



Lumencord

Interactive pendant, born to convey
feeling of missing

“When the light speaks what the heart feels”

Tianyi(Lisa)Yang's process book

Content

Brief Page 2

Background research Page 2

Ideation Page 4

Feedback Page 5

Development Page 5

Engineering drawings Page 6

Modeling Page 6

3D Printed Page 7

Finial Page 7

Story Board Page 8

Bibliography Page 9

Appendix Page 10

Brief

Creative Conscience Awards

Creative Conscience is an international award that aims to encourage creativity to bring positive impact to society. Participants can submit projects in multiple fields such as design, technology, and communication, focusing on **innovative solutions** to **social issues**.

Award Purpose

Encourage young creators to provide practical designs, hoping to **solve problems**, make contributions and positive changes to society, and contribute to sustainable social development (Creative Conscience, 2025)

Creative conscience Brief Summary



Mental health + Community

Problems

- Social isolation, inclusiveness, emotional belonging are key to well being concerns

Why I chose it



• I was exposed to the Global Sustainable Development Goals in high school.



• Understanding Maslow's Theorem (happiness is not only about money, but also about spiritual pleasure)

Evaluation Criteria

- Creative concept
- Feasibility
- Social impact

Rationale

I chose the Creative Conscience design brief because it focuses on global social issues such as mental health, loneliness and lack of belonging. I have worked on projects related to **sustainable development goals** and have a strong interest in this. There are many **long-distance couples** around me. As a user experience designer who focuses on users, I realize that this group of "long-distance couples" is facing a huge **emotional gap and expression barriers**.

Through this design, I hope to transform the gentle and concrete emotional experience into a **real-life interactive solution** to provide **spiritual comfort** for people suffering from spatial isolation. At the same time, this direction gives me the opportunity to combine **wearable design with a humanistic empathy approach** to create a solution that is not only emotionally valuable but also **socially meaningful**.

Mission

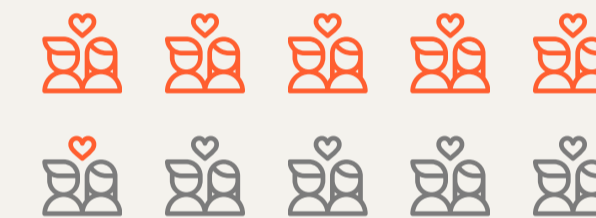
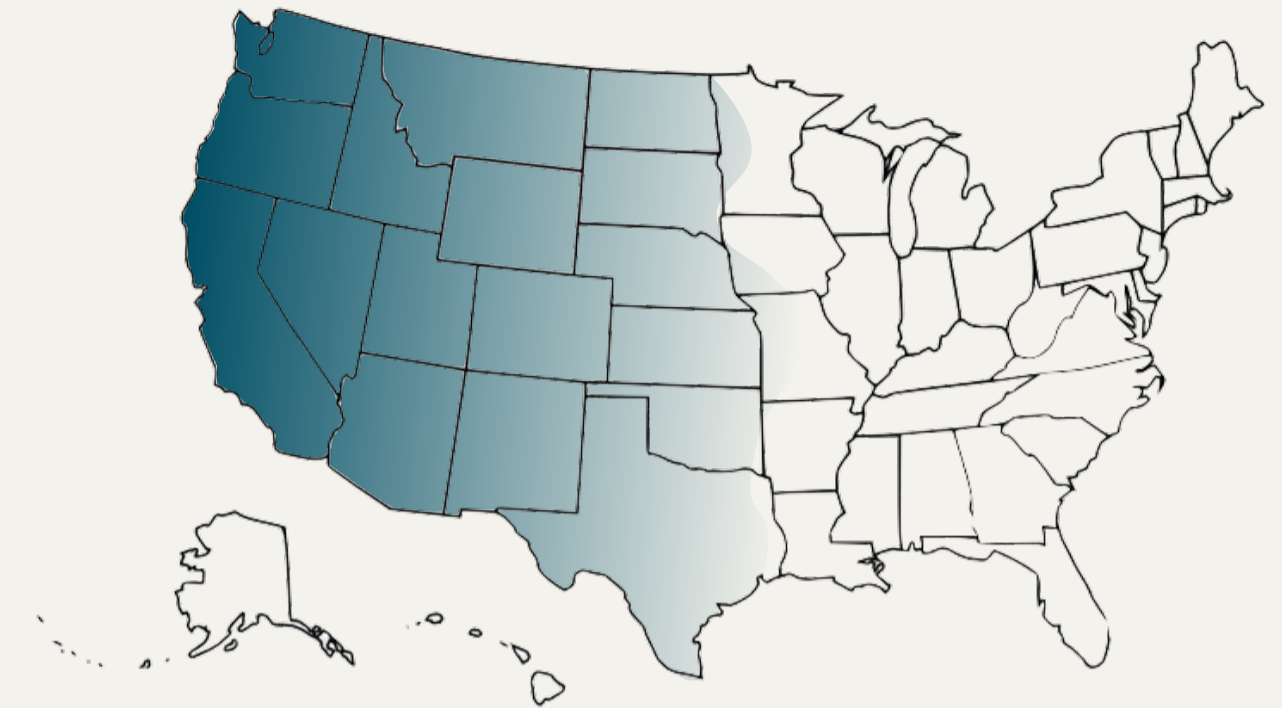
I am committed to designing a **wearable device** that visualizes abstract emotions, transforms long-distance thoughts into a **real sensory experience** through light and synchronous interaction, and rebuilds a sense of **companionship** and **emotional support** for long-distance couples, friends and family (later added based on feedback).

Vision

Build a future where emotions can be conveyed **across space anytime and anywhere**, so that every heartbeat and every touch can cross the distance and reach the other party to form companionship "**you are not alone**".

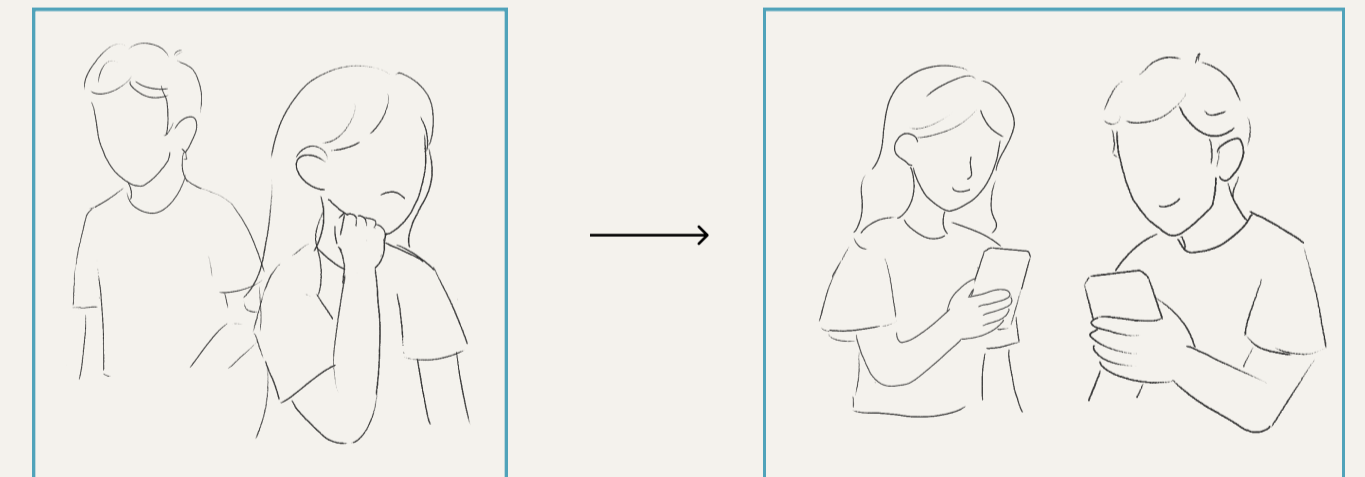
Background Research

Globally, 58% of Americans say they have been in a long-distance relationship some point in their life, according to the research. (Polanski, M,2024)



Research shows that 42% to 50% of long-distance couples experienced loneliness (Survive LDR,2023)

The study found that long-distance couples use social networks more frequently to face challenges such as limited communication. (Holtzman, S, 2021)



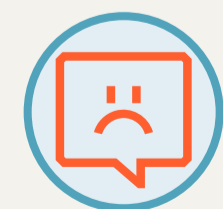
According to the research, 63% of long-distance couples have difficulty communicating properly due to inconsistent schedules, which leads to misunderstandings.(Polanski, M, 2024)



