



# PORTFOLIO

A collection of work from 2019 to 2022  
Sustainable Design | Product Design | Graphic Design

*DI BA*

01

# Life Among Algorithms

A poster campaign concept to empower algorithm influences

**Keywords** - Design for Sustainability and Social Innovation, Ethnographic Research, Algorithmic Bias

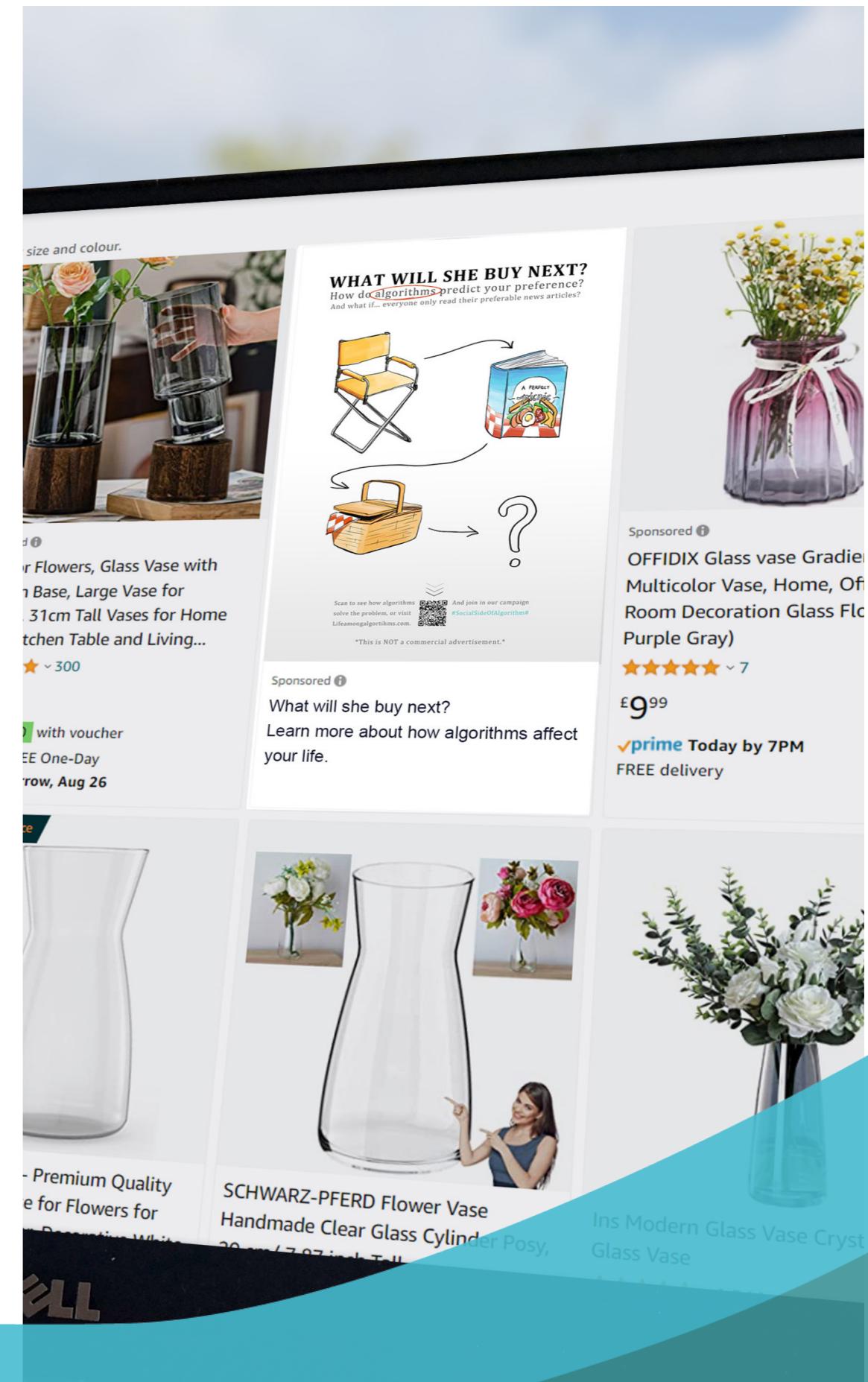
Artificial intelligent computer algorithms have gained considerable popularity in many societies. However, some cases suggest algorithms can be biased.

## How might we encourage ethical algorithm uses?

After a survey participated by an inclusive group, I discovered an imbalance of power between the algorithm users (data analytics etc.) and the algorithm 'influencees'.

Therefore, this project aims to empower algorithm influencees by raising public awareness of the increasing algorithm uses in daily lives, leading to a more socially sustainable society.

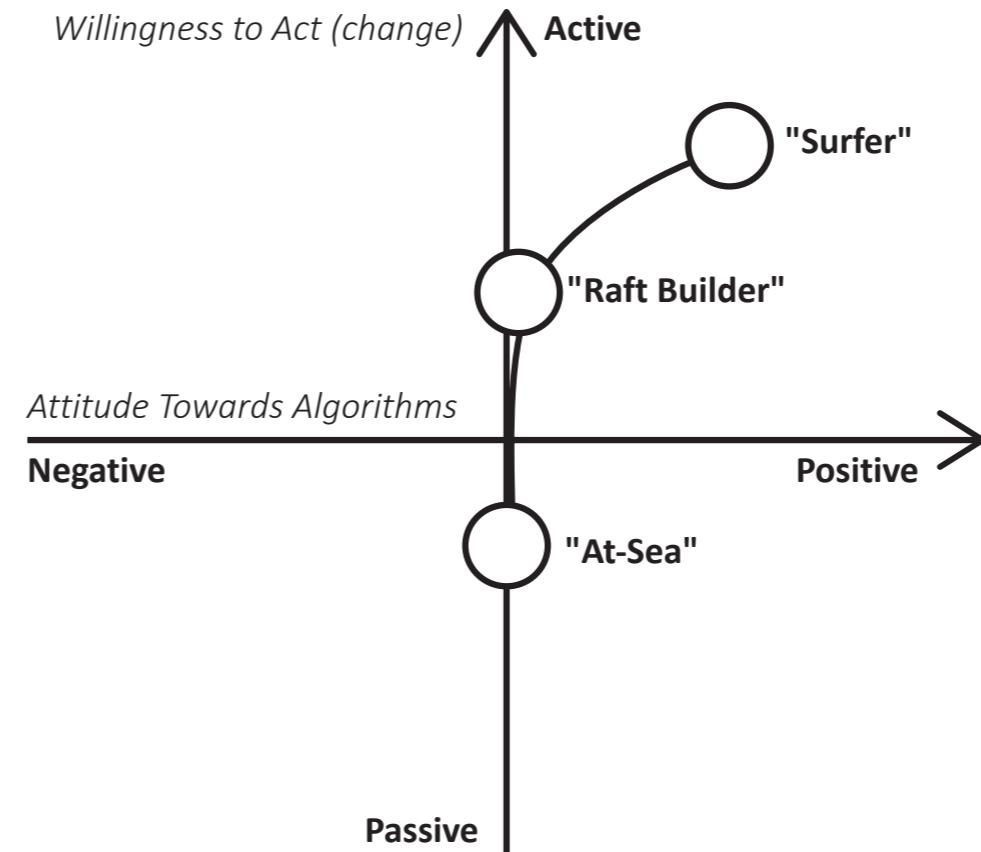
This is an individual project conducted by myself.



"

Many of us know little about algorithms,  
yet we have different attitudes.

