coral reef.

Flamingo
Characteristics:
The long and long and thin and thin, and its bright pink colour. They are well known for their beautiful dancing, in which they move completely synchronized with a certain choreography. Furthermore, their pink colour comes from eating certain algae. The more efficient they search for the algae, the pinker they get, which means they become more attractive for mating.

Sunset moth
Characteristics:
The patterns on the wings of the sunset moth are extremely colourful and asymmetric. The colourful appearance warn predators of their toxicity. The skin of the wings is iridescent.

Squid
Characteristics:
The squid can change their colourful skin in an instant, in order to become camouflaged in their surroundings. The tiny dots in their skin can become bigger and smaller, due to small pigment muscles that are called cephalopods.

Mandrill
Characteristics:
The purplish, sharp shell of the mandrill can change of colour, like red, white, yellow and pink, so it can camouflage itself between the coral reef.
3. Techno-Fashion benchmarking

Foil that changes in transparancy

Intimacy 2.0 by Studio Roosegaarde

This suit is constructed from e-foils and wire that can become less transparent in response to the wearer's heartbeat.

Tiny LED's embedded in jacket

Bright Jacket for Holst Centre, by Marina Toeters

Tiny LED's are embedded in flexible smart fabric with interconnected technology, and miniature technology.

Phosphorescent compound engineered membrane

Solar Charged Jacket by Vollebak

The jacket consists of a phosphorescent membrane that becomes ultra-transparent under the influence of phosphorescent particles in the jacket's fabric.

Glas spheres embedded in resin, added to fabric

Black Squid Jacket by Vollebak

The resin the jacket has been treated with contains 2 billion black glass spheres. The glass spheres let light travel through them, reflecting it to the original light source while scattering away from it simultaneously. It looks like it's emitting light.

A smoke generator embedded in a 3d printed structure

The Smoke Dress by Anouk Wipprecht

This dress has a smoke generator and a touch-sensitive control to allow the wearer to control when smoke is emitted into the air.

A touch sensitive garment with reacting lights

Tender by Matthijs ten Bohmer

The garment is made from touch-sensitive fabric with embedded LED's that react to different ways of touching. The LED's are programmed to move in response to touch.

Loosely woven heat reactive textile

Dynamic Colour Textile

Loosely woven fabric can be heated, and the fabric will react to changes in temperature by changing color.

Moveable patterns with integrated shape memory alloy

SKORPIONS by XSLabs

The patterns cut into the fabric of the jacket can be adapted using shape-memory alloys, allowing the wearer to change the pattern.

LED ribbons hidden underneath soft and flexible TPU foils

Phototrope by Paulien van Dongen

The TPU foil refracts the light of the LED ribbons in a vibrant and multicoloured manner.

Light patterns underneath cut structures

AWE Goosebumps by Sensoree

The structure is cut out of the fabric, showing lights that shine through the gaps. The lights are controlled using a touch-sensitive interface.

Constructed dresses that transforms

Rise by Hussein Chalayan

Nothing about integrated technology, but Hussein Chalayan can be transformed with a single touch.

Laser cut patterns that open up when exposed to air streams

SKYNFEEL Apparel by Paulien van Dongen

The dragonfly patterns are cut in such a way that they open when exposed to air streams, such as when flying through the air.

Multiple treated fabric layered garment

Chameleon by NEFFA

The scarf consists of layers. The first layer has been treated thermally to change color when exposed to light. The second layer has been treated with a different color. The final layer reacts to UV light, showing its orange color when exposed to any light.
Mechanical legs reacting on approaching and breathing sensors

The Spider Dress by Anouk Wipprecht

The legs of the spider dress react on people who approach the person, who is wearing the dress, in a certain way. They can respond aggressively or invitingly, depending on the state of the dress.

Fibre optic crochet

Fibre optic crochet by Kristy Kuusk

Crochet with fibre optics to generate light and energy. Light is sent through the fabric of the dress, and the fibres start to light up in the dark. Different colours can be sent through the light to create the desired effect.

Colour changing costume reactive on (body) heat

CHACUN(E) by Kristy Kuusk

The costume is made from fabric that has been dyed with fibre optic crochet. When heated, the fabric changes colour and creates an original piece of fabric art.

Folded fabric with imbedded motors, triggered by light sensors

Living Pods by Ying Gao

The nets are made from folded fabric that is connected to light sensors. They can be triggered by light, and expand aggressively or invitingly.