Inconsistent schedules



Difficulty in communication

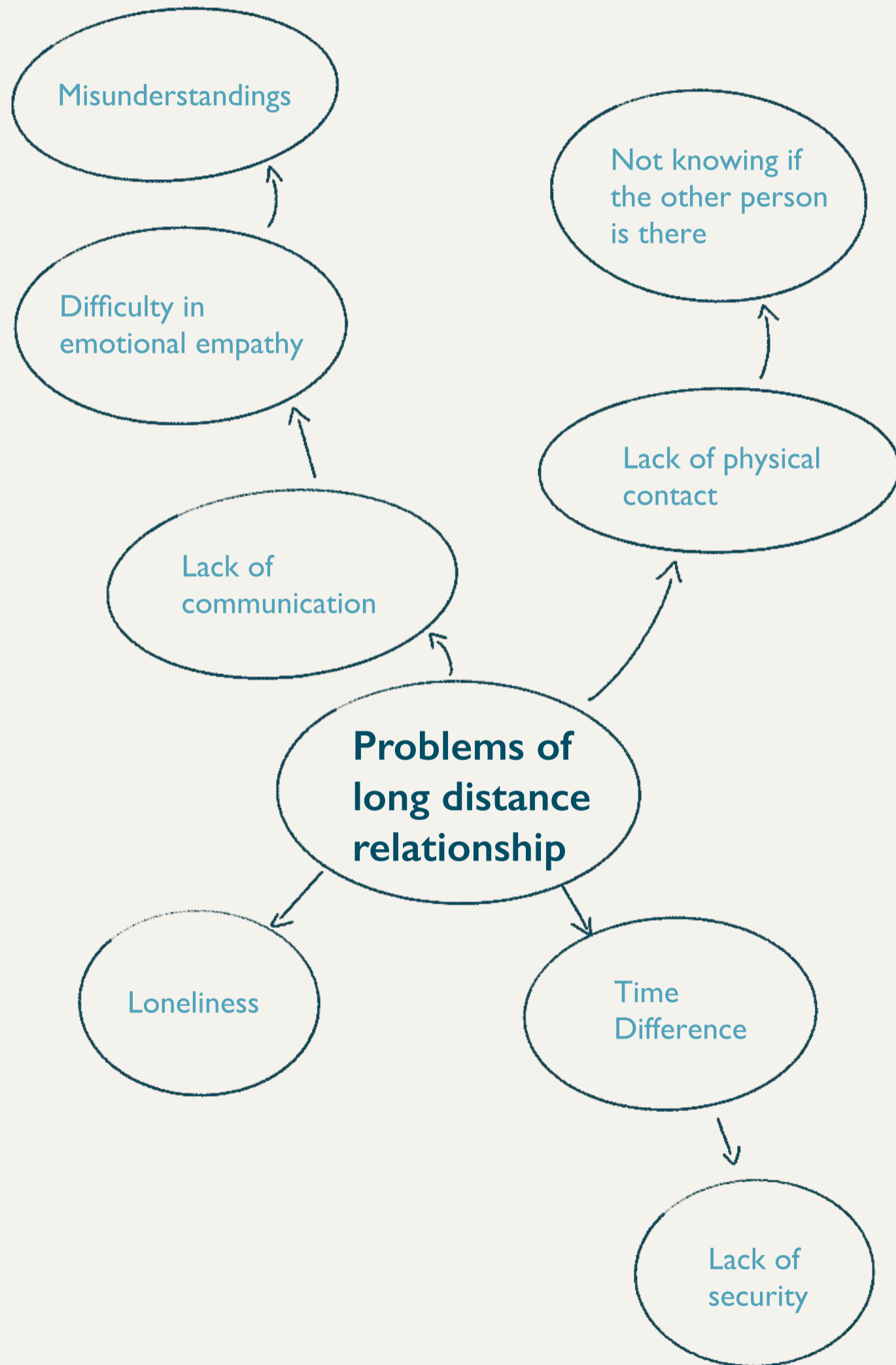


Misunderstandings

Background Research

Pain points

According to the research, this is a mind map of common pain point for long-distance couples



Possible Solution

Pain point	Solutions
Emotional alienation	Diversified communication methods
Single communication	Emotional Expression
Time difference/ busyness	Avoid over-control
Reliance on social software	Joint Activities
Lack of shared experience	Time difference management
Emotional anxiety/ insecurity	Virtual Intimacy
Limited emotional expression	Emotional value/sense of companionship

Market research

Bond touch



(Bond Touch®, 2025)

Function	Remotely transmit touch (vibration)
Linkage method	APP Bluetooth pairing + network
Battery life	About 4 days
Appearance	Minimalist round bracelet

Hey bracelet

Function	Remote touch transfer (vibration/LED)
Linkage method	APP Pairing + Network
Battery life	About 3 days
Appearance	Ordinary bracelet



(FeelHey®, 2025)

Mood board

What can you bring with you to think of me?



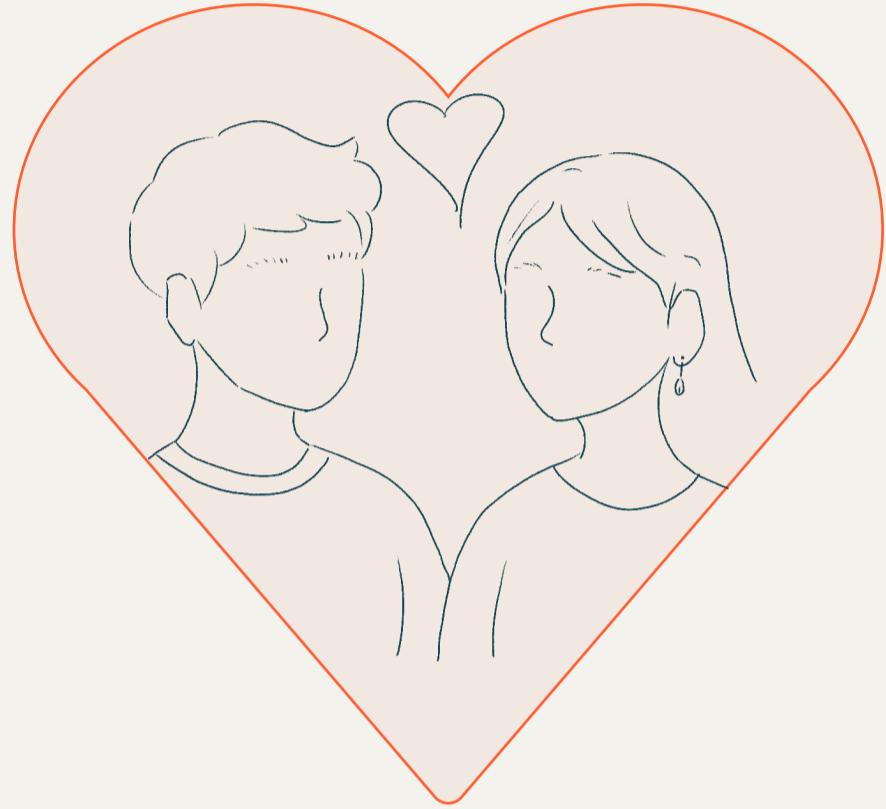
Compare and contrast

	Bound Touch	Hey Bracelet
Wearing comfort	★★★★★	★★★★★
Practicality	★★★★★	★★★★★
Battery life	★★★★★	★★★★★
Design	★★★★★	★★★★★

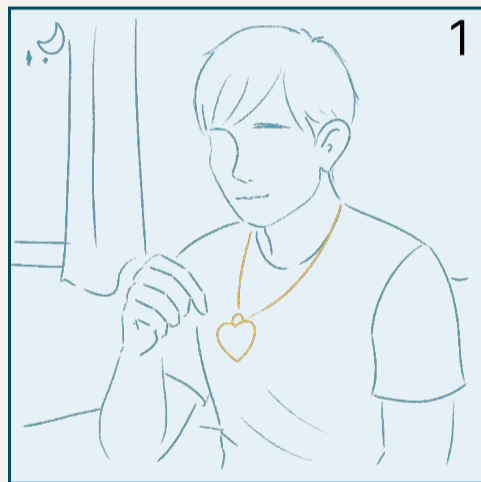
Ideation

Persona

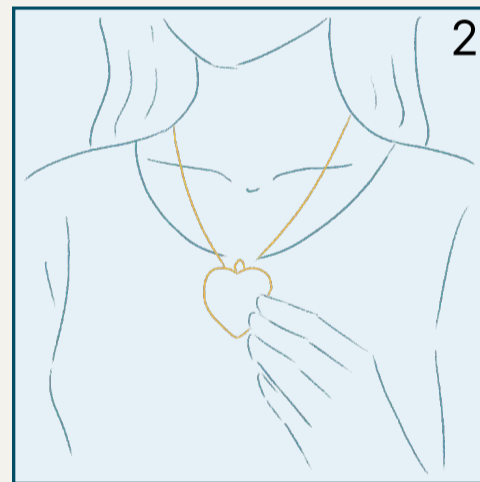
According to the previous research, the target users should be couples who are in a long-distance relationship, generally students and workers aged 18-25.