"



41  
Respondents

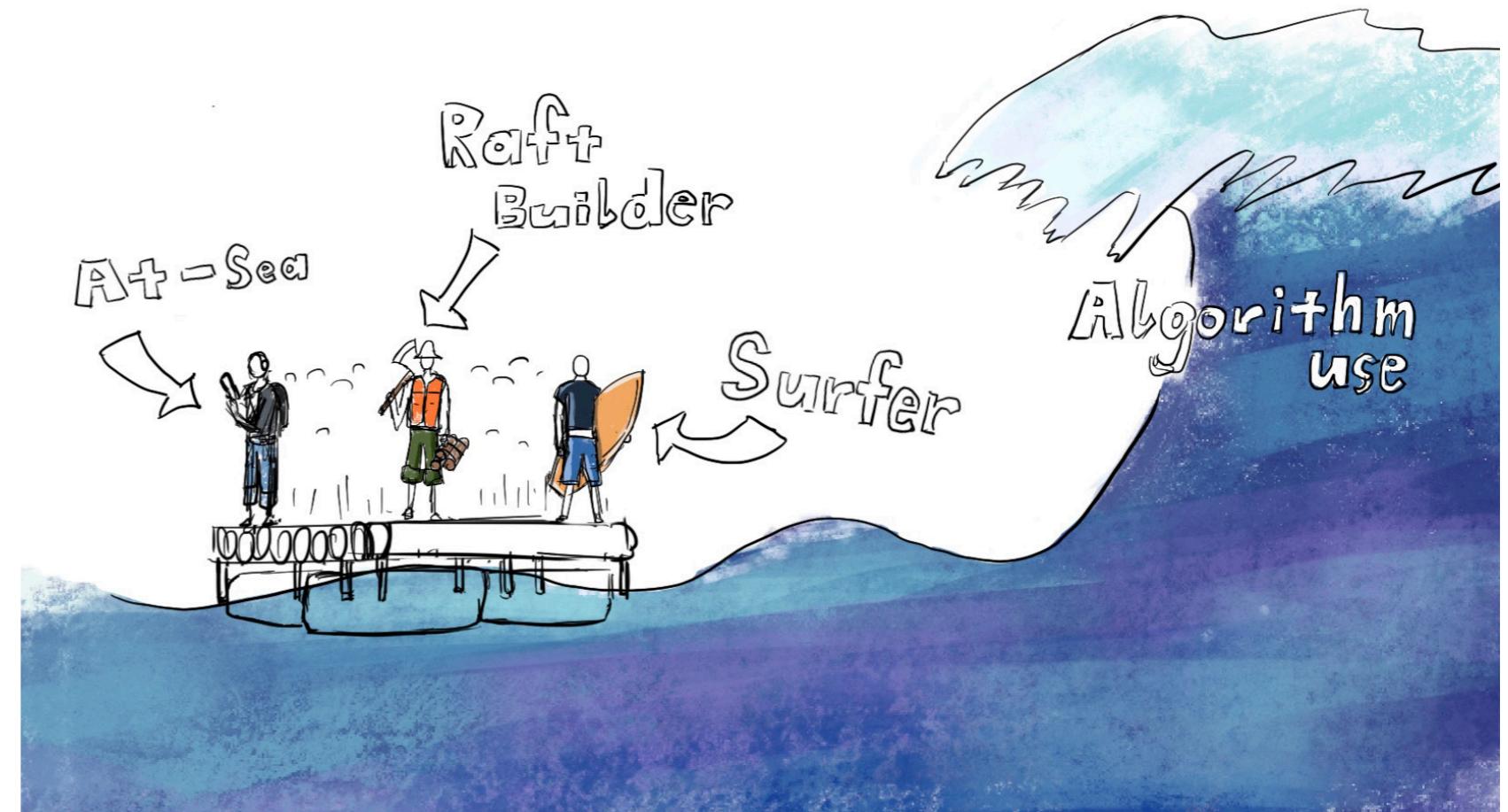
4  
Ethnic Groups

20 - 70  
Age Range

### Ethnographic Research: How well do people know about algorithms?

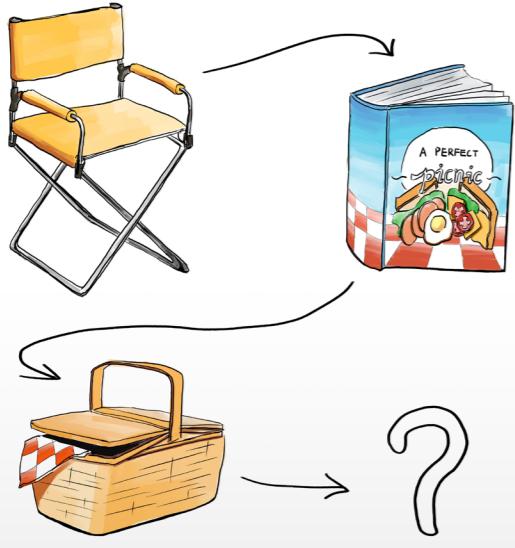
My online questionnaire and interviews received 41 quality respondents from 4 ethnic groups ranging from 20 to 70 years old. I discovered that most participants had limited understandings of how AI algorithms might affect their lives. Based on attitude towards algorithm applications and willingness to act, I categorized participants as three different personas shown in the image below.

Inspired by the results, the current project should focus on raising public awareness, equipping people with knowledge, and encouraging individual responses. The project should act as a preparation for a further transition towards more ethical algorithm uses and robust systems.



## WHAT WILL SHE BUY NEXT?

How do **algorithms** predict your preference?  
And what if... everyone only read their preferable news articles?

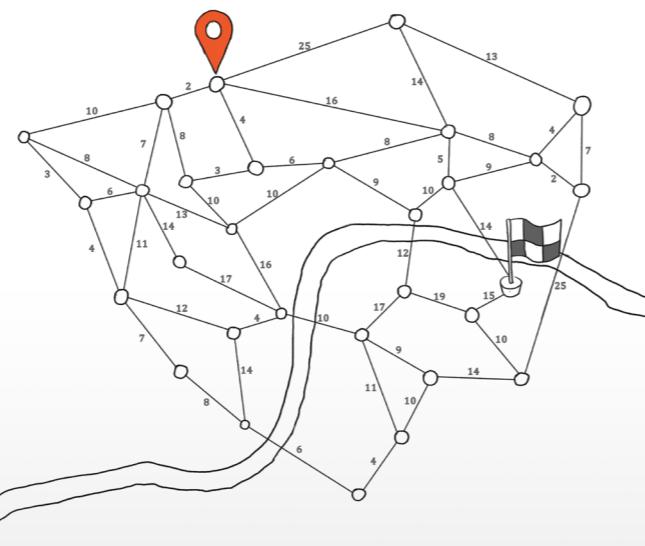


Scan to see how algorithms  
solve the problem, or visit  
[Lifeamongalgorithms.com](http://Lifeamongalgorithms.com).  
And join in our campaign  
#SocialSideOfAlgorithm#

\*This is NOT a commercial advertisement.\*

## WHICH IS THE FASTEST ROUTE?

How do **algorithms** navigate people around?  
What if most drivers were recommended with the same route?



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solve the problem, or visit  
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And join in our campaign  
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## WHAT IS WRONG ABOUT THIS SPINE?

How do **algorithms** identify an X-ray image?

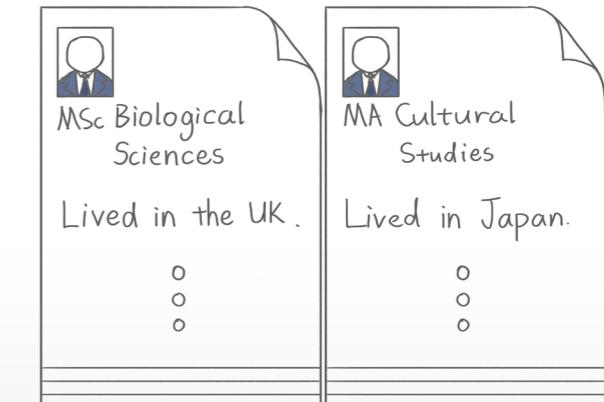


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## WHO MAKES THE BEST CUP OF TEA?

How do **algorithms** assess job applicants?



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“ Quizes in the posters ask people to complete  
what would be algorithms' tasks.

## Deliverable: A Poster Campaign

The deliverable of the project consists of 4 different posters plus a website.

