

MARK II-VII

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Non-static fashion technology for self-expression



Our Concept

Clothing has evolved from simply protection to an important part of human culture and communication (Kodžoman, 2019). Besides showing style, they also positively influence our behaviour and self-esteem if the correct clothes are worn (Johnson, Lennon & Rudd, 2014). Modern fashion is increasingly accessible to the general populace, granting more people the choice to pursue individualistic fashion tastes. With MARKVII, we aimed to explore opportunities beyond fast fashion; clothing with unlimited possibilities and closer connections between the self and the garment. This could be achieved by exploring the intersection of three domains- self expression, fashion and wearable technology. The garment's design is non-static and easily manipulated both by the wearer and by their interpersonal interactions.

Related Works

Our work is greatly informed by literature on fashion communication and wearable technology. This was how we discovered the potential for a non-static solution that speaks through itself (Goedhart, 2020). Fashion can be a social interface. These concepts informed our product to use colors and patterns as direct communication. Although still in its early stages, wearable tech has begun expanding beyond utility into fashion statements (Borsler, 2019). This proves that integrating technology into clothing can be done in an aesthetic manner, which supported our hopes to create a ubiquitous and aesthetically-pleasing solution.

Youtube Link:

Design Process

Stage 1 - Defining + researching our problem space

- **The Theme:** Our project falls under the theme 'Expressables', which we have interpreted to mean technology that aids in self-expression. Understanding of the theme is to integrate technology beyond the idea of 'wearable tech', but 'fashion' as a novel means of expressing our appearance.
- **The Design:** Our concept is steered in the direction of our concept towards aesthetic, expressive purposes. Clothing interaction has always been rather passive, in that the wearer puts on clothing for others (and themselves) to view. We settled on technology which can be manipulated and affected directly by the wearer. This is where we identified the term Non-static Design. As a team, we realised that a technology which can allow non-static design is something unrestricted by clothing form.
- Our goal is to design interactive clothes for self-expression, so during the definition phase, new forms of fashion and the interactivity of the garment were the two main aspects we discussed and explored.



Figure 1. Theme brainstorm

Stage 2 - Ideating + refining design

- **Interaction Mediums:** Temperature, sound and touch etc. were senses we thought of as ways to interact. Light was our final thought, as it is a universal medium that is also striking and easy to manipulate.
- **Interpersonal Interaction:** We hoped to evolve beyond the passive interaction of clothing into an active interconnection between the wearer, observer and garment. Therefore, we considered interpersonal interactions. In a sketching session, we thought of distance sensors or other short distance connection technique to trigger changes of pattern or colour when two wearers meet.
- **Intrapersonal Interaction:** On enhancing self-expression, we were inspired by existing projects (Moere & Hoinkis 2006) that use direct user inputs to affect clothing in a cryptic and personal way.
- **Wider Interaction:** The booming NFT industry and the related trading market allowed new insights into enforcing uniqueness of digital things. Since Mark VIII is non-static, treating individual patterns like NFTs can introduce peer-to-peer clothing purchases- a new form of social experience. It was an exciting idea and soon we determined that this would be the basis for the intrapersonal (Fingerprint) experience.