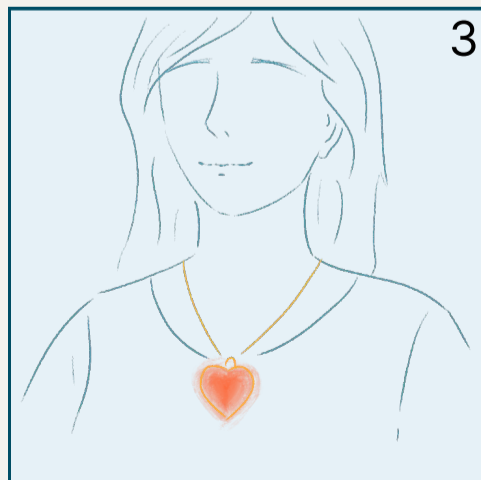
Concept



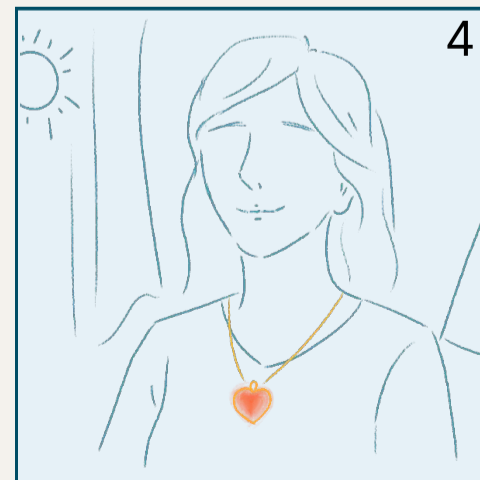
1 When one person misses another, they can press the necklace



2 This person's necklace is connected to the other person's necklace.

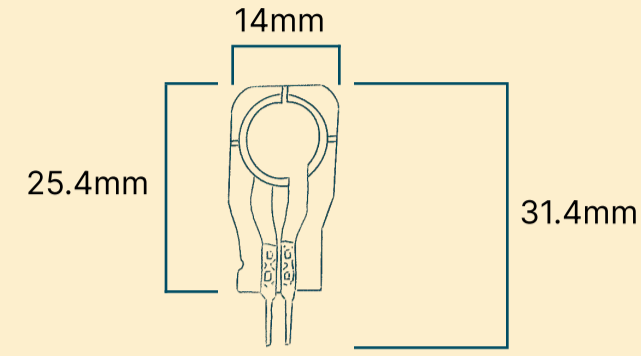


3 At this time, the other person's necklace will glow



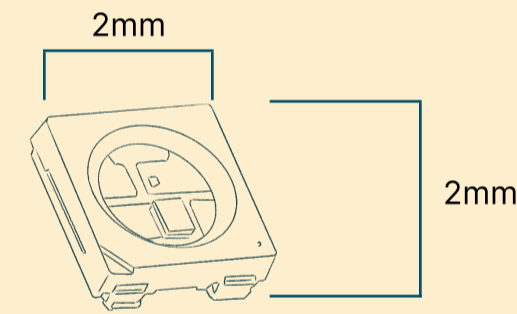
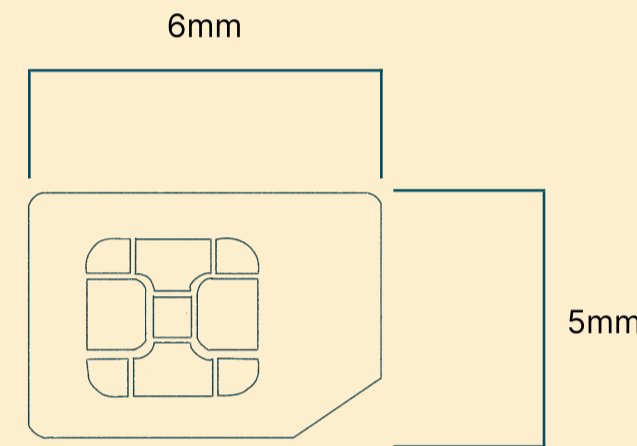
4 The person who is missed will see the other person's missing.

Technical research



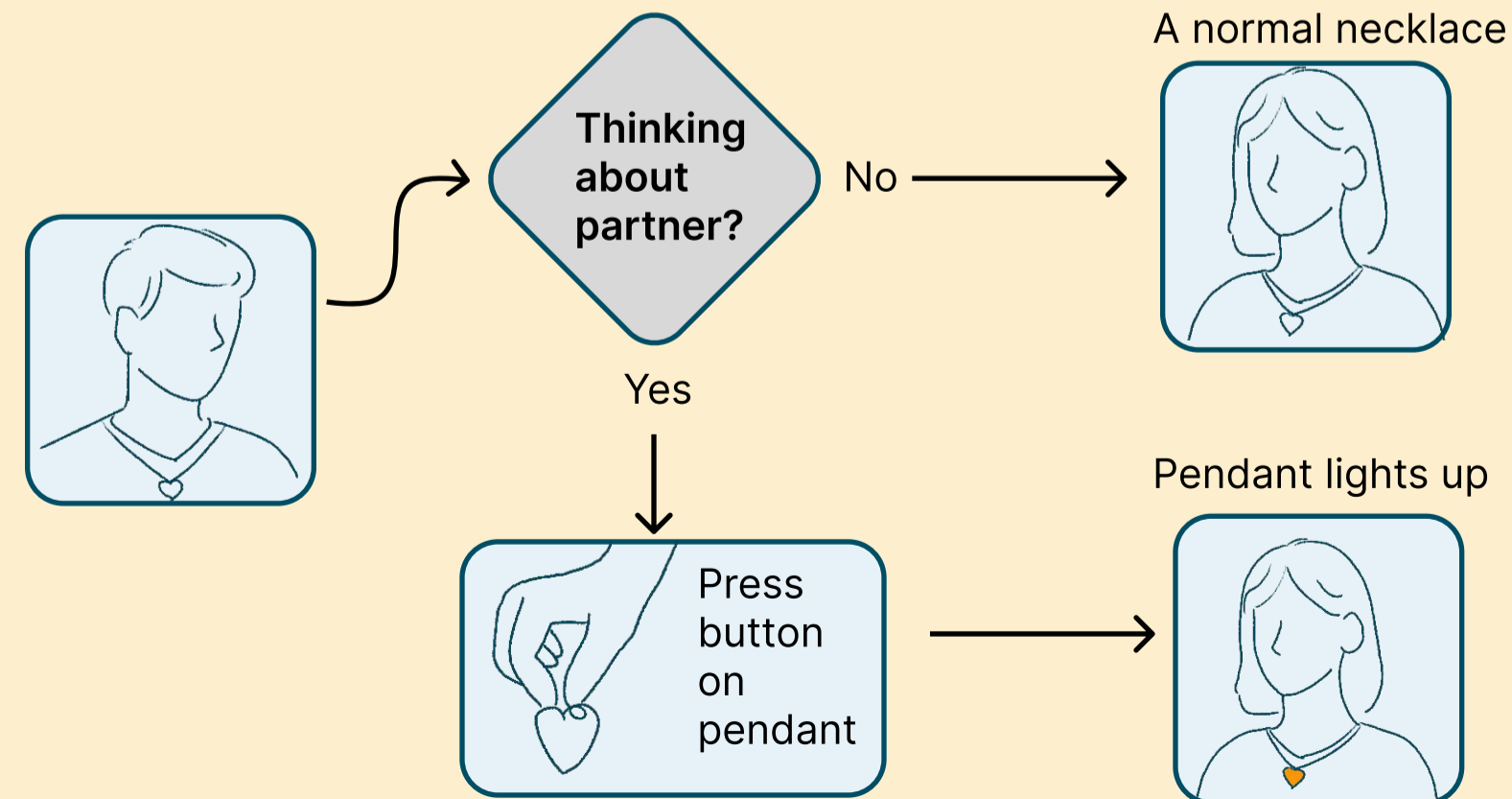
According to the research, it is found that the pinching intensity can be sensed through the pressure sensor (Force Sensor), such as the small Flexible Force Sensor. (Papani, R, 2024)

