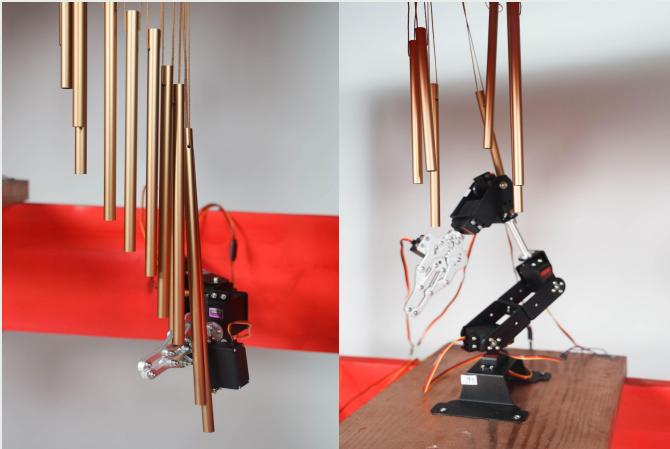


Chime of the Hidden Pulse



Inspiration

Technology



Tradition



Combining the traditional act of striking a wooden fish with modern technology, this work makes the invisible inner world visible through mechanical arms and wind chimes.

Concept

Why Robotic Arm?

In religious activities, striking the wooden fish is a rhythmic and contemplative gesture. We chose a robotic arm to respond to the user's striking motion, **preserving the formal quality of the "ritualistic act"** while also **highlighting the interactive logic between human and machine** through mechanical movement. The robotic arm symbolizes a modern technological reinterpretation of traditional ritual—serving as a mediator that connects human action with the underlying “divine” sound.

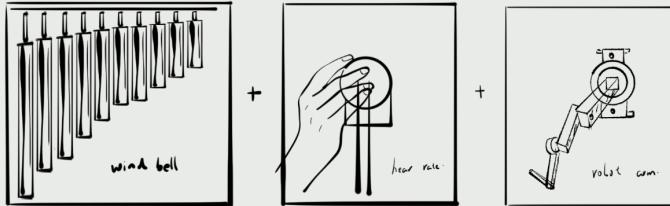
Why Wind Chime?

The sound of wind chimes is spiritual and ever-changing, possessing a natural, nonverbal capacity for emotional expression. **Through their resonant rhythms, we transform cold heart rate data into a sensuous auditory experience.** Unlike musical instruments, wind chimes are not precisely controllable—they sound only when moved by the wind. Just like a heartbeat, they are involuntary yet perceptible and amplifiable. By leveraging the “naturalness” of wind chimes, we imbue physiological signals with a sense of ritual.

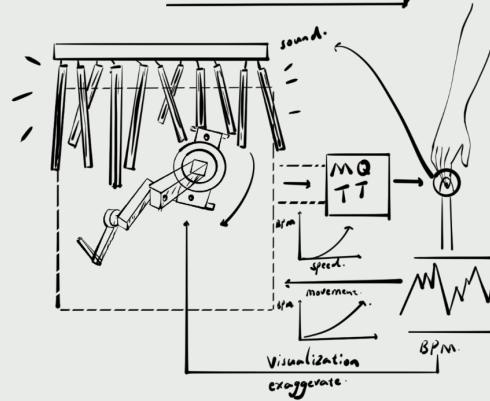
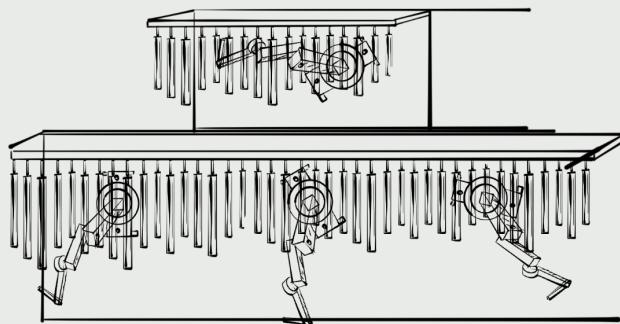
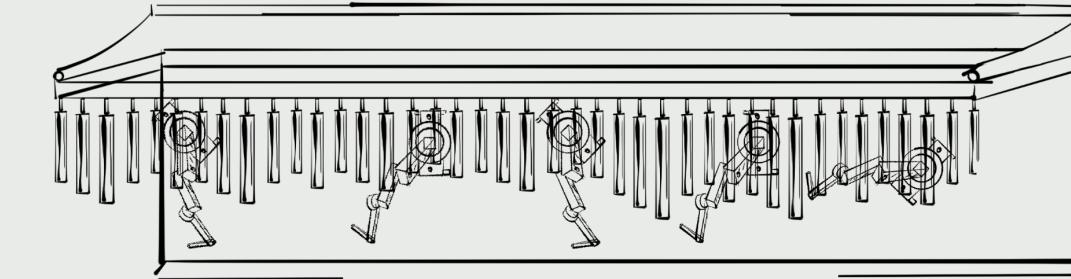
Why Heart Pulse?