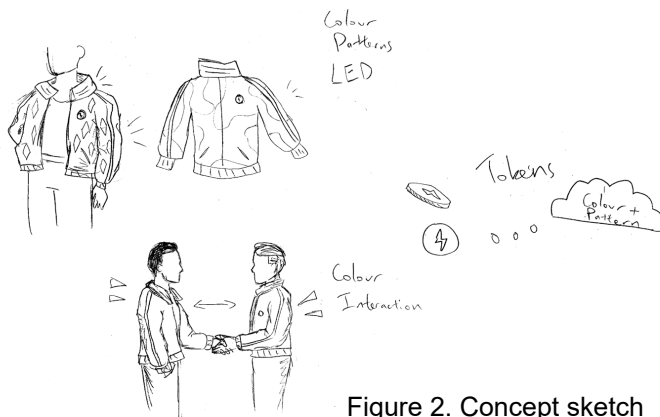


Figure 2. Concept sketch

Design Process

Stage 3 - Tech spike research + implementation planning

- MARK HVII can be broken down into its primary components:
- **Light Source:** We had chosen NeoPixels for our light source as the most realistic and available resource. We experimented with different light diffusion behaviours and colour algorithms to create combinations that were pleasing and meaningful. Initially, we had designed for each pixel to be separated by wires and then resoldered together to create a long, flexible band. Because of time constraints, the prototype opted to use entire strips, but if time allows, the flexibility could be reintroduced later on.
- **Physical Token:** The physical token had to be a component that could generate and store a unique colour combination. Based on workshop resources and teaching team advice, we removed the token trading system and opted for a physical RFID token scheme. Each 'seed' is unique, which coincides with our concept of nonfungible tokens and is therefore well suited for our technology application.
- **Proximity Sensing:** Interpersonal interaction was a barrier. Bluetooth and ESP were plausible solutions, but the difficulty was on how sensors can detect other Mark-VIIs without interference. In many conversations with the teaching team, we found that wireless communication was greatly beyond our prototype scope at this time. Additionally, with universal proximity sensors, the boundaries of interaction will no longer be limited to Mark HVII users, thus opening up more opportunities for interaction.

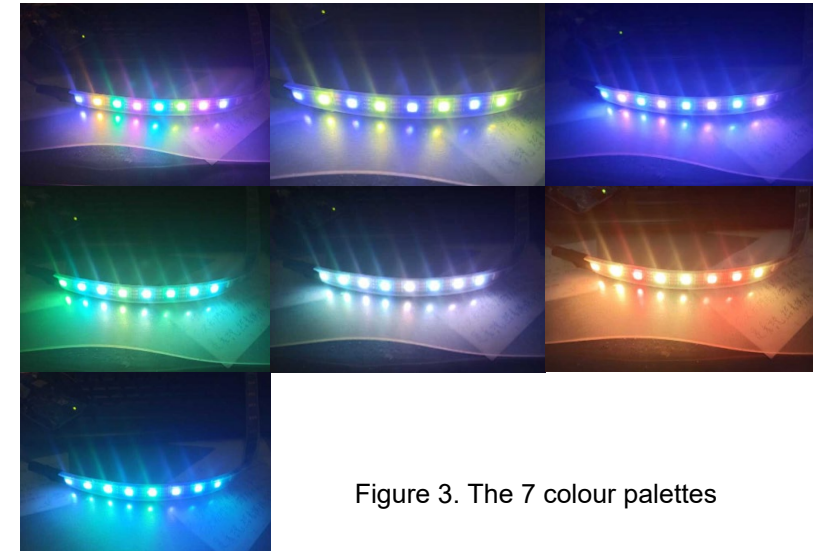


Figure 3. The 7 colour palettes

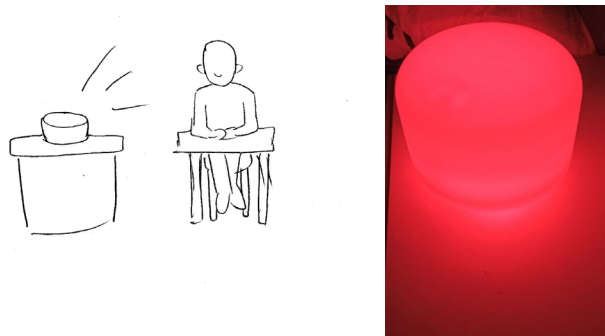


Figure 4. User test setup

Stage 4 (CURRENT) User experience testing + beyond

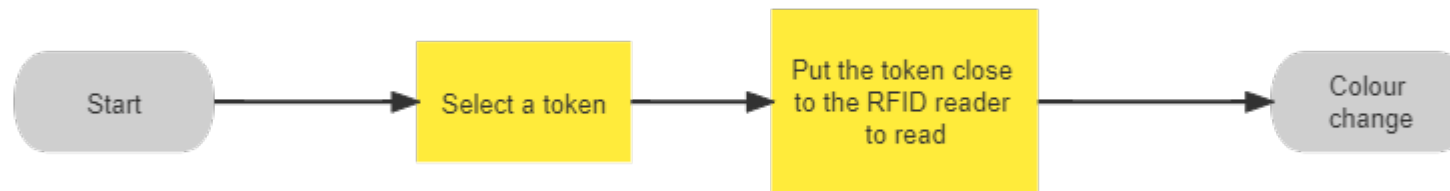
- **Colour Testing:** User testing was needed to justify the types of colour palettes used in the jacket in order to determine if the physical experience met our expectations and vision. Even with great resources on colour psychology, we believe user testing is still worthwhile. We set up a dark room, illuminated the room with a single color (or series of colours), and invited test subjects to express thoughts and emotions they experienced. We used these results to select certain colour combinations that were well liked and expressed interesting emotions.
- **Further Implementation:** As each feature becomes developed, future stages will see them coming together as the final Mark HVII. If time allows, product polishing time could allow us to revisit technologies we have backlogged, such as the flexible pixel system and ESP communication. Focus could also be on the comfort and user experience of the jacket, which would call for further testing.