The communication method can be an Internet of things card (IoT), which is very cheap and small, suitable for implantation in a necklace. It consumes little power and uses little traffic for each communication, but can be used to communicate anywhere, free from the limitations of mobile phones and WiFi. (Velos IoT, 2025)

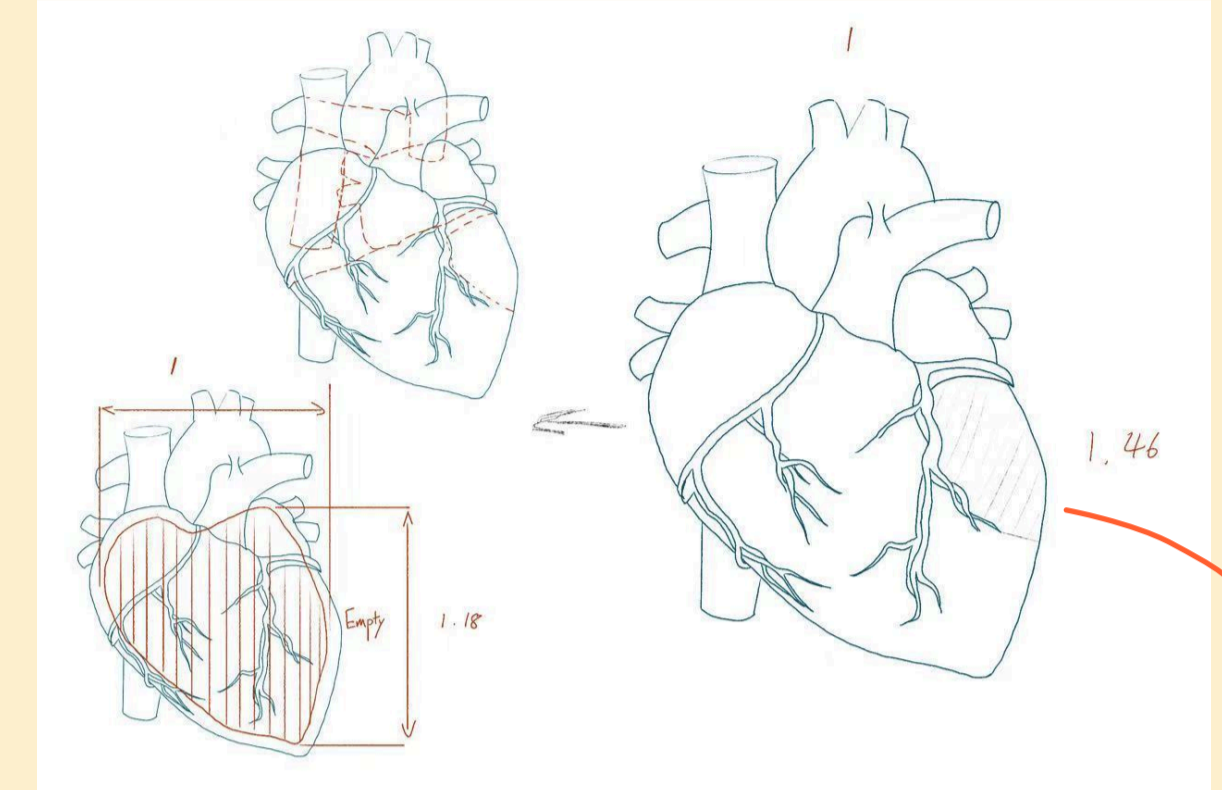


When pressed, the RGB LED light in the other person's necklace + light-guiding materials such as acrylic can make the necklace shine

User Flow



Sketch



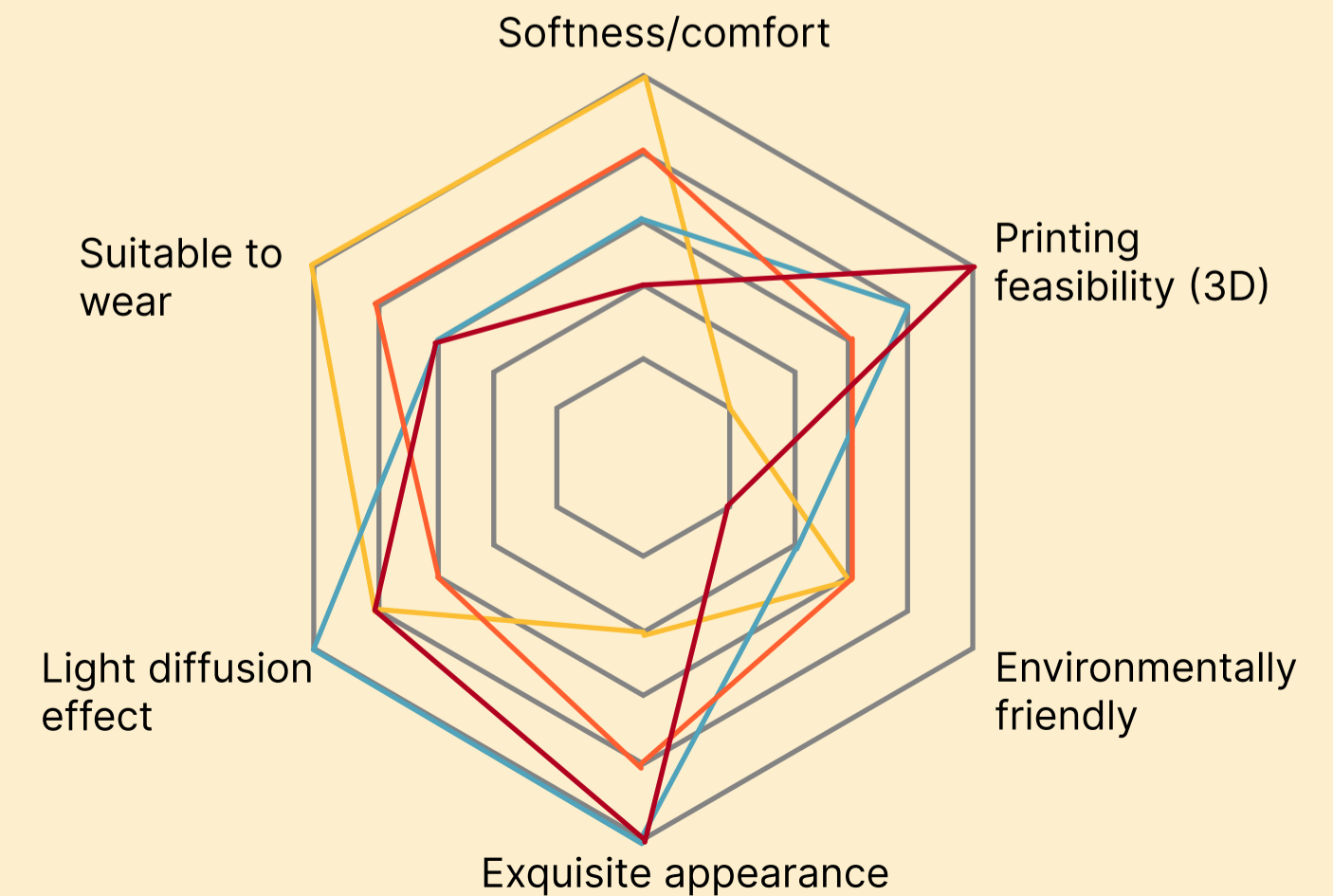
I chose to make a **heart-shaped** pendant because every time when we thought of someone is coming from the heart.

I chose to put the **button** on the **left atrium** because blood flows to the whole body through the left atrium. I think when the user presses the button, it will express that **all the blood in my body is missing you** (another user)

Materials

In order to ensure that the shape and effect of my design can be fully displayed, I asked the **3D printing professionals in the school**. According to their suggestions, I made a list of possible materials and chose **resin**, because it is the material that can best achieve translucency and retain design details.

- Silicone Rubber ■
- Frosted Acrylic / PMMA ■
- Transparent TPU ■
- Resin ■



Feedback

Technical Engineer

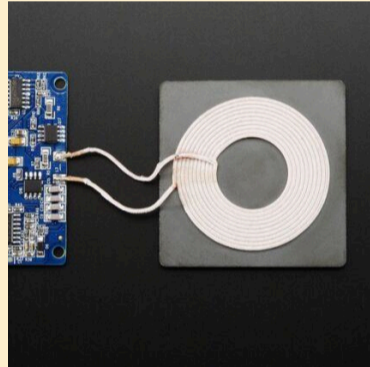
- Although the **current technology is feasible**, it would be better if there were some changes.
- You can try to use **wireless charging** to save battery replacement, save space, and maintain the integrity and beauty of the appearance.