The four posters describing four different AI algorithm applications shall be placed in their relevant scenario. For example, the navigation can be seen on buses or undergrounds. Each poster shows a simple task usually done by a computer program, putting the audience in the position of an AI algorithm.

The website contains more detailed information about the AI algorithms. One can visit the website by inputting the URL or scanning the QR codes on the posters.

This is about... **Recommender System**

In respond to the question: What will she buy next?

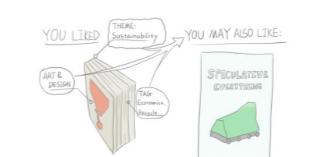
You may already be familiar with “recommendations” coming from your phone apps, online shopping, watching videos and news pages, but how can the apps and websites predict your preference? There should be some strategies.

Imagine you are choosing a gift for your friend. If you know what he/she already likes, you may choose something similar. Or you may choose items that are preferred by people who are similar to your friend. Or if you know his/her recent activities, you may just be able to predict what he/she needs.

Similar strategies are adopted by the apps and websites. Specifically, there are three main algorithms involved:

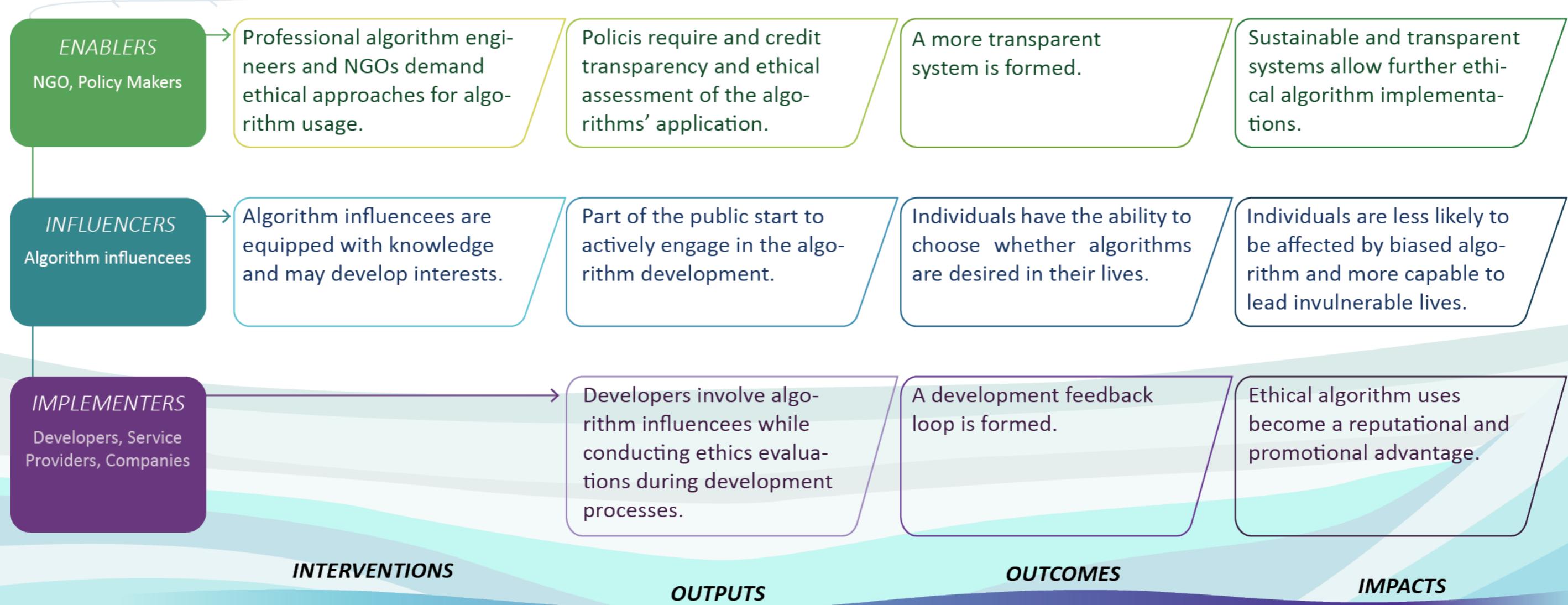
You buy X, so you may buy Y

By the name of “content-based filtering”, this algorithm predicts your preference by analyzing what you already like. For example, if the algorithm knows that you bought a novel, it will start to guess what was your motivation - was it because of the author? Or the genre? Then the algorithm may recommend you with novels by the same author or in the same genre.



# Life Among Algorithms

Theory of Change Diagram



# Lento

A mid-range thermometer and hygrometer concept for wooden musical instruments

Keywords: Product Design, Rapid Prototyping, Electronic Prototyping

Wooden musical instruments such as violins are sensitive to temperature and humidity. Inappropriate storage conditions may damage the instrument.

Through market research, we discovered that there were few thermometers or hygrometers designed for the instrument players.

Therefore, we proposed a novel design combining thermometer and hygrometer specifically for wooden musical instrument owners and players who desire optimum protection and prefer quality products. The design adopted a unique method of measuring temperature and humidity by detecting the internal stress of a wood sample in a confined space.

This is a group project where I contributed to the entire process.