Fibre optic crochet

Fibre optic crochet by Kristy Kuusk

Crochet with fibre optics to generate light and energy. Light is sent through the fabric of the dress, and the fibres start to light up in the dark. Different colours can be sent through the light to create the desired effect.

Fibre optic crochet

Abloom (G) by Marina Toeters

The flowers printed on the textile appear when the fabric becomes heated. The print reacts on temperature and will appear and disappear.

Light with flowers that appear when heated

Elephantasia by by-wire.net

A set of 3 garments that interconnects. One shirt manages the system connections and is connected by a network of connections. The shirt measures body warmth, and the rest of the system is connected by a wireless network. The system is designed to be flexible and adaptable.

Interconnected garments

Walking city by Ying Gao

The origami folds of the dress are triggered by movement sensors, and can change the shape of the dress. The dress changes its shape in response to movement.

Robotics with twisting and turning fibrous panels, animated in the presence of strangers

Animated dresses by Ying Gao, NoWhere, INowhere by Ying Gao

Tiny motors move parts of the fabric that illuminate in the dark.

Series of dresses: Rights one has movement and stretch sensors that control LED's

Series of dresses: Rights one has movement and stretch sensors that control LED's

Memory metals in dynamic dresses

Spring 2007 collection by Hussein Chalayan

In 2007, Hussein Chalayan introduced the world with memory metals embossed clothing. The metal changes its shape in response to temperature.

Lights embedded in 3d layered dresses

Spring-summer 2016 by Ilja Haute Couture

This spring-summer collection by Ilja Haute Couture features lights embedded in 3D layered dresses. The lights change colour and shape in response to movement and temperature.

Interconnected garments

Animalia by by-wire.net

A set of 3 garments that interconnects. One shirt manages the system connections and is connected by a network of connections. The shirt measures body warmth, and the rest of the system is connected by a wireless network. The system is designed to be flexible and adaptable.

Series of dresses: Rights one has movement and stretch sensors that control LED's

Bela Textile project dress, by NEFFA and...
A jacket with embedded electroluminescent wires

Lighting Jacket by NEFFA

The jacket has electroluminescent wires embedded in the back of the jacket. The wires are made from copper covered in phosphor that glows when being powered.

Clothing with embedded lasers

Laser Dresses by Hussein Chalayan & Moritz Waldemeyer

This dress by Hussein Chalayan embedded hundreds of moving lasers that is being refracted by crystals. They are all embedded in the fabrics.

LED’s connected with conductive fabric and glue

Led prototype for MaanR&D by Marina Toeters

The MaanR&D logo is laminated on Lycra fabric, with LED’s glued on the fabric with conductive glue.

15000 leds embedded beneath fabric

The video dresses by Hussein Chalayan & Moritz Waldemeyer

The video dress by Hussein Chalayan and Moritz Waldemeyer presents 15000 leds that can show moving images, like silhouettes of sharks or a sequence of a blooming rose.

Soft robotics with embedded LED’s

Soft robotics by Jasnarok

Jasnarok made a few examples of soft robotics with embedded lighting. The pieces, all in- and deflatable, show different structures, like spikes, dotted textures and pointed domes. They show different haptic and visual experiences based on different emotions.

Soft robotics by Jasnarok

The MaanR&D logo is laminated on Lycra fabric, with LED’s glued on the fabric with conductive glue.
4. Initial form principle ideas

Features:
- Dynamic shape
- Attracting light
- Use with rhythm
- Additive elements

Materials:
- See-through plastic
- Wooden rods
- Plastic case
- Fabrics or textiles

Features:
- Dynamic patterns
- Attracting lights
- Additive elements
- Use with rhythm

Materials:
- Silicone
- Plastic casing
- LEDs
- See-through plastic glass
- Oil pump
Inflatable dome

- Design:
  - Small holes, no light
  - Flexible/elastic
  - Reinforced holes (has an effect)
  - Larger holes letting light through
  - De-flated

- Inflated

- With pneumatic pump

- Modular plastic box

  - Size: 30 x 30 cm

- Features:
  - Dynamic shape
  - Conducting lights
  - Play with rhythm or installation/depend

- Additive element

- Materials:
  - OLEDs
  - Plastic casing
  - Pneumatic pump
  - Air vent
  - Wooden baseplate (not)

- Plastic box to house the electronics.
  - Enables to fit multiple tests
  - Different mock-ups can fit on top

Buy? Make?
Folded Fabric with LED strips

Features:
- Dynamic shape and pattern
- Use of dynamic lights
- Slow change of dynamic pane
- Total silhouette of dress