Professor

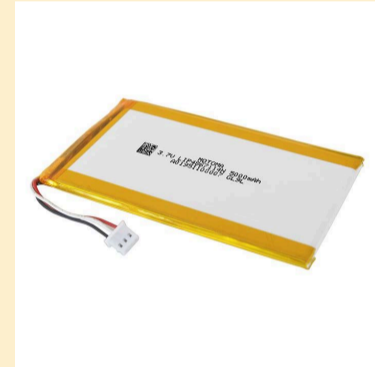
- Maybe this project can not be only for **lovers** but also **family** and **friends**
- How can we **make them happy?** Family, friends, lovers.
- Use **contrast** to show the significance of your product
- Think of boys, will they accept and willing to wear a heart shape, maybe try **other design** or try **more styles**

Technology should use (according to the engineer) II

See Appendix 2



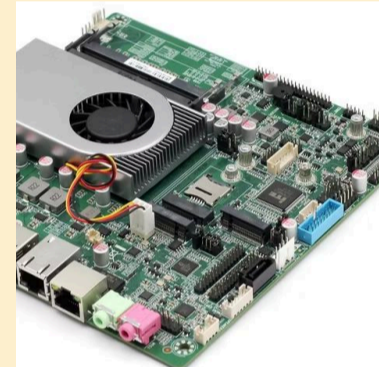
Wireless charging module: Taking into account both functional practicality and industrial aesthetics.



Battery: 7 days of ultra-long battery life in typical application scenarios. meet the power supply needs of continuous monitoring equipment.

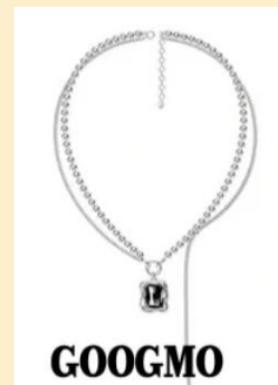
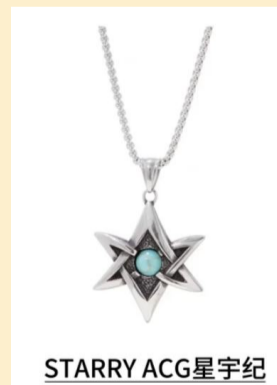


IoT communication: Ensure that the signal can be received in complex environments, and low energy consumption



Mainboard: Achieving full function integration within a limited space to ensure stable system operation.

Gender Neutral Design



→ Design

→ Brand

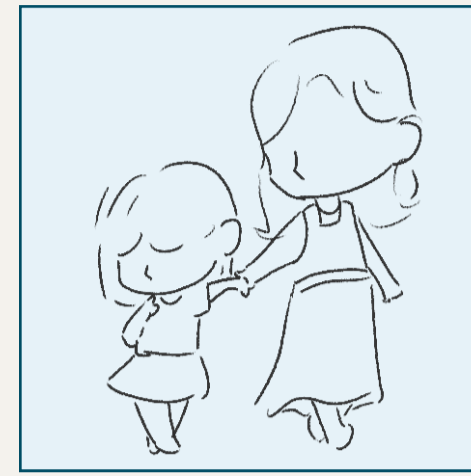
Design features: Most designs use metal to surround gemstones

Shape: No gender preference, mostly simple geometric shapes, such as rectangles, circles, hexagonal stars, etc.

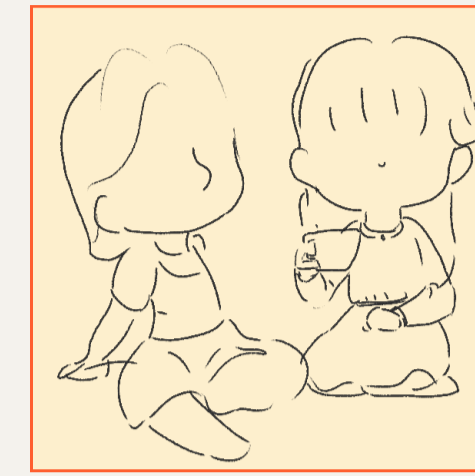
Pendant color: Basically the color of the gemstone and the metal, mostly silver and blue.

Development

Family



Friends

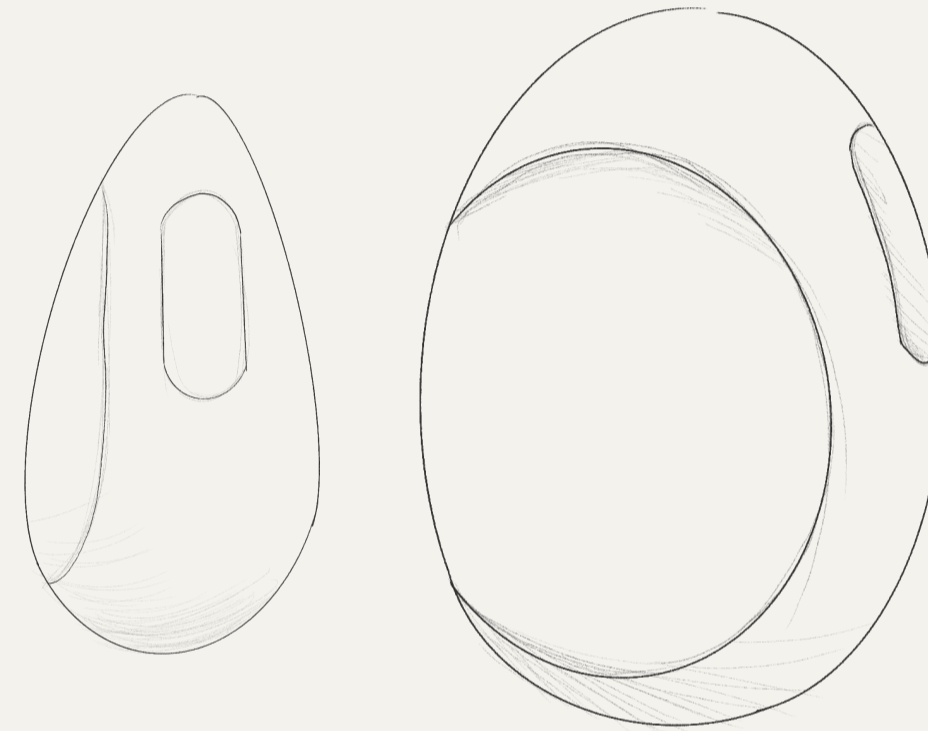


Persona II

According to the feedback, the target users can be

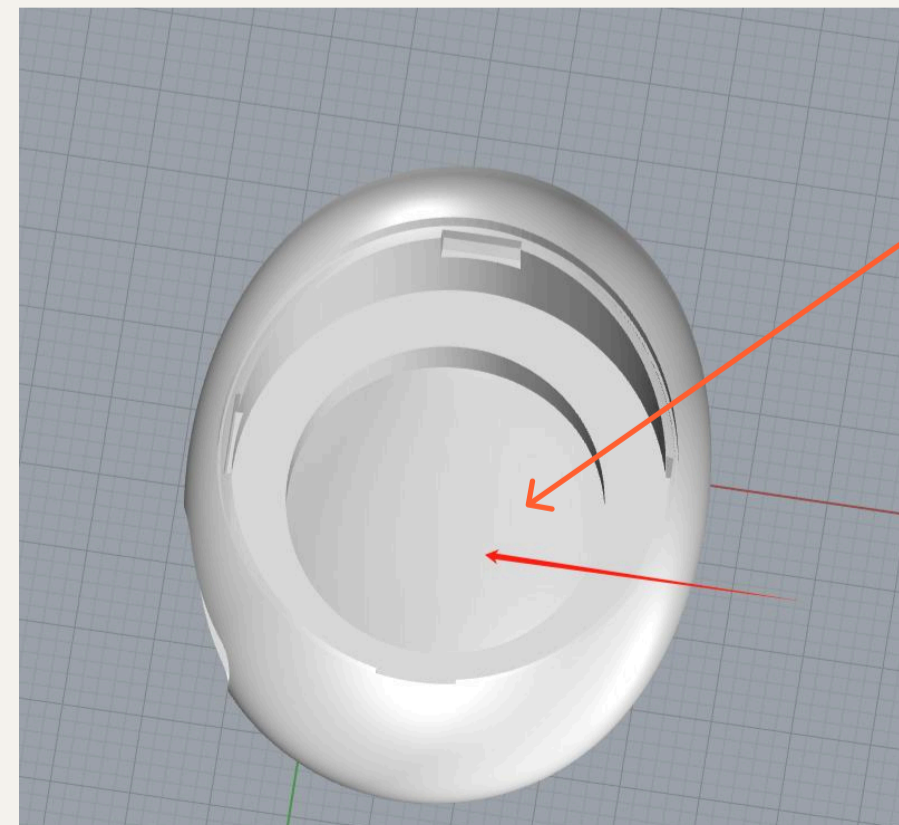
- Couples who are in a **long-distance relationship**, generally students and workers aged 18-25.
- **Family members**, parents and children, brothers and sisters who are in different places
- **Friends** who are in different places
- Among **international students**