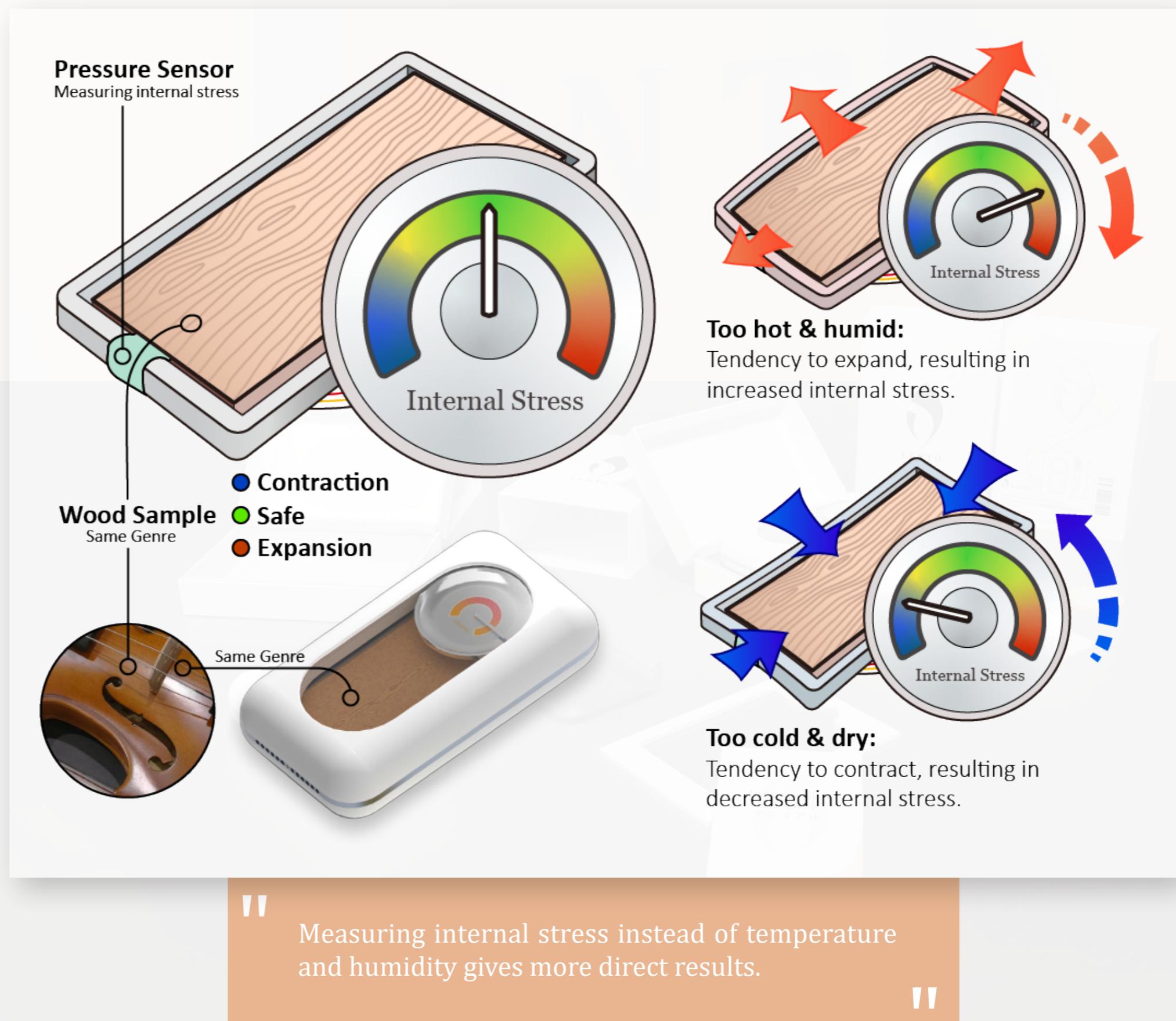
LENTO

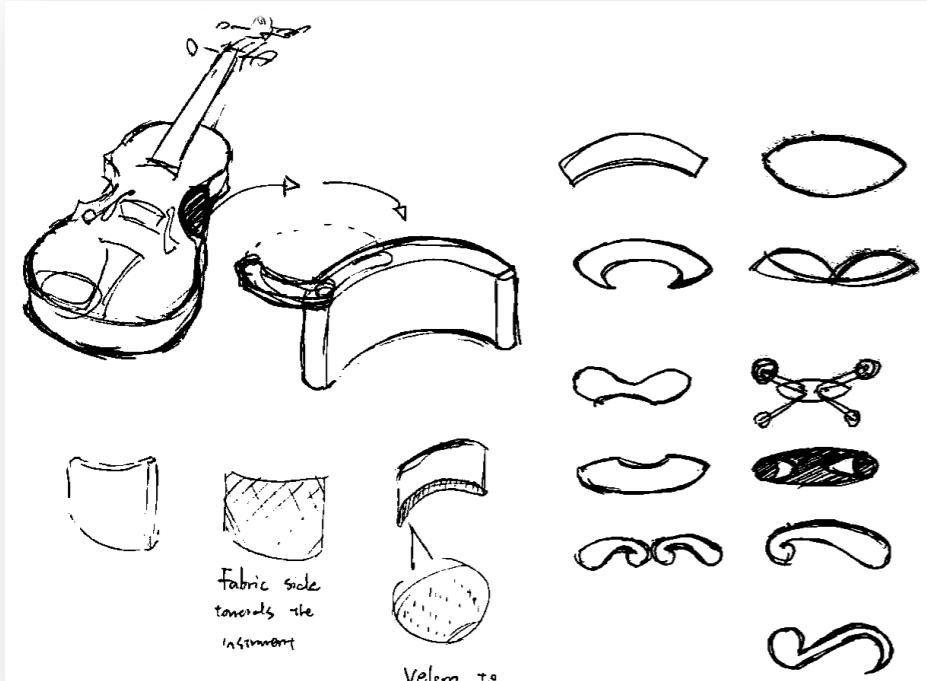


## Measurement Principle

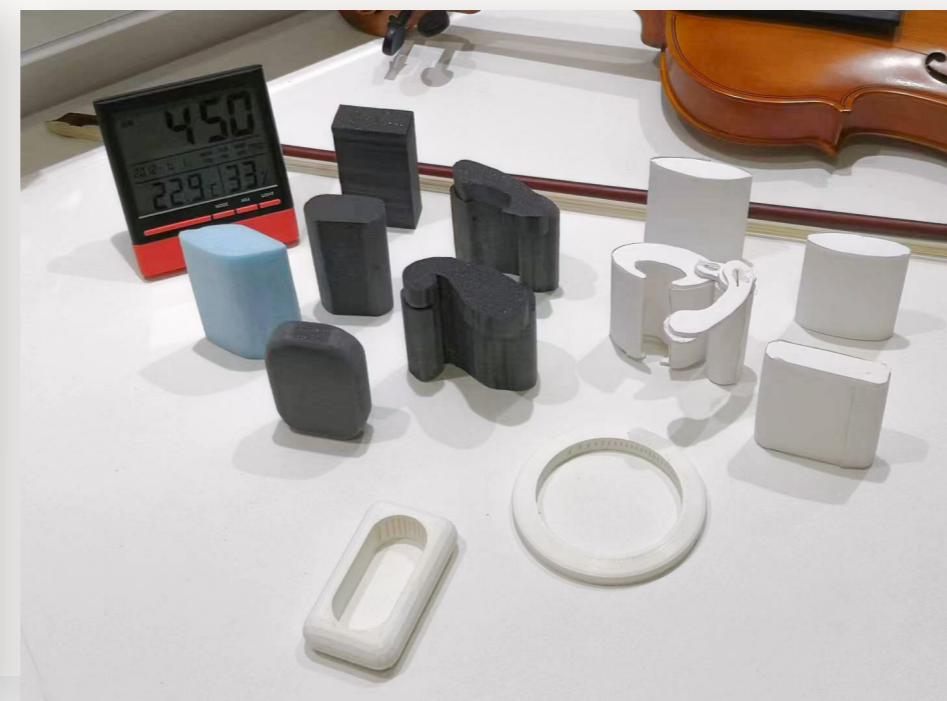
Instead of using existing electrical sensors for measurement, we took a critical step back. Do our users need specific numbers or their instrument in a proper storage condition, eventually? What if there is a more intuitive approach?

Thus we proposed a novel, intuitive measurement approach with unique aesthetic quality. A sample of the same type of wood as the instrument is put inside a confined frame. As temperature and humidity change, the wood sample will try to expand or contract, resulting in internal stress changes. By measuring the pressure between the sample and the frame using a pressure sensor, we can determine how far the sample might have deformed. Thus we can understand if the surrounding environment is appropriate for the instrument.