Top-view

Materials:
- Plastic casing
- LED strips
- Rigid iron screen-through fabric
- Steel rods
- Rotary motors
First ideas

Play with moving lighted shapes

Grid crochet

More expressive

Features:
- Dynamic patterns
- Interactive lights
- Recognizing body shapes

Materials:
- Plastic case
- Fiber optics
- LEDS
- See-through wings
- Elastic materials

Curved Puffy Shaped Fiber optics

(Colors: a shade of icy, blue)

Technical:

Pull

Fixed

Play with inflatable shapes

20 ideas van ideeën

Inflatable

Features:
- Dynamic shape
- Dynamic light
- Play with reflection
- Materials:
- Plastic
- Elastic plastic tube
- Valcro
- Glass
- Air pump

Shapes:

Ribbed? Small effect, need to test on body!
Light Reflection in Moving Fabric

Features:
- Dynamic pattern
- Play with rhythm
- Extra features

Materials:
- Reflective material
- Reflective fabric
- Reflective material

Refractive/Scrambled light distorting fabric

Inflatable cylinders with LEDs

Features:
- Dynamic patterns
- Dynamic lights
- Play with rhythm
- Reflective materials
- Plastic fabric
- Stiffened plastic
- LED strips
- Inflated

Lights on (bright)
- Air pump
5. Form principle dress designs
Garment #02

Inflatable LEDs inside

Fiber optics
Garment #03

Fiber optics

Wave folds
LEDS inside
(or not?)
Garment #07

Wave Folds

Hidden LEDs

Hidden LEDs
Garment #08

180°

Fiber compiler

Inflatable
6. Dress pattern designs

Design 1

Design 2

Subtle/Expressive Style

20 fiber optic light settings in two patterns FIXED!
Design 2

Expressive Scale
7. Dress design inspiration

All images by Issey Miyake, Comme des Garçons and LabeledBy. Lamp design by Leah KS Amick.
Personal pictures taken at the “Fashion Statements” exposition of the “Amsterdam Museum”
8. Folded shapes designs
9. Technical descriptions materials

Lighting elements

LED strips

"Adafruit Mini Skinny NeoPixel Digital RGB LED Strip - 30 LED/m - WHITE"
Bought at: www.Floris.cc

LED/fiber optic mounts (front and back)

Custom designed 3d printed PLA
Printed with an Ultimaker 2+
Spray painted with black matt spray paint

Fiber optics

"2.0mm Solid Core Side Glow Fiber Optic”
Bought at www.thefiberopticstore.com

"5mX hoge kwaliteit side glow transparante solid core glasvezelkabel
2mm/3mm/5mm/ 6mm/8mm/10 gratis verzending”
Side glow 2mm
Bought at www.aliexpress.com, from KINGGREEN

LED mount - LED strip fitting

Fast-acting super glue

Fiber optics - LED mount fitting

2 components glue
Dynamic front panel element:

2x micro metal gearmotors
Pololu 50:1 MICRO METALEN GEARMOTOR MP 6V, model 2365
Bought at www.opencircuit.nl

Motor mounts and shoulder plate:
Custom designed 3d printed PLA
Small prototyping parts
Small push button + diode

Motor covers
Anti slip mat, ribbed, transparent
Bought at Action Rotterdam
Black Chiffon
Bought at Schroder Rotterdam

Wires:
“Line Green Dark 300” fishing wire
Bought at Decathlon

Fabric:
Black Organza
Bought at Kniphal Amsterdam

Wire fittings:
Custom made 5mm copper rods
Dress body:

2nd hand bought MEXX dress
Custom tailored
Bought at Sweet Rebels Rotterdam

Black Chiffon
Bought at Schroder modestoffen Rotterdam

Electrical circuit:

Belt holder:

Fabric, elastics and velcro straps
Bought at Schroder modestoffen Rotterdam

PVC sheet to assemble the electronics

Electrical heart:

Arduino Micro zonder headers - ATmega32u4
2x Adafruit DRV8871 DC Motor Driver Breakout Board - 3.6A Max
RS PRO Wire Lead Terminal Lithium Rechargeable Battery, 5200mAh 4.78 x 68 x 19 mm