Sketch



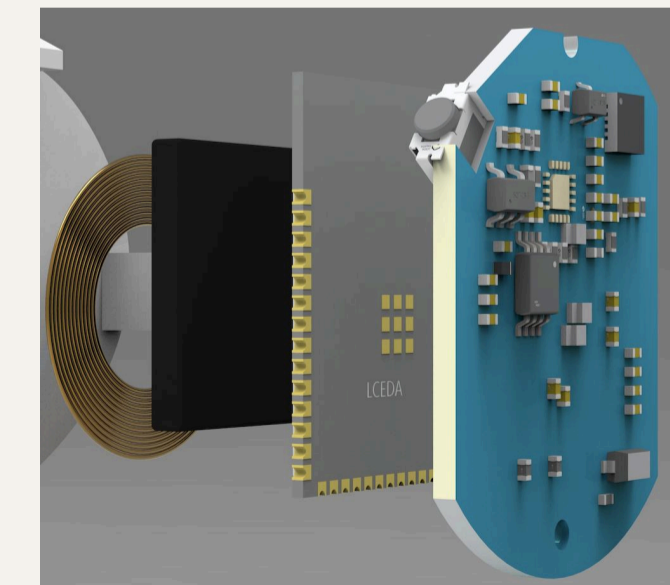
- According to the professor's suggestion, I designed it into a **customizable style**, with an oval gemstone core and silver wire (iron wire was used in the prototype, and silver wire may be considered in the future) wrapped around the outside to form a shape instead of the previous heart shape. This is more suitable for **various situations and genders**.
- Choosing the shape of oval gemstone: The rounded corners are softer, expressing the **feeling of missing** in a gentle way rather than sharp.

Design



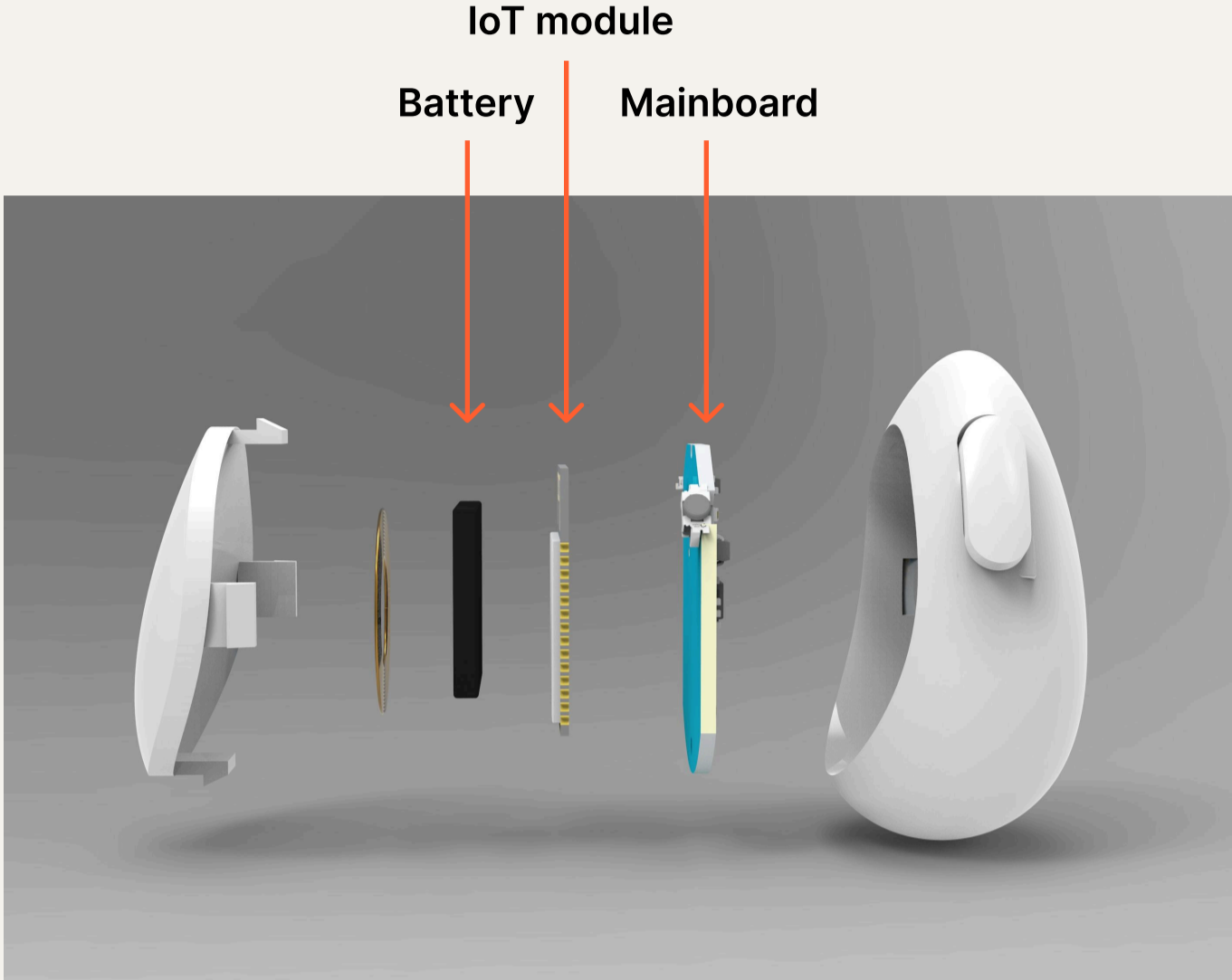
Parts of the design are thinned to increase light transmittance while avoiding being completely transparent so that users can see the chip.

Material



Based on the engineer's advice, the internal parts will be replaced with the modules he suggested to better showcase my design.

Engineering drawings



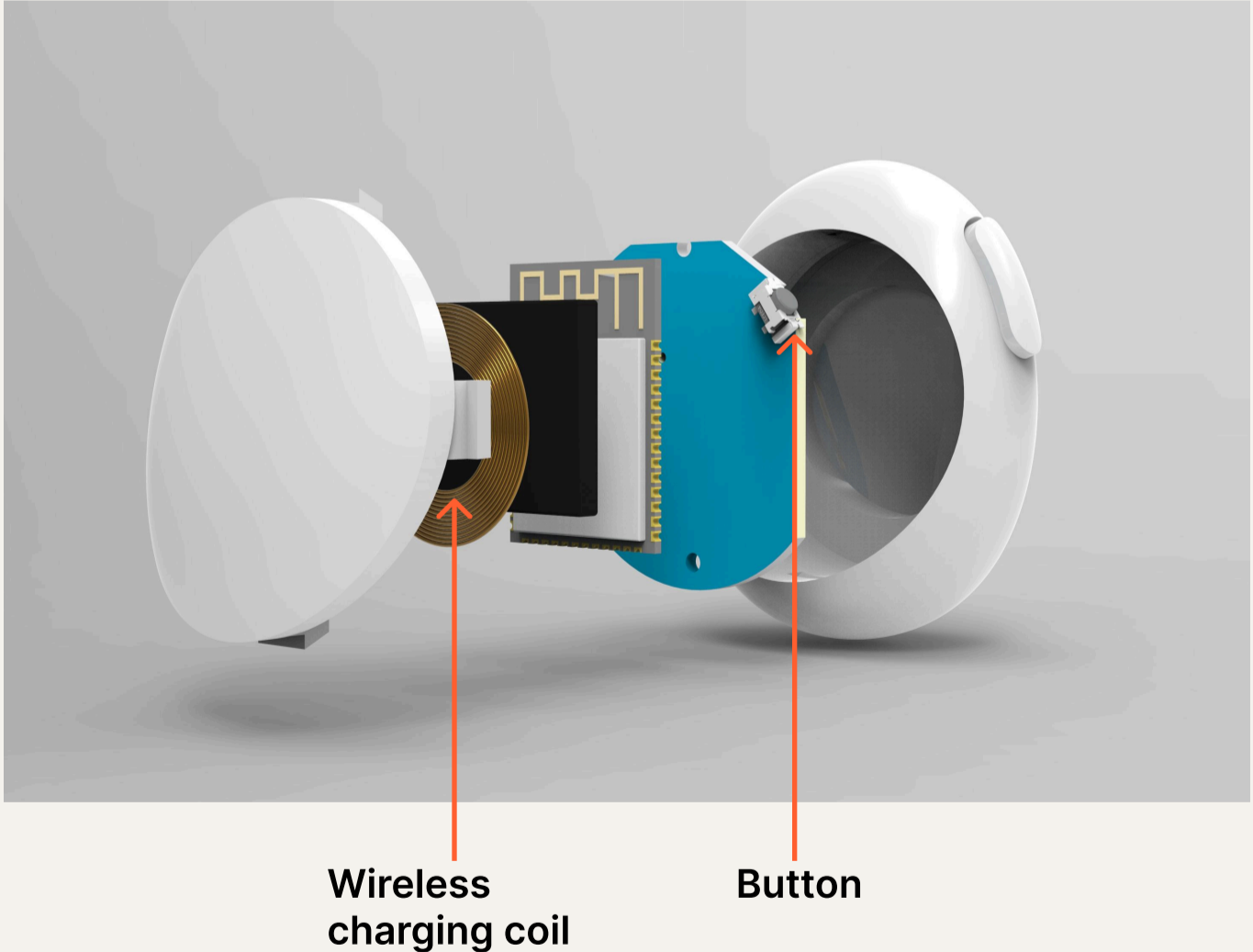
Small battery but can last **7 days** on a single charge