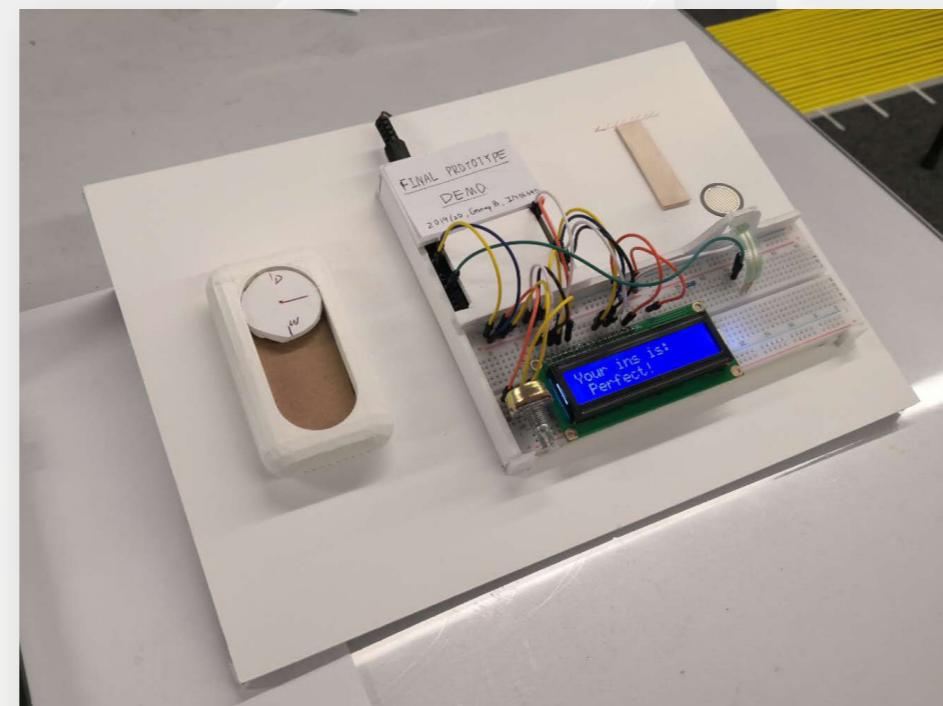
Sketching



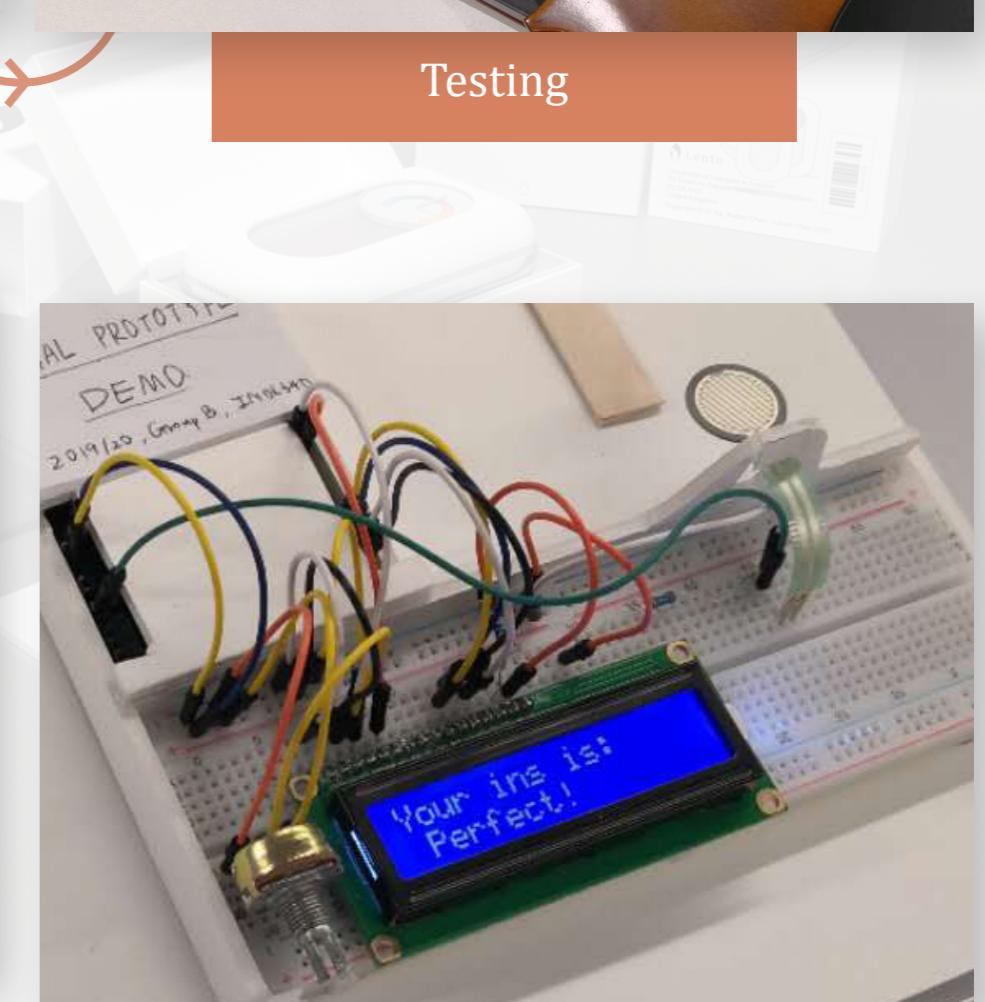
Blue foam and PVC models



Testing



Electronic Prototyping



## Prototyping

We made several appearance mock-ups to explore and determine aesthetically and functionally desirable shapes.

We also built an electronic mock-up rig to demonstrate our unique measurement principle.

## Package

The product package should display desirable qualities such as 'quality' and 'reliability'. Thus, we made a few decisions.

We kept the outside of the package neat and straightforward by using some clean graphics and a sleeve to cover the surface of the box. Such concept can also be seen in many high-end electronics package designs. Thus our users would sense familiarity, predictability and safety.

The package contents are placed and stacked at the centre of the box with a hierarchy. The arrangement should feel organized and professional.



03

## Anti-Vibration Metamaterial Glove

*A construction glove concept for protecting workers from harmful vibration.*

**Keywords** - Product Design, CAD Parametric modeling, Mechanical Metamaterial, Finite Element Analysis

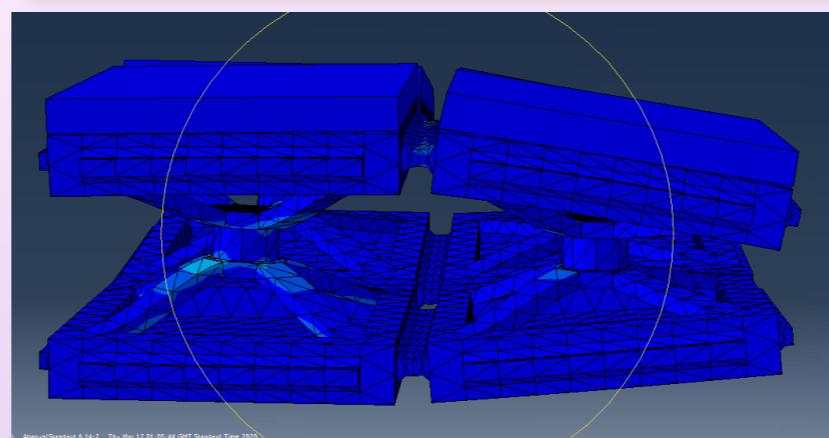
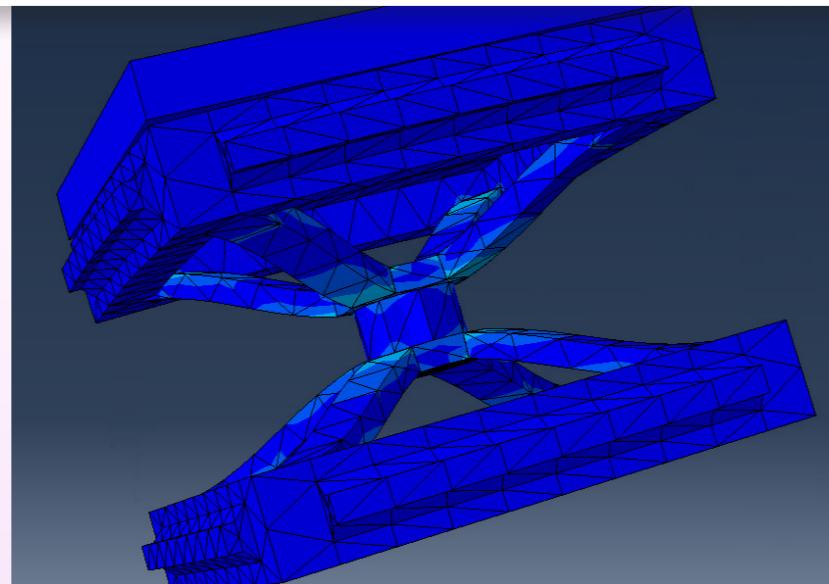
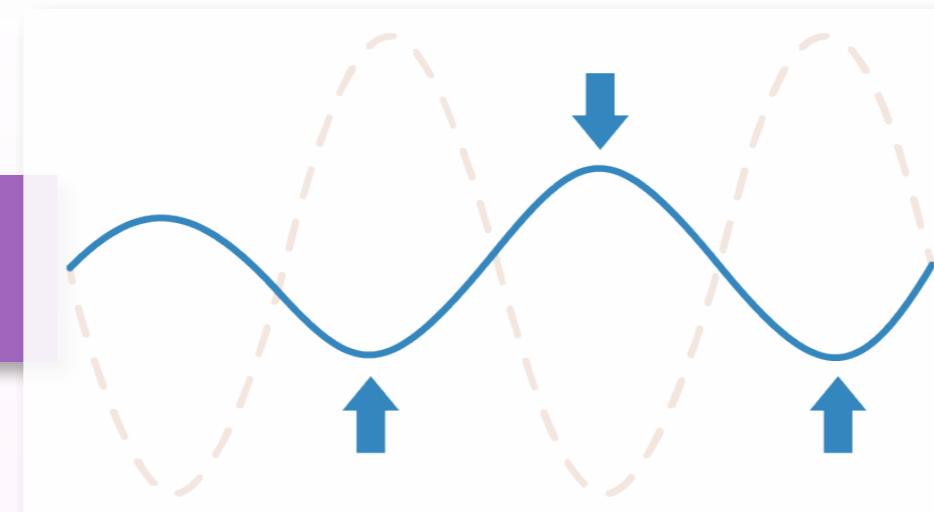
Construction contractors are often exposed to vibration when operating tools like pneumatic drills. Long-term exposure to such vibration may result in HAVS (Hand-Arm Vibration Syndrome) caused by local blood loss and irreversibly damaging fingers and wrists.