Push button
10. Arduino controlling code

```c
#include <FastLED.h>
define NUM_LEDS 20
define DATA_PIN 3
define DATA_PIN 4

//The two LED strips
CRGB leds1[NUM_LEDS];
CRGB leds2[NUM_LEDS];

int switchPin=2; //controlling switch
int motorPin1=5; //Breakout board 1
int motorPin2=6; //Breakout board 1
int motorPin3=9; //Breakout board 2
int motorPin4=10; //Breakout board 2
int motorSpeed=120; //Going down left motor
int motorSpeed2=150; //Going down right motor
int motorSpeed3=87; //Going up left motor
int motorSpeed4=120; //Going up right motor
int stap = 0;
int x=0; // x is een teller
int i;
int k;
int j;

void setup() {
    Serial.begin(9600);
    pinMode(motorPin1,OUTPUT);
    pinMode(motorPin2,OUTPUT);
    pinMode(motorPin3,OUTPUT);
    pinMode(motorPin4,OUTPUT);
    LEDS.addLeds<SK6812,3,RGB>(leds1,NUM_LEDS);
    LEDS.addLeds<SK6812,4,RGB>(leds2,NUM_LEDS);
    pinMode(switchPin,INPUT_PULLUP);
}

void loop() {
    switch (stap) {
    case 0: //Subtle state
        Serial.println("Subtle state");
        for ( int i = 1; i <= NUM_LEDS; i+=2)
            leds1[i]=CRGB::Black;
        for ( int i = 1; i < NUM_LEDS; i+=2)
            leds2[i]=CRGB::Black;
        
        x++;
        if (x<500) k=x/2; else k=(1000-x)/2;
        if (x==650) x=350;
        for ( int i = 0; i < NUM_LEDS; i+=2)
            leds1[i]=CHSV(k, 255,150);
        for ( int i = 0; i < NUM_LEDS; i+=2)
            leds2[i]=CHSV(k, 255,150);
        FastLED.show();
        if (!digitalRead(switchPin)) {
            stap = 1;
            x=0;
        } else {
            break;
        }
        break;
    case 1: //Transition to expressive state
        Serial.println("Start turn up, going expressive");
        // Left motor
        analogWrite(motorPin2,0);
        // Right motor
        analogWrite(motorPin3,0);
        // go to next state
        stap = 2;
        x=75;
        break;
    case 2: //Expressive state
        x++;
        if (x<380) k=x/4; else k=(760-x)/4;
        if (x==460) x=380;
        for ( int i = 1; i < NUM_LEDS; i++)
            leds1[i]=CHSV(k, 220, 255);
        for ( int i = 1; i < NUM_LEDS; i++)
            leds2[i]=CHSV(k, 220, 255);
        FastLED.show();
        if (!digitalRead(switchPin)) {
            stap=3;
            x=0;
        } else {
            break;
        }
        break;
    case 3: //Transition to subtle state
        Serial.println("Start turning down, going subtle");
        // Left motor
        digitalWrite(motorPin1,1);
        analogWrite(motorPin2,motorSpeed);
        //delay(7000);
        // Right motor
        digitalWrite(motorPin3,1);
        analogWrite(motorPin4,motorSpeed2);
        x++;
        if (x==900) {
            Serial.println("End turn up, expressive");
        } else {
            break;
        }
        break;
    default:
        stap = 0;
        break;
    }
    // execute loop every 10 ms
    delay(10);
}
```

```
void setup() {
    Serial.begin(9600);
    pinMode(motorPin1,OUTPUT);
    pinMode(motorPin2,OUTPUT);
    pinMode(motorPin3,OUTPUT);
    pinMode(motorPin4,OUTPUT);
    LEDS.addLeds<SK6812,3,RGB>(leds1,NUM_LEDS);
    LEDS.addLeds<SK6812,4,RGB>(leds2,NUM_LEDS);
    pinMode(switchPin,INPUT_PULLUP);
}
```

```
void loop() {
    switch (stap) {
    case 0: //Subtle state
        Serial.println("Subtle state");
        for ( int i = 1; i <= NUM_LEDS; i+=2)
            leds1[i]=CRGB::Black;
        for ( int i = 1; i < NUM_LEDS; i+=2)
            leds2[i]=CRGB::Black;
        
        x++;
        if (x<500) k=x/2; else k=(1000-x)/2;
        if (x==650) x=350;
        for ( int i = 0; i < NUM_LEDS; i+=2)
            leds1[i]=CHSV(k, 255,150);
        for ( int i = 0; i < NUM_LEDS; i+=2)
            leds2[i]=CHSV(k, 255,150);
        FastLED.show();
        if (!digitalRead(switchPin)) {
            stap = 1;
            x=0;
        } else {
            break;
        }
        break;
    case 1: //Transition to expressive state
        Serial.println("Start turn up, going expressive");
        // Left motor
        analogWrite(motorPin2,0);
        // Right motor
        analogWrite(motorPin3,0);
        // go to next state
        stap = 2;
        x=75;
        break;
    case 2: //Expressive state
        x++;
        if (x<380) k=x/4; else k=(760-x)/4;
        if (x==460) x=380;
        for ( int i = 1; i < NUM_LEDS; i++)
            leds1[i]=CHSV(k, 220, 255);
        for ( int i = 1; i < NUM_LEDS; i++)
            leds2[i]=CHSV(k, 220, 255);
        FastLED.show();
        if (!digitalRead(switchPin)) {
            stap=3;
            x=0;
        } else {
            break;
        }
        break;
    case 3: //Transition to subtle state
        Serial.println("Start turning down, going subtle");
        // Left motor
        digitalWrite(motorPin1,1);
        analogWrite(motorPin2,motorSpeed);
        //delay(7000);
        // Right motor
        digitalWrite(motorPin3,1);
        analogWrite(motorPin4,motorSpeed2);
        x++;
        if (x==900) {
            Serial.println("End turn up, expressive");
        } else {
            break;
        }
        break;
    default:
        stap = 0;
        break;
    }
    // execute loop every 10 ms
    delay(10);
```
11. Electric lay-out
“I know the dress was not entirely finished yet. However, the visibility of the motors drew me the most attention which I thought was not beneficial for the dress. Try to cover it up”