The heartbeat is the most direct and emotionally charged physiological signal. It truthfully reflects a person's mental state—whether tense, calm, excited, or sad—serving as a mirror of both emotion and life. **On a technical level, heart rate can be measured with precision; on a spiritual level, it symbolizes the “movement of the heart.”** This dual nature makes it an ideal medium. In this project, heartbeat data becomes the core of sonic expression, forming a closed loop of internal perception → external expression → environmental resonance.

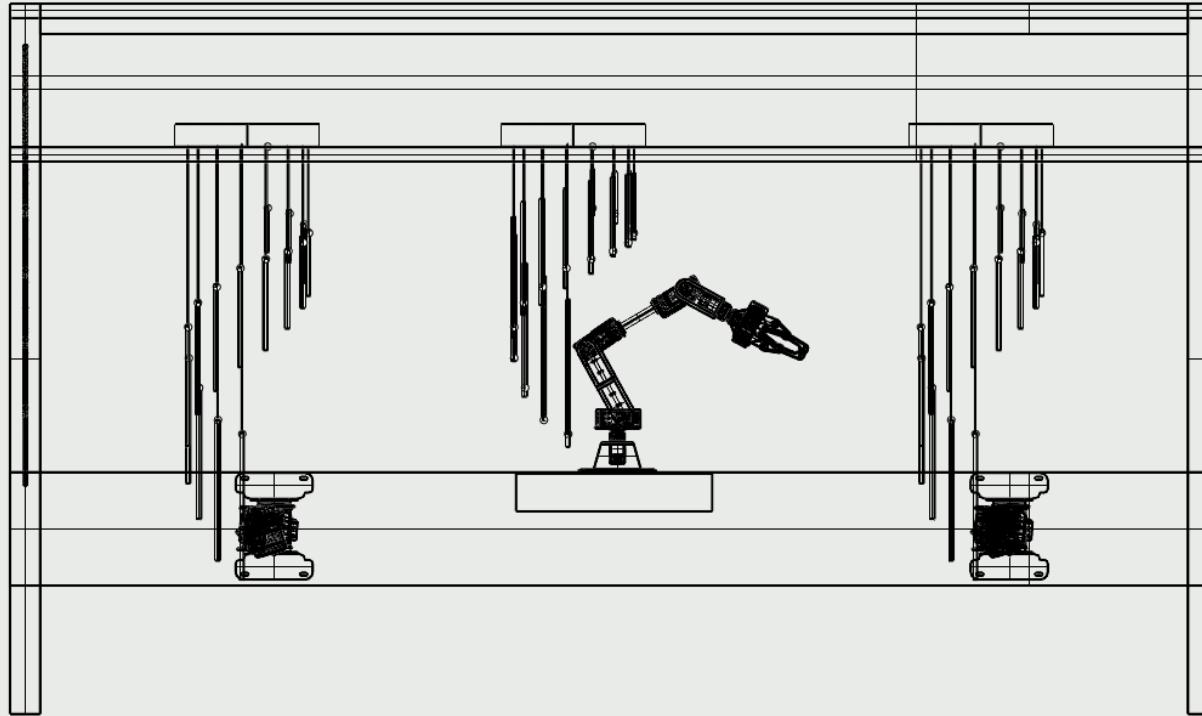




sketch

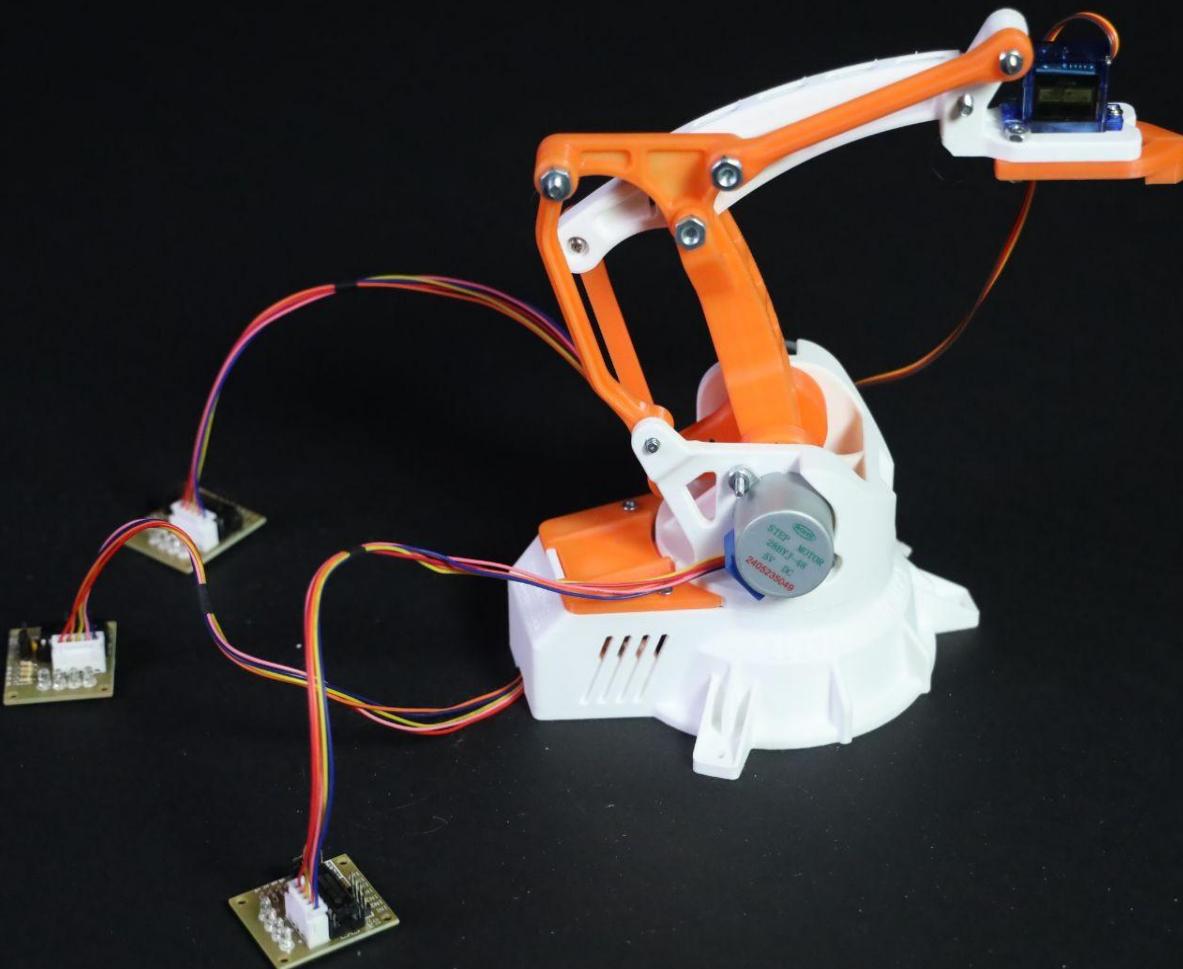


Model Design



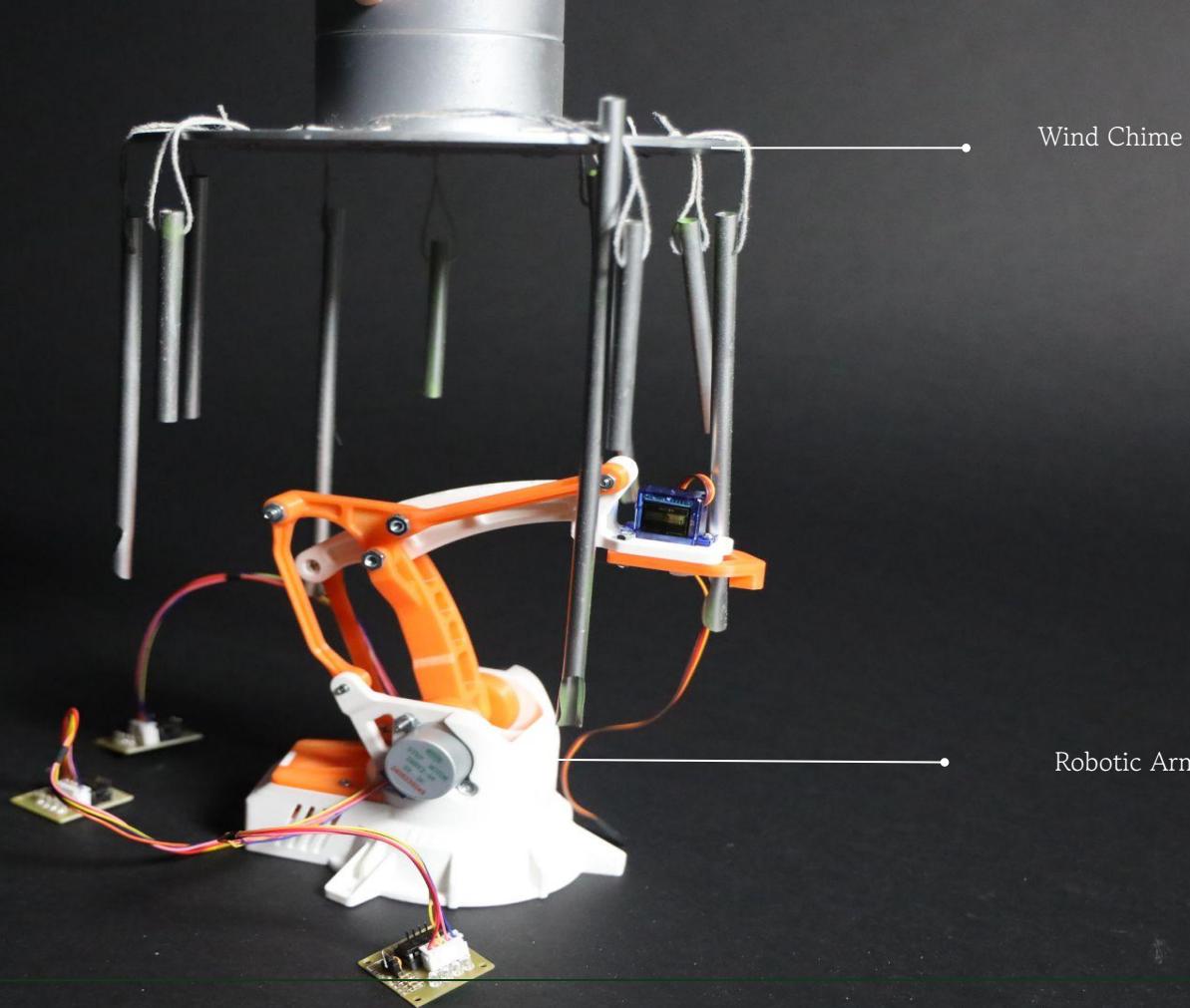
Chime of the Hidden Pulse