Therefore, this project proposed an anti-vibration glove concept. The design is expected to reduce vibrational force by approximately 40-50 per cent by adopting a novel mechanical metamaterial structure, according to the FEA simulation result. This advantage can allow better health protection, potentially longer working time and increased revenue.

This is an individual project.



40 - 50% Reduced vibration  
with the metamaterial design

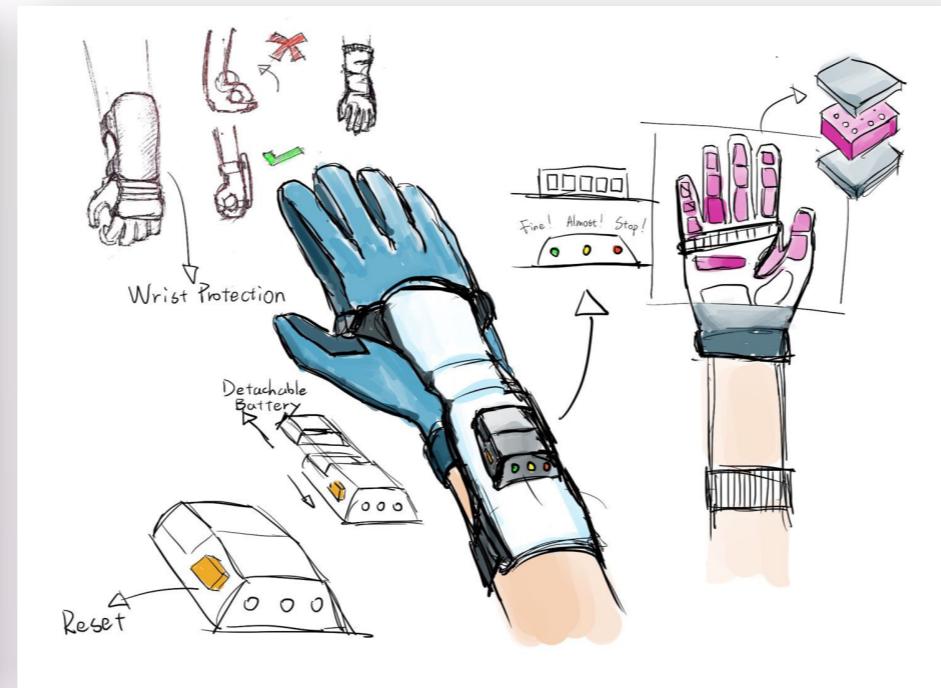
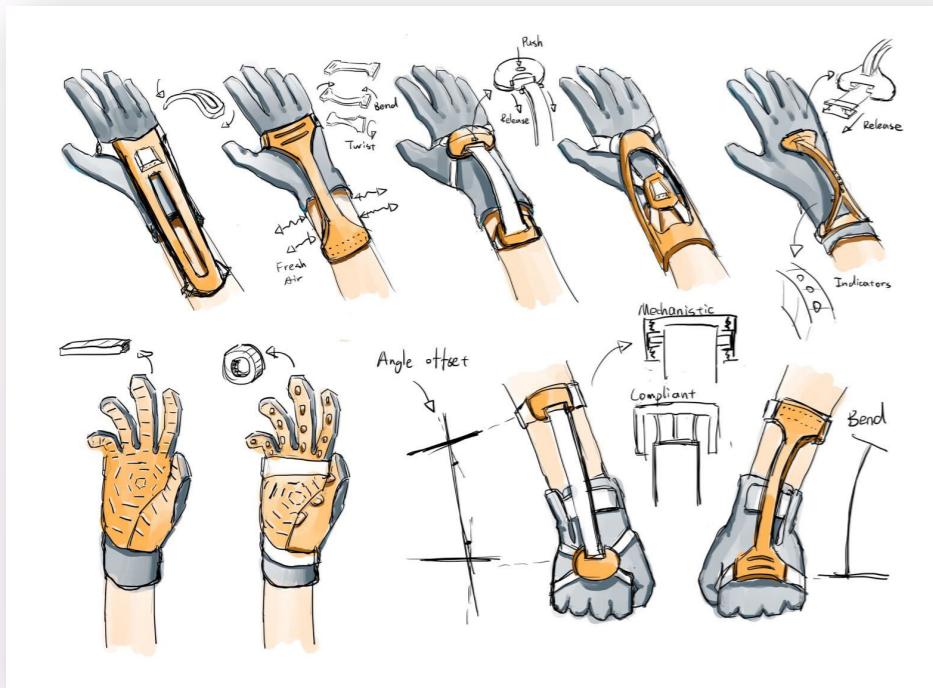


## Mechanical Metamaterial

There is limited space between a worker's hand and the device's handle. Material choice is crucial.

Metamaterial shows excellent potential in performance. Instead of solid material, mechanical metamaterial introduces engineered micro-structures with desirable mechanical properties. These micro-structures usually consist of multiple repetitive structural units.

I then proposed a specific metamaterial design using CAD tools such as Creo and Abaqus. According to simulation results, the proposal is expected to reduce 40-50 per cent of received vibration along the designed axis.