“The particular length of the dress may bring down the overall aesthetic (a bit). Maybe making the dress shorter (above the knee) or longer (to the ground) will make the overall design with the lights look more high-end”

“I would have maybe chosen for another structure of lights with the playful emotion. I really liked the extra layer of fabric with the other emotion”

“I would avoid the curtain-like element and play more with the lights”

“Maybe you could explore different dress colors and forms as well. I found the black dress to be a little bit too ‘formal’ for an informal situation like that evening. It could be a bit more playful perhaps?”

“If the silhouette of the dress was more intricate (perhaps with layers), the lights could be expressed more subtly through the dress’s texture or the textile. For instance the layering required for Zac Posen’s LED dresses. I can see the (soft) expression through light can be conveyed through (puffed up) sleeves”

“Most important in my opinion is the intuitive transition between the states. Changes should be small and unconsciously be experienced”

“It would be nice if more of the dress could change colors”
“I think it’s very difficult to calm and confidence in one state of the dress. I gave a 5 to this question because I thought the dress to give a very calm feel, but not as much a feel of confidence. Confidence is often seen in posture: straight back, chest forward and chin up. Although this “lack of confidence” could be partly because of the wearer, I think a dress could definitely stimulate a confident posture. But at the same time I believe that this confidence would go against the calmness of the dress. The subtle blue LEDs for instance in combination with the subtle silhouette of the dress provide for calm aesthetics, whereas for confidence I would expect a very expressive dress (which the other state is) with, for instance, very in-your-face bright red LEDs.”

“However, how I understood it is that the subtle state would be for a professional environment whereas the expressive state would be for a more fun and social environment. I believe both states are very appropriate for their respective environment. I am just not sure if the casual Het Nieuwe Cafe was the appropriate setting for such a fancy looking dress.”

Written in Dutch

“Allereerste - super interessant idee! Ik zou met je ontwerp een klein beetje uitkijken dat het niet een jurk is dat versierd wordt met licht, daar krijg ik zelf een beetje een kerstboom gevoel bij, maar dat het een meer een geheel wordt. Misschien door bijvoorbeeld een manier te zoeken het licht op een wat patroon achtigere manier te verwerken door het bijvoorbeeld te weven? Ik denk ook dat het nuttig kan zijn om eens echt te kijken naar jurken. Waar vrouwen zich op welke manier zich fijn voelen, vol zelfvertrouwen of ontspannen. Ik denk namelijk dat over het algemeen de plooien (die bovenaan zitten) mooier tot z’n recht zouden komen op een andere plek - misschien heupen, of schouders?”