Interaction Plan

We regard our concept's interaction paradigm as Ubiquitous Computing. We want to integrate interaction into people's daily personal and social life. Users don't need to purposely operate the Mark HVII, and it does not necessarily change the way people have been wearing clothes. It will automatically make light pattern adjustment according to the environment and user's behavior. We hope to bring new changes to fashion and dressing without changing the user's behavior.

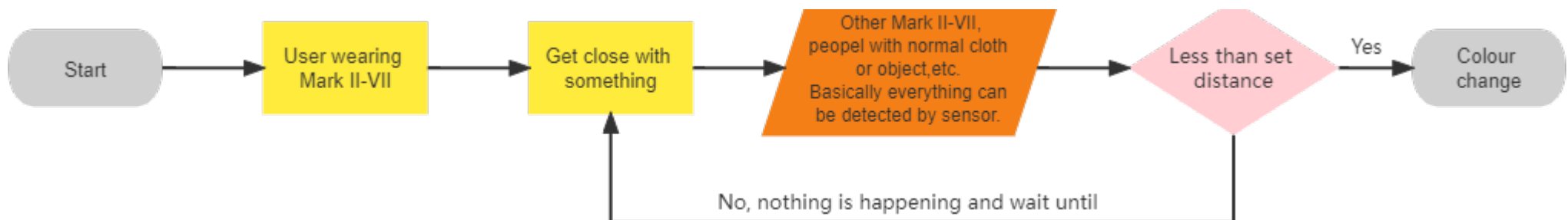
1. Physical token

Users can select a token they have on hand, store the color pattern, read the token on the RFID reader, and the LED lights of clothes can change colors.



1. Interaction of clothes

The distance sensor can sense the distance between the user and the object, when the distance reaches the threshold, it will trigger a change and the color of the led will shift.



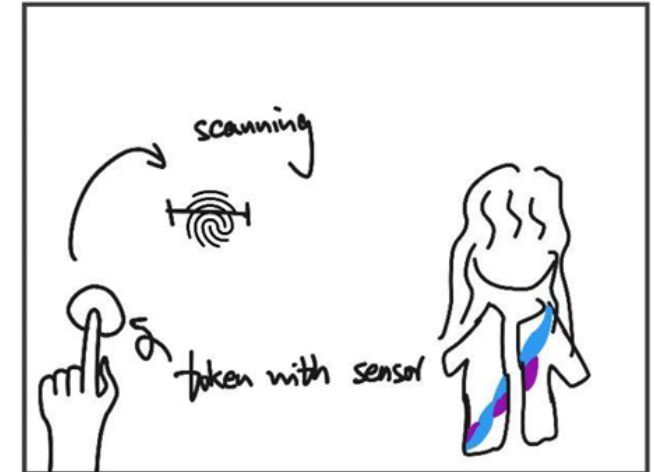
Interaction Plan



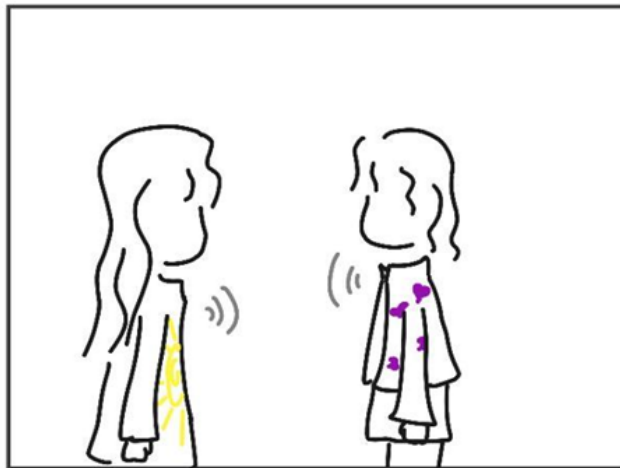
Jannie is a university student and decides wants to wear the MARK II-VII because she wants to feel more stylish while still keeping true to herself. So she obtain a jacket, and she surf online to buy the patterns she favour.