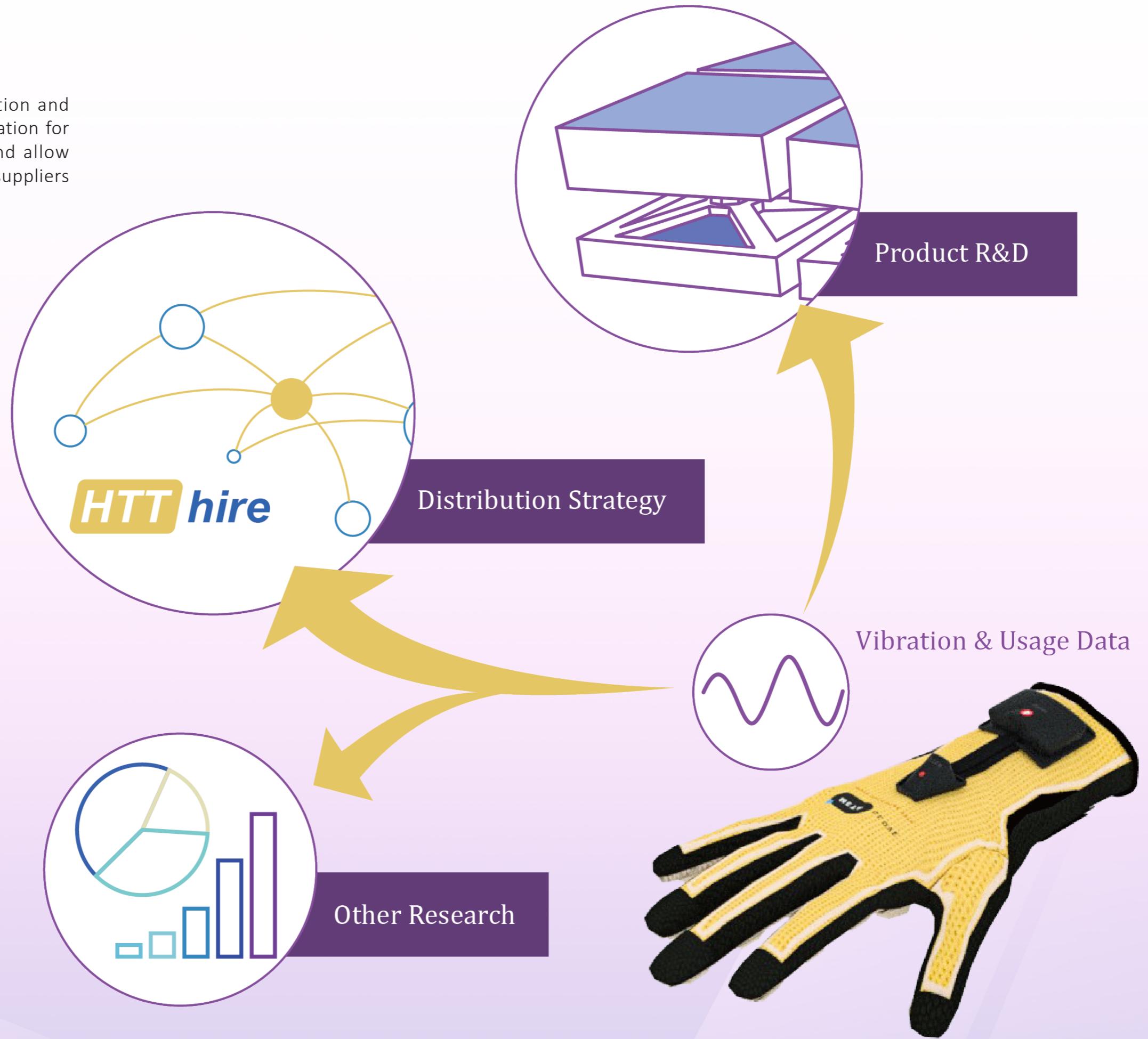


## Aesthetic Design

The glove should display appropriate aesthetic qualities as professional equipment: reliable, robust, comfortable and functional. Following this guideline, I made several iterations of the appearance design based on feedback from peers and the supervisor.

## Forming a bigger system

Sensors inside the glove measure vibration and usage data. The data can provide information for research and development purposes and allow better business strategy for equipment suppliers and redistributors.



# Brochure: Shared Industrial Platform EMU

**Keywords** - Graphic Design, Visual Aids, Photo Editing & Rendering

Our client (CRRC Corporation Limited) asked us to produce a batch of brochures advertising a novel high-speed train system design at the 2018 Innotrans exhibition in Berlin, among other international groups. The brochure should display humanistic qualities, a sense of future and enjoyment while being smooth and effortless.

As the leading graphic designer, I was responsible for creating the brochure's visual design. My contributions include typesetting, creating visual aids, sampling and rendering photos etc.

The brochure visually and effectively contributed to the communication among CRRC and other international companies at the exhibition, photos from which were also used by multiple editorial sites.

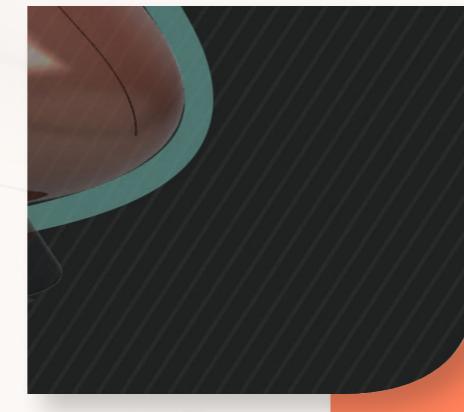


## TypeSet

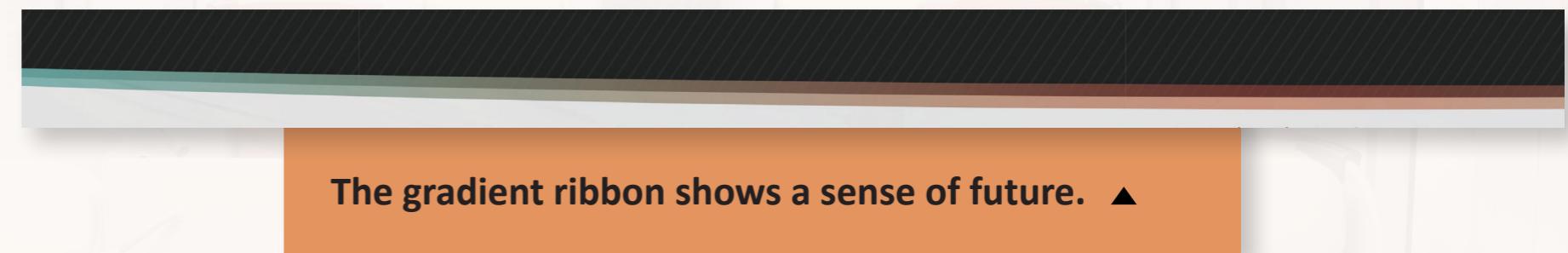
To relate to the novel double deck train design, I split the pages into three vertical sections, with the centre displaying the rendered appearance of the train acting as a split line. The main sections of all pages are constrained by a giant train shape, further suggesting the double-deck train design.

To achieve a sense of effortlessness and smoothness, we deliberately left empty spaces while ensuring the content naturally flowed horizontally on the main pages. The top and bottom margin used curved deep grey strips traced with a gradient ribbon from red to blue as a frame, adding a sense of gentle, smoothness and future.

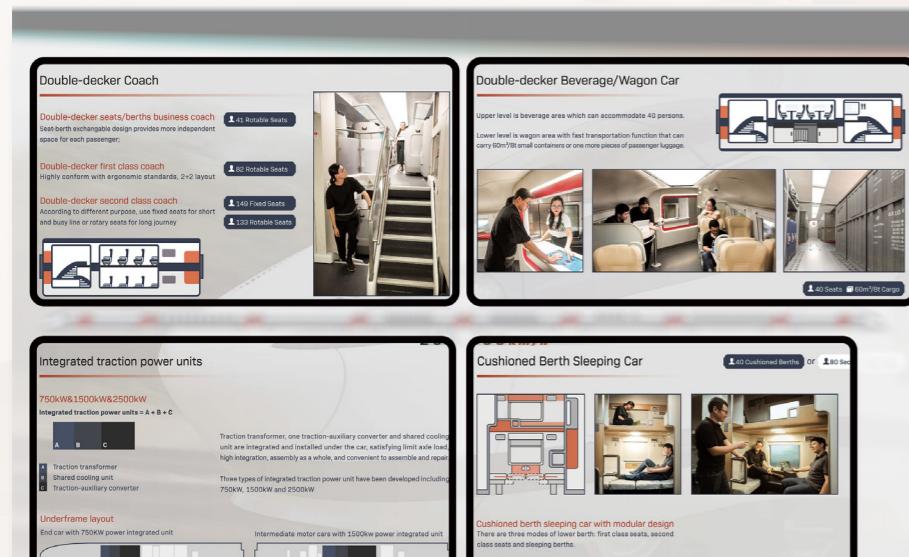
In addition, a round corner is cut out at the bottom right of the first page to make it more comfortable to open the brochure.