“For me the colours and the shapes of the dress matched the expressions really well. Both states felt natural in the social setting. I would however, change the shape of the ledlights for the expressive state, because for me the shape in combination with the lights is too much associated with a Christmastree and christmas lights. I don’t even know if the changement in the shape is necessary for the expressive state. I think by just showing them more clear and changing the colours it’s already quite expressive. Another interesting idea for the expressive state would be to tighten the led lights around the body so the dress gives more shape (for example around the waste). I think women, depending on how they feel on some days, or what kind of events they have, choose to wear wider or more shaping clothes. It would be interesting if you’d had both options in one dress”
13. Full video transcript (in Dutch)

Video plan afstuderen

Duur: 1.30 minuten

Doel

Een intieme weergaven van de details van de jurk en waar de design detaillering vandaan komt, en het laten zien van de 2 expressies.

Onderdelen

Karakteristieke shots

Geeft het gevoel weer van 2 uitstralingen van de jurk, subtiel en expressief, en zijn de elementen die ervoor hebben gezorgd wat voor vorm en bewegings uitstralingen de jurk moet hebben. Deze shots dragen bij aan de mood van de video.

Vorm concepten

Komen voort uit de karakteristieken, en zijn de eerste ontwerpstappen naar de fysieke elementen van de jurk. Deze shots dragen bij aan de mood en intimiteit van de video.

Detail shots van de jurk

Laten detailgeringen zien van de jurk die weer zijn voortgekomen uit de karakteristieken. Deze shots zijn de uitkomsten van de mood die gecreëerd is in de video, en zijn op zichzelf een opbouw naar de totaal shots.

Overzicht shots van de jurk

Dit zijn de shots waar de video naar opbouwt. Eerst een mood en intimiteit creeren, en opbouwen met de detail shots. Dan als clue van de video de jurk in zijn totaalheid laten zien, en het dynamische element. De draagster van de jurk draagt bij door de statussen te uiten door middel van beweging en uitdrukking.

Quotes

De eerste 2 quotes gaan over de rol van kleding en het sociale probleem binnen onze samenleving, en over onze expressieve behoeften. Deze zijn niet van mij overigens.

In the current age, we expect more from technology and less from each other. We sacrifice the conversation for mere connection.

Clothing concerns all of the human person, all of the body, all of the relationships of man to body as well as the relationships of the body to society.

De tweede quote is van een iemand die ik heb geïnterviewd, en gaat over haar kijk op dat een kledingstuk op stemmingsveranderingen zou moeten kunnen inspelen.

Sometimes a mood does not always match what is comfortable to wear on that particular day. Clothing should be able to change according to a persons' mood.

De derde quote gaat over de toekomst, waarin de rol van kleding is veranderd en een diepere betekenis krijgt. Dit is dus de wereld waarin mijn kleding een rol gaat spelen. Deze is wel van mij zelf.

In the future of fashion, technology enables clothing to be dynamically expressive, so as to make people feel more comfortable when expressing themselves, offline, and helps with the human value in interacting.

Doorloop

1. Starten met een quote als ‘kick-off’ van de video en het verhaal. De quote moet iets vertellen over de achtergrond van het project en het uiteindelijke doel van het ontwerp.

2. Shot laten zien van design karakteristieken die te maken hebben met de subtiele uitstraling, en dus de emoties kalm, rust en vertrouwen. Dit zijn bijvoorbeeld shots van een boom, grasvelden of omaatjes die op een bakje zitten. Gepaard daar aan komen de detail shots van 2 of 3 van de ontwerp karakteristiek dozen, die dynamisch bewegen.

3. Detail shots van de subtiele uitstraling van de jurk, maar alleen detail...
shots. De totale shots van de jurk komen later. Tijdens deze detail shots zie je al een uitdrukking (gezicht en/of beweging) van de draagster van de jurk.

4. Nog een quote, wat meer te maken heeft met hoe een persoon zich uitstraalt door middel van kleding

5. Nu komen shots van design karakteristieken die te maken hebben met de expressieve uitstraling, en dus de emoties blijheid, speelsheid en geluk. Ook hierbij komen de detail shots van 2 of 3 van de ontwerp karakteristiek doen, maar je ziet ze veranderen van de subtiele uitstraling naar de expressieve uitstraling. Dit moet wel weer erg in detail gebeuren, want de focus moet niet te erg liggen op deze ontwerpen.

6. Nu weer detail shots van de jurk, maar in expressieve uitstraling. De focus ligt nu weer meer op detail shots van de jurk zelf. Dit deel moet een voorloop zijn van de volgende stap in het filmpje, waarin de jurk gaat veranderen naar expressief. Het creëert een opbouw naar het totaal shot van de jurk.