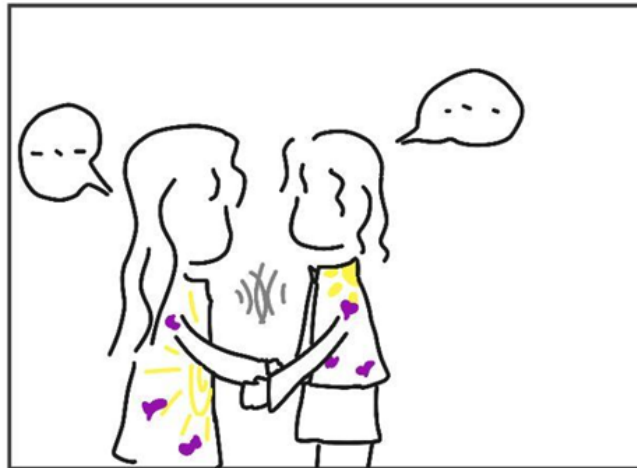
She can choose what pattern display on Mark II-VII through the app. And she can sell the pattern that she is bored with or disliked on the online market.



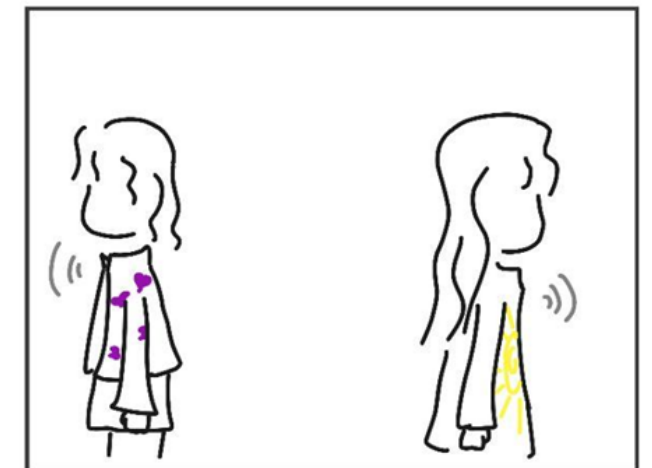
She can buy a special token that with sensor to scan her fingerprint. She watches as her plain white jacket becomes illuminated in a different colour. She wears the jacket proudly, knowing that she directly created this pattern, and no one else will have the same one.



The jacket also have sensor which can allow the interaction between the users happen. The patterns/colour on their clothes will mix or generate related pattern.



As they get closer she sees some colour disturbance in both their jackets. She uses these interactions to reflect onto her jacket pattern, creating even more variety.



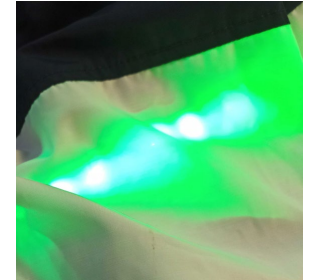
When they separate, the pattern will slowly change back to its original shape.

Project Objectives & Success Criteria

The success of our project can be measured by criteria split into three project objectives. Within each objective are several success criterias to determine our success:

1. Advancing beyond fast fashion through non -static design

- The desirability of swapping tokens instead of buying new clothes is equal or more
- People can stay in one garment and change the lights/pattern
- The average use of the Mark IV/II is greater compared to static garments
- Mark IV/II will attract more attention and discussion



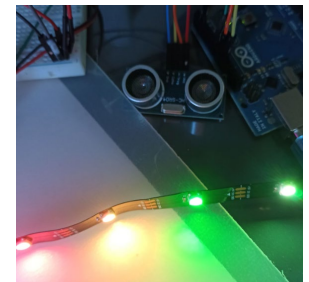
1. Enhancing self -expression in clothing with increased personal involvement

- User feels increased connection to Mark IV/II fingerprint compared to regular clothing they purchase
- The user can reasonably express himself by using the changed pattern on the clothes
- The user uses a specific combination of lights and can understand the emotion expressed by the colour
- Others can understand the meaning by the user's pattern or colour palettes



1. Facilitating interactions between the wearer, observer and garment

- The wearer prefers to interact with another wearer through the set interaction
- The wearer attracts more observers through the interaction, creating more social opportunities
- Attracting more potential users and being able to create social and interactive topics



References

Goedhart, M. (2020). Nonverbal communication skills of clothing (Master). Erasmus University Rotterdam.

Gorsler, F. (2019). Balenciaga Track LED: Official Release Info & Where to Buy. Highsnobiety. Retrieved 26 March 2022, <https://www.highsnobiety.com/p/balenciaga-track-led-light-release-date-price/>.

Johnson, K., Lennon, S., & Rudd, N. (2014). Dress, body and self: research in the social psychology of dress. *Fashion And Textiles*, 1(1). doi: 10.1186/s40691-014-0020-7

Kodžoman, D. (2019). The psychology of clothing. *Textile & Leather Review*, 2(2), 903. <https://doi.org/10.31881/tlr.2019.22>