◀ The round corner makes it more comfortable and convenient to turn the page. ▲



The gradient ribbon shows a sense of future. ▲



The arrangement of different blocks echos with the double-deck train design. ▲

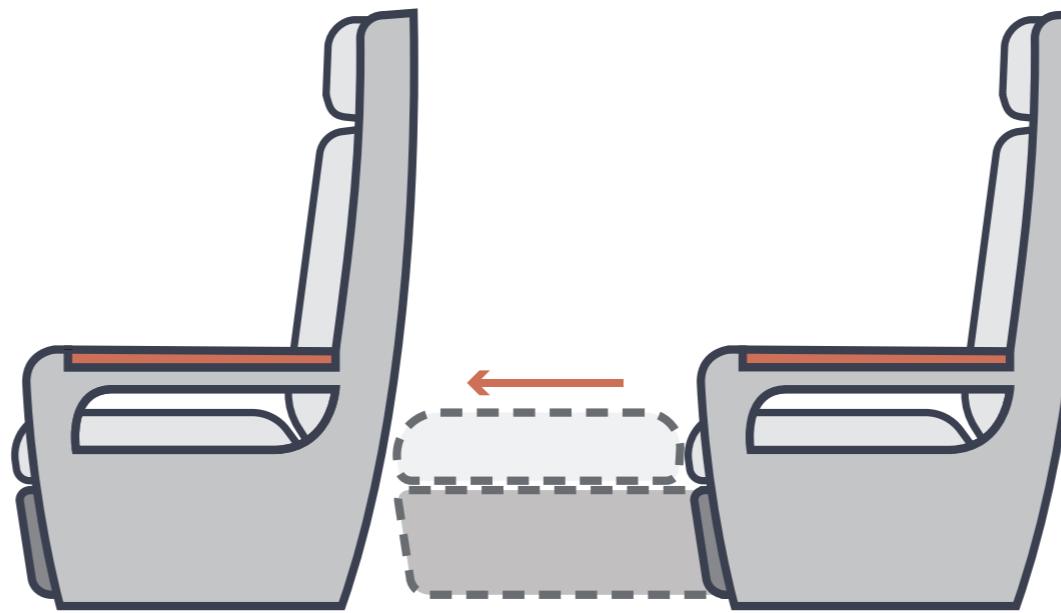
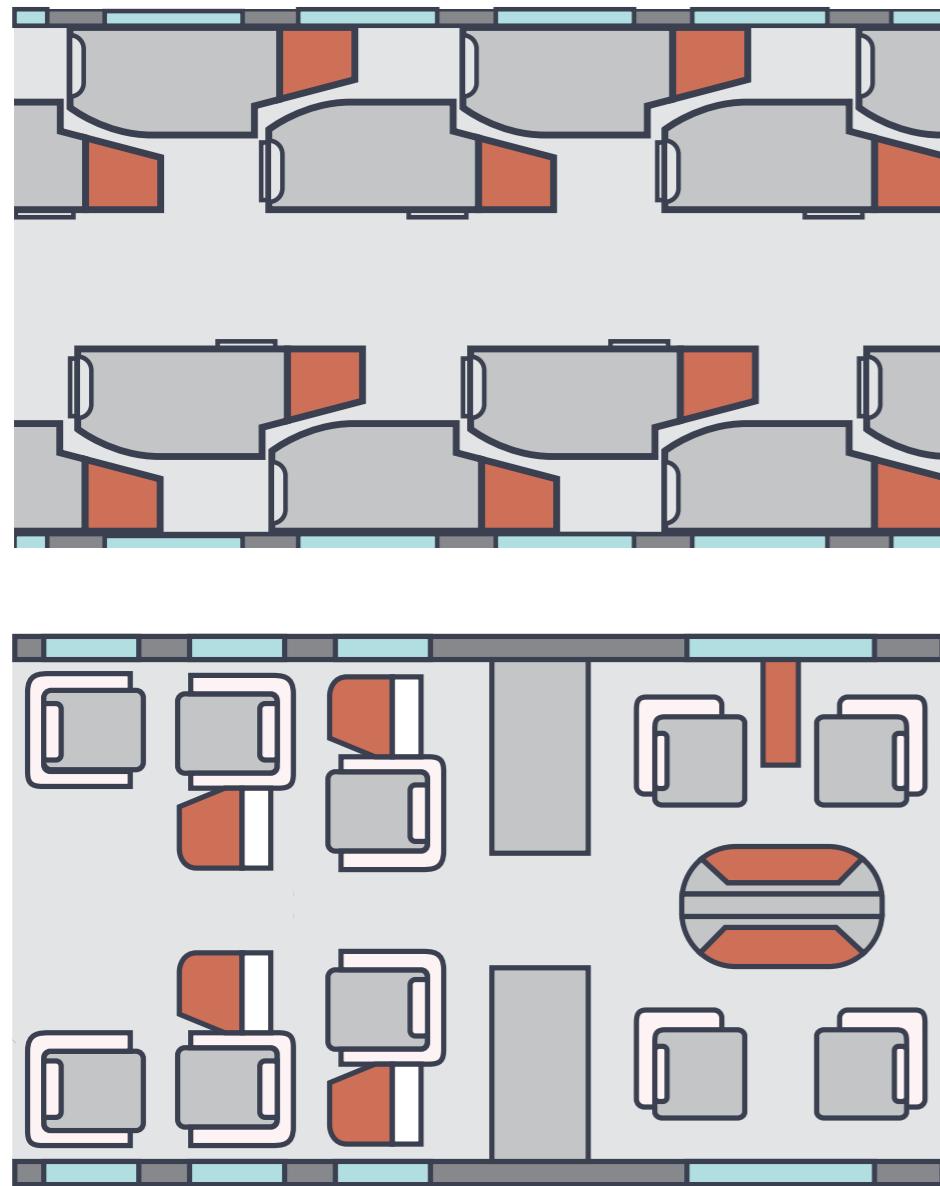


The main sections are constrained by a giant train shape. ▲

## Visual Aids

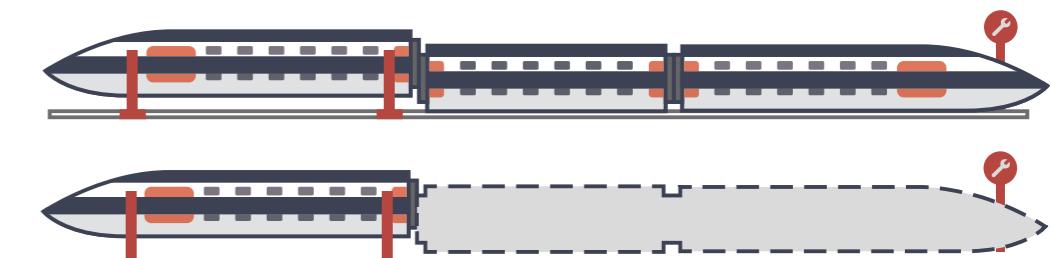
To show humanistic qualities and cosiness, I carefully chose colour combinations (pink, orange and a gradient of gray) and adopted smooth curves in the visual aids.

To display a clean, confident and powerful image, we used simple shapes with high colour contrast in the infographics.



40 Seats 60m³/8t Cargo

Maintenance spare rate -50%



Formation mode : Mc+nM+nT+nM+Mc

Mc+OM+1T+OM+Mc



Mc+1M+1T+OM+Mc



Mc+1M+1T+1M+Mc



Mc+1M+0T+OM+Mc + Mc+OM+1T+OM+Mc



## Tailoring Photos

Upon request, we sampled real photos of the novel train design and tailored them to better show the desired core qualities in the brochure.



▼ Before ▲

▼ After ▲



Before ▲

▼ After ▲



## Thank you for reading my portfolio.

Hi, I am Di, a recent design graduate. My speciality is sustainable design, while I am also a well-trained product and graphic designer.

I am particularly passionate about connecting people with their natural inner selves through the power of design. I am often fascinated by how much internal power we possess. Curiosity, perseverance, tranquillity... I believe with these qualities awakened, one can live a more satisfying life. Our society may then become more socially sustainable and prosperous.

I have been influenced by several different cultures while living in China and the UK. This multicultural experience developed my knowledge, empathy, communication and critical thinking skills, which are also of significance to my design career.

I have a wide range of creative skills, including ethnographic research, graphics, video production, rapid prototyping, electronic prototyping, interactive programme, VR and AR application etc. These skills have organically contributed to my design works.

If you are interested, please find me through the information on the right.

*Di Ba (Dee)*

Sustainable Design | Product Design | Graphic Design



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