7. Nu komt het totaal shot van de jurk, waarin de draagster eventjes wordt laten zien in de subtiele staat, met subtiele bewegingen, maar ze stopt. De jurk verandert naar de expressieve staat. Op het moment dat de verandering wordt ingezet komen er ook een paar detail shots van dat de stof omhoog wordt getrokken. Op het moment dat de jurk is veranderd naar de expressieve status gaat de draagster zich ook ineens veel expressiever gedragen, in gezichtsuitdrukking en met bewegingen.

8. De video eindigt met een laatste quote van mezelf, van de 'design vision', waarin ik vertel wat het ultieme doel is van de jurk en de wereld waar die in leeft.
Expressieve gezichtsuitdrukkingen:

Vrolijk, lachend (op een zelfverzekerde manier, niet alsof je ergens om lacht), speels, gevlijd (mix tussen genieten en zelfverzekerdheid).

Make-up:

Er moet op het eerste oog geen groot verschil zijn in de make-up en haar uitstraling. Een verschil zou kunnen zijn dat wanneer de overgang naar de expressieve status over gaat, ze haar haar van een staart naar los gooit. Daarnaast zouden we gebruik kunnen maken van glitters over haar gezicht, dat alleen opvalt wanneer er licht op schijnt en camera wat dichter op haar gezicht staat.
14. Appendix sources

These sources are all the sources used for the project. Referenced sources of the main report are also put in chapter 9 of the main report.

Text


Cuddy, A. (2012, October 1). Your body language may shape who you are. Retrieved May 21, 2019, from https://www.ted.com/talks/amy_cuddy_your_body_language_shapes_who_you_are


These sources are all the sources used for the project. Referenced sources of the main report are also put in chapter 9 of the main report.

Images


15. Project brief

IDE Master Graduation
Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student’s IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student’s registration and study progress.
- IDE’s Board of Examiners confirms if the student is allowed to start the Graduation Project.

STUDENT DATA & MASTER PROGRAMME
Use this form according the format “IDE Master Graduation Project Brief, familyname_firstname_studentnumber_dd-mm-yyyy”. Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1!

** chair dept. / section: 
** mentor dept. / section: 
Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v.

SUPERVISORY TEAM **
Fill in the required data for the supervisory team members. Please check the instructions on the right!

** chair Prof. dr. ir. Jansen, K.M.B. dept. / section: Emerging Materials
** mentor Jepma, E.J. dept. / section: Design Aesthetics
2nd mentor Jasna Rokegem
organisation Jasnarc

city Antwerpen
country Belgium

Comments (optional): 

(use Adobe Acrobat Reader to open, edit and save this document)

IDE TUDelft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30

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Currently, the fashion industry is the second most polluting industry in the world, next to the oil industry. The reason why this industry is so polluting is because the consumers buy too many clothes that they don’t need. Because of this, 1/3rd of the owned garments are not being used and in the Netherlands alone, 688 million pieces of clothing are being thrown away. Also, the industry forces the consumer to wear the garments a short time to eventually buy new ones.

Because this industry is so polluting, a lot of initiatives are starting to go against this trend. A Dutch television series, called "VPRO Tegenlicht", highlights a few of those initiatives in their episode “Future Fashion”. One of them, the Belgian design studio “Jasnarok”, is designing a new generation of clothing, called "Techno Fashion", where they combine innovative technologies with interactive fashion.

The founder of the label, “Jasna Rokegem”, states her ultimate goal: “My ultimate goal is for us to only own one garment, the ultimate garment, that can change its shapes, forms and colors, and that always stays clean. The garment adapts itself continuously according to the needs and feelings of the wearer”. That garment can satisfy the need of the consumer and replace the large amount of clothing being owned today. They state on their website: “Our team explores and implements the latest research and technology in the field of wearables, sensors, robotics, and electronics, combining these with futuristic haute couture and high-end design. Because fashion is more than a gadget or a cover for ourselves, fashion & tech can become an interactive extension of our inner selves and create a new kind of nonverbal communication using real-time feedback”.

Techno fashion is the next generation of clothing. In the current digital age, adding technology to a product is nothing special anymore. Therefore, clothing is yet another daily life staple in which technology is added to enhance people’s lives. That is called Techno fashion. Clothing originally is meant for functional benefit. But, over the years, clothing has become a very important way of expressing one’s identity. Techno fashion has been theoretically proven to be able to extend emotion and identity unlimitedly. Together with new clothing manufacturing techniques like 3D-printing and electricity conducting threads, and labels such as Jasnarok, this means it has many opportunities to be beneficial to its wearers and for the clothing industry.
People tend to express themselves through clothing, and they are in need of expressing identity, body language and emotions. The label Jasnarok has done research about how clothing can interact with one’s subconscious and regulate our emotions. She is looking for new modes of empathic communication and explores the different haptics. She is in search of patterns in expressing human feedback.