Use IoT, **cheap**, **unlimited locations**, anytime, anywhere, **low energy** consumption

Buttons, power supply needs to go through the **mainboard**

Choose to use buttons so that there is **clear interaction feedback**

Wireless charging can **save space**



In order to ensure that my idea was feasible, I found a **professional structural engineer** to help me draw the engineering drawings and change some accessories to more suitable ones (the **pressure sensor was changed to a button**).

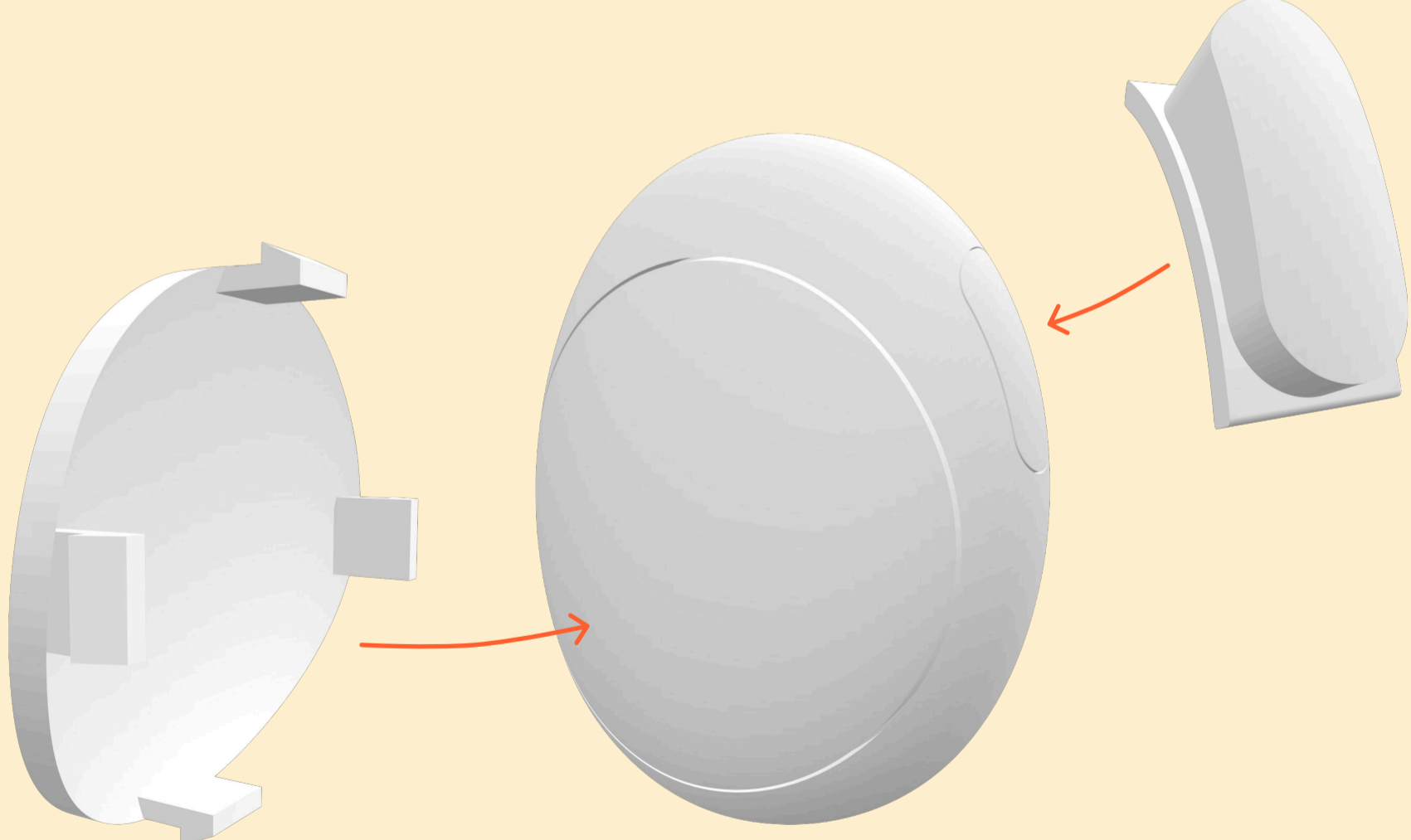
Modeling

Size



The pendant is **small enough** and **light enough** to carry around, and the user won't feel tired when they hang it around their neck. It is also convenient for users to choose their favorite style for **customization**

Effect + Installation Diagram



The snap-on design **reduces material contamination** (such as metal contamination caused by screws) and makes it easy for facilitates maintenance.

3D Printed



I 3D printed this model so I could see the actual size and the real image.



This is a back panel that is sealed with waterproof glue, so it won't short-circuit. Even if it breaks, it can still be used as a decorative item because of its shape.



This button part was not printed out, there was not enough time to find a button of the right size for installation and testing. I need to pay special attention to this next time I do a project.

Conclusion

- This time I tried resin, which has a relatively high hardness and is reflective, with smooth surface. I can consider painting it in different colors for "DIY".
- In the future, I can try - frosting material, printing in different colors, translucent materials, and softer materials.