Moreover, body language is commonly used by humans to communicate certain emotions to others, and conveys a lot of information about emotions. This can be used to design emotional virtual agents. Techno fashion can help a person in expressing body language and emotions, and can extend its purpose. Hopefully this can become an alternative for regular clothing, and can be something that can replace the large amount of clothing being owned by a person today.

But, nowadays, Techno fashion can be very experimental and conceptual, and indeed present their unlimited ways of expressions. This looks unfamiliar to people and most of its functionalities are undesired. There is a need for an application of the possibilities of Techno fashion, besides the conceptual work presented right now. What exactly do the wearers appreciate about ways of expressing themselves, and what does their environment appreciate?

How do we express and experience body language, and how can we translate that into an application of Techno fashion that is desirable and understandable? How can we translate that phenomenon into Techno fashion in order to replace the need for multiple outfits?

I am trying to find out what parts of the body are most important when expressing body language. My goal is to find patterns in expressing body language, and map this according to the following 5 emotion groups: Neutral, calm, sad, anger and happy. These emotions will be mapped through and captured for both haptic and visual feedback. The feedback will be mapped, and expressed through body islands. The body islands are wearable parts, containing dynamic features, that are used for haptic and visual feedback. The goal is to find what emotive patterns and body islands are the most promising and how these can best be expressed.

Next, I want to know what the effect is of expressing these emotions through these designed body islands, on the wearer and on the surroundings. Do the body islands create a desired effect?

And finally, what role does body language and emotion expression play right now when wearing regular clothing? The application of body islands should provide an alternative for that. I want to end up with something that give the industry and its consumers a groundbreaking idea they can actually use, and that they look at as being credible and realizable in a few years.

**PLANNING AND APPROACH**

The planning chart above is based on 4 days a week instead of 5. This means the project will be executed in 25 weeks instead of 20, to cover the remaining days. This was discussed and decided on during meetings with the board of this project.

At the start of the project, in the analysis phase, the VIP method will be used to gain insights and principles about the world. This method will be used because, as seen in other examples of using the method, the insights are very promising and out of the box. Together with a literature research, and the insights gained from that, a personal project vision and design goal will be formulated.

Finally, I want to involve a lot of user tests in order to verify the different design ideas, and to make credible iterations. To be able to involve the wearer as much as possible, multiple user test sessions will be very important to get user insights. The first session will be planned in the analysis phase, to gather these insights as soon as possible. These user insights will be used in the conceptualization phase. In the embodiment phase, another context mapping session will be used to verify the concept ideas. Finally, a last big user test will reflect on the final design.

**ASSIGNMENT**

State in 2 or 3 sentences what you are going to research, design and/or generate, that will solve (part of) the issue(s) pointed out in “problem definition”. Then illustrate this assignment by indicating what kind of solution you expect and/or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas; ... In case of a specialisation and/or annotation, make sure the assignment reflects this.
MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities etc. and point out the competences you have yet developed.

Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge on specific subject, broadening your competences or experimenting with a specific tool and/or methodology. Stick to no more than five ambitions.

Ever since I was starting to think about how to express myself through clothing, I was very much interested in how clothing matches someone's identity and how it affects someone as a person. These psychological aspects of using a product is what got me into the master discipline of design for interaction.

In design for interaction, I am most interested in how a person behaves around a product and what his personal motivations are in certain scenarios and contexts. I would very much like to add something to that situation that surprises the user, something he wasn't aware of in the first place.

Ever since I started to work in the fashion industry, because I wanted to combine the two disciplines of being a product designer and a designer in the fashion industry, I saw the progression towards innovation being very slow. Techno fashion is a very innovative phenomenon which can be promising, but there aren't many executions that makes it tangible and realizable for consumers. I think an industrial designer can help making it credible to the fashion industry.

One of the main problems of the industry is that it's very polluting. One of the reasons is the consumers buying behavior, which results in buying too many clothes that they don't need. I am very driven in finding a solution for that behavior, that still brings satisfaction to the users in expressing themselves through their clothing.

The project will be executed 4 days a week. That is why the 100 days will be put in 25 weeks.