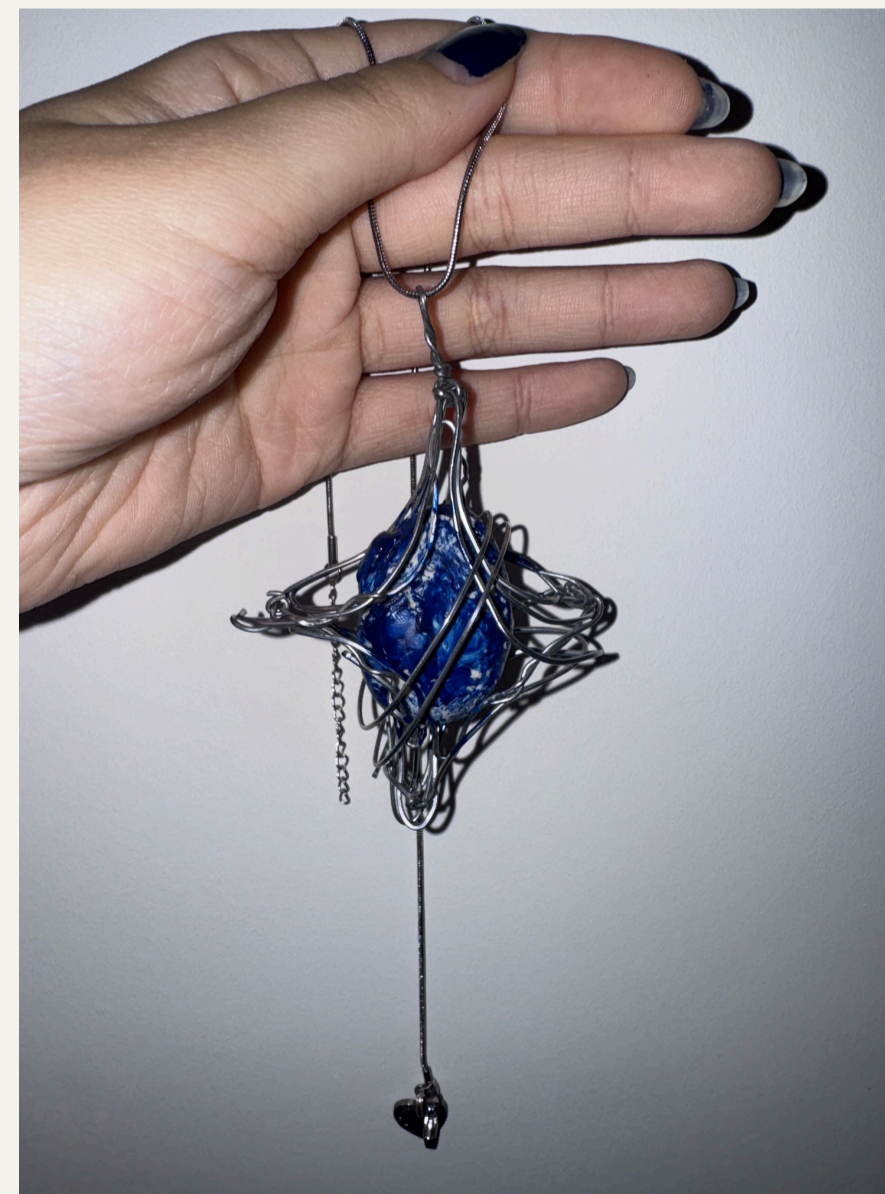
Finial



I chose the **star shape** because it is a neutral shape that can be worn by both **men and women**, and can be worn by **any age** (parents, children, peers).



I chose blue partly because I learned from other designs for **gender neutral** are mainly blue, and another reason is that the starry night is blue, dark blue. Like the color of the **starry sky** when you look up at it when you miss someone.

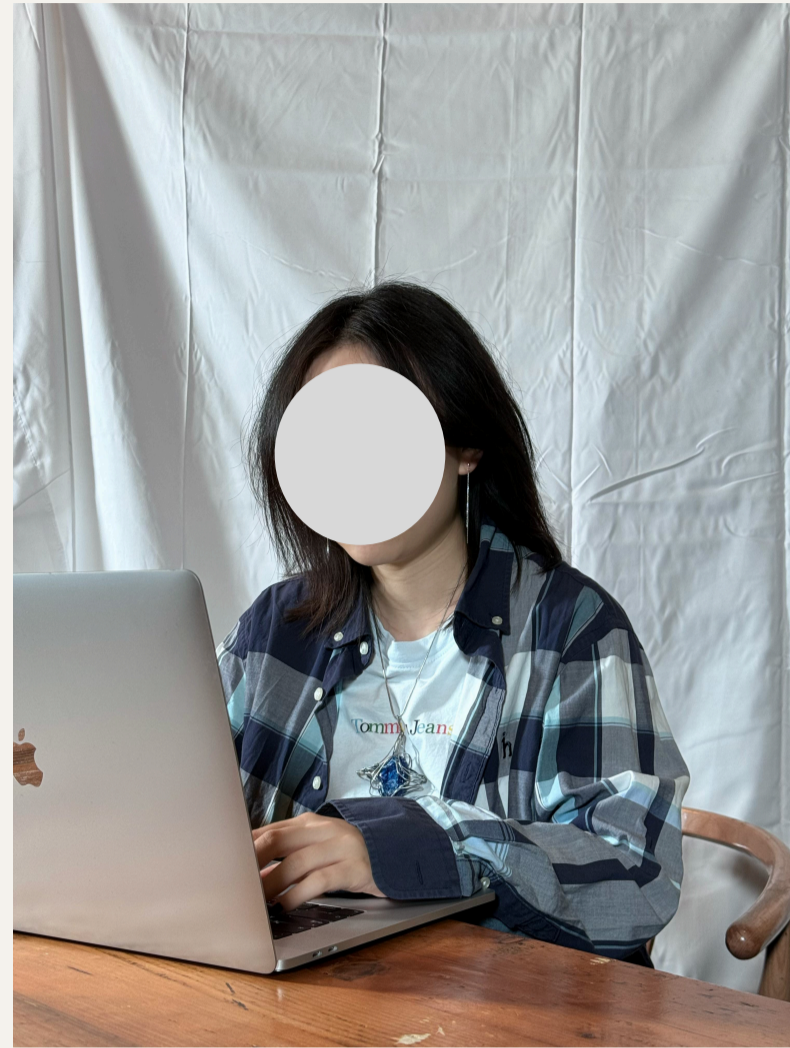


I chose to learn from other designs and use **silver wire** (will be replaced with silver wire to avoid rust) to wrap the shape. This gives users room to **customize** the appearance.



Story Board

Necklaces can be used between couples, friends and family



Working..., Oh I miss him/her!

The necklace can be used in different scenarios, such as when you are working and thinking about each other.



Click, I hope he/she could know my feeling

You just need to press the button on the necklace

Lover

Friends



Opening the door... The necklace glows

The signal will be sent to the person who matches your necklace regardless of time and place.



Oh! she is missing me

At this time, his necklace will light up, and he will know that you are missing him



Taking a call... The necklace glows

This pendant's luminous silent reminder method can avoid disturbing the other person while still attracting the other person's attention.



Oh! she is missing me

"When the light speaks what the heart feels"

Bibliography

Bond Touch® (2025) Bond Touch® Official [online]. Available at: <https://bond-touch.com/> (Accessed: 2 Apr 2025).

Creative Conscience (2025) Awards [online]. Creative Conscience. Available at: <https://www.creative-conscience.org.uk/awards/> (Accessed: 18 March 2025)

FeelHey® (2025) FeelHey® Official [online]. Available at: <https://feelhey.com/> (Accessed: 2 Apr 2025).

Holtzman, S., Kushlev, K., Wozny, A. and Godard, R. (2021) Long-distance texting: Text messaging is linked with higher relationship satisfaction in long-distance relationships, *Journal of Social and Personal Relationships*, 38(12). doi: 10.1177/02654075211043296. [online] Available at: <https://pubmed.ncbi.nlm.nih.gov/34924671/> (Accessed: 3 Apr 2025).

Papani, R., Li, Y. and Wang, S. (2024) Soft mechanical sensors for wearable and implantable applications, *WIREs Nanomedicine and Nanobiotechnology*, 16(3): e1961. doi: 10.1002/wnan.1961.

Polanski, M. (2024) Surprising Long Distance Relationship Statistics – LDR 101 [online]. LuvLink. Published 30 September 2024. Available at: <https://www.luvlink.com/blogs/news/surprising-long-distance-relationship-statistics-ldr-101?srsId=AfmBOorGA8hKVI6lSk6eN5q1CSPfGjPZyKdFNB70pcRft4ditQie2Ynq> (Accessed: 3 Apr 2025).

Survive LDR (2023) Long Distance Relationship Statistics 2023 – What You Need to Know [online]. SurviveLDR. Available at: https://survivedr.com/long-distance-relationship-statistics/?utm_source=chatgpt.com (Accessed: 3 Apr 2025).

Velos IoT (2025) A comprehensive guide to everything you need to know about IoT SIMs [online]. Velos IoT. Available at: <https://info.velosiot.com/a-comprehensive-guide-to-everything-you-need-to-know-about-iot-sims> (Accessed: 2 Apr 2025).

Appendix

Appendix 1 Time table

Time	Goal
2/20 - 3/17	Collect ideas extensively, explore directions and briefs
3/18 - 3/23	Finalize the project direction based on conversations with teachers
3/24 - 4/11	Take a holiday and complete all online research
4/12 - 4/26	Proof of concept and preliminary prototype production, collect feedback
4/27 - 5/10	Production of high-fidelity presentation content
5/11 - 5/21	Final submission & completion

Appendix 2 Feedback from engineers (Original version)

无线充电模组：

采用 Qi 标准无线充电方案，实现无触点式便捷充电。通过一体化无缝设计，消除传统充电接口对产品外观的割裂感，使设备表面形成完整流线型结构，兼顾功能实用性与工业美学表现。

电源管理系统：

搭载低功耗电源管理芯片与高密度锂聚合物电池，在典型应用场景下可实现 7 天超长续航能力，配合智能休眠模式可进一步延长待机时长，满足持续监测类设备的供电需求。

物联通信单元：

采用双模自适应通信架构，兼容 NB-IoT 窄带物联网与 4G LTE Cat.1 通信协议。通过智能信号择优算法，在保障低功耗特性的同时实现基站无缝切换，确保复杂环境下仍能维持 -110dBm 以上的接收灵敏度。

核心控制主板：

基于高密度 SIP 封装技术，集成 4 微控制器、机械按键单元、无线充电管理 IC 及可编程 RGB 灯效系统。板载空间利用率达 92%，在有限的封装尺寸内实现全功能整合，确保系统稳定运行。