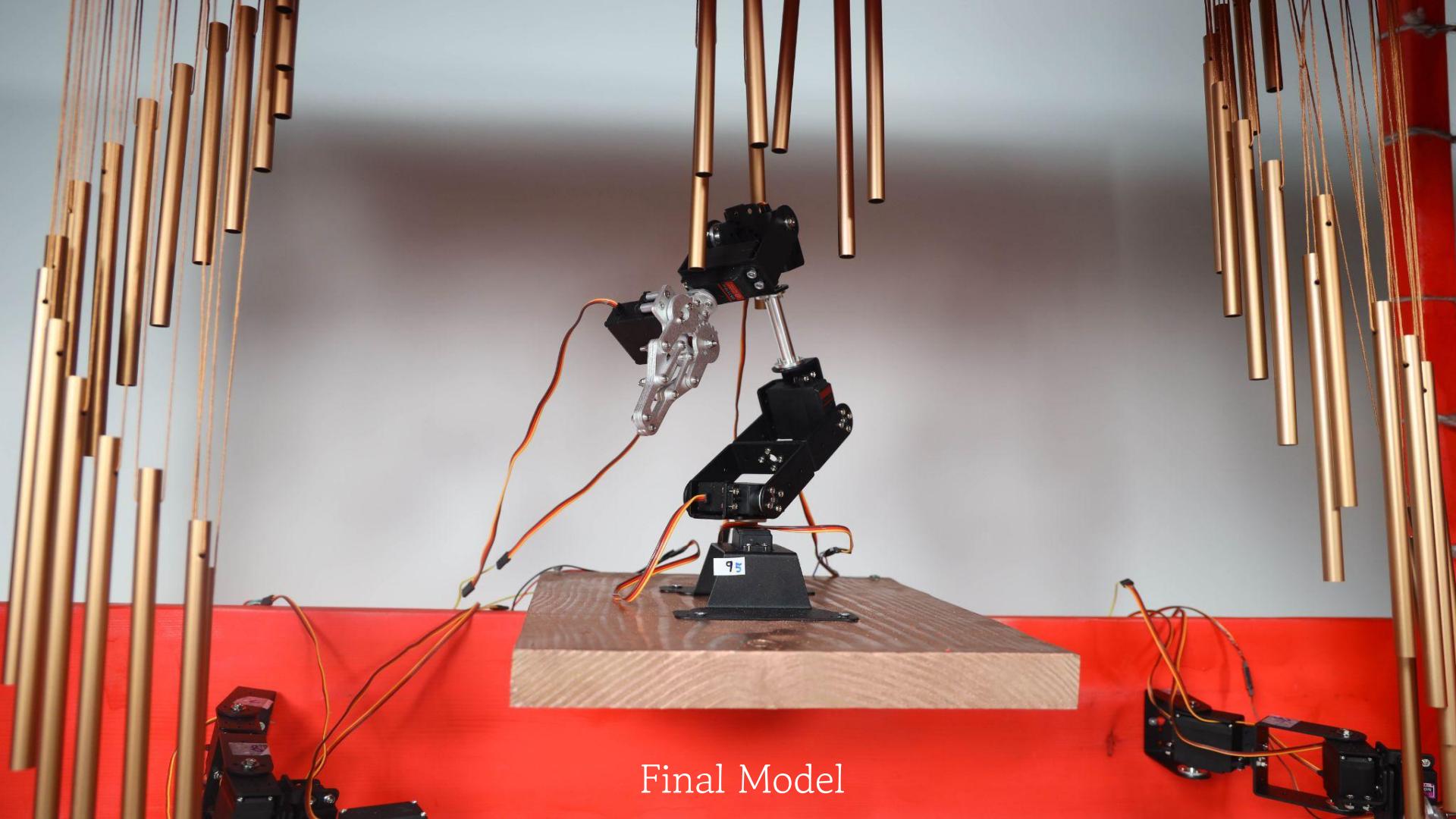
Diyu Zhou
Wingsze Zheng
Shuhan Liang



Prototype

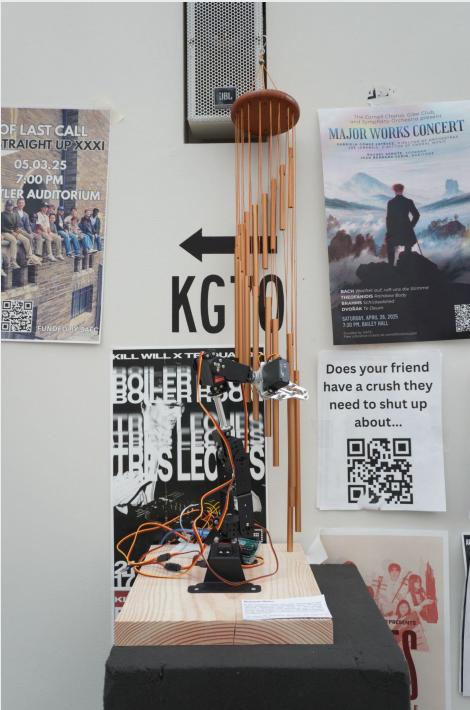
Prototype





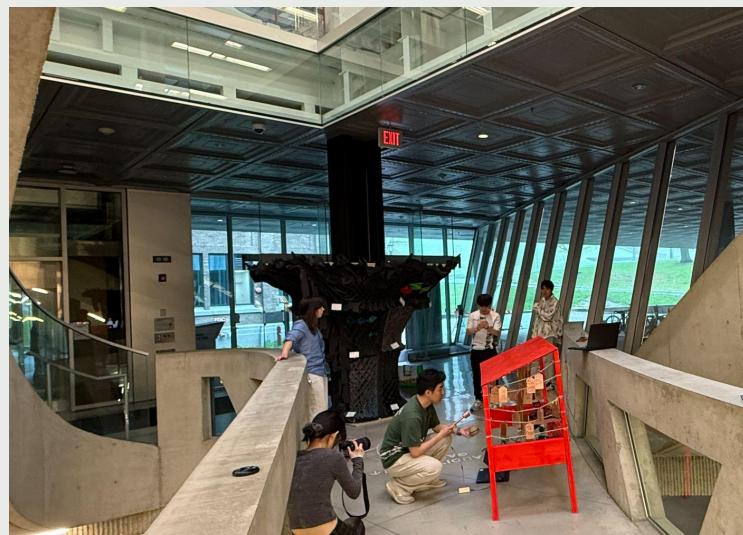
Final Model

Initial Simulation



Test the mechanism and reactions of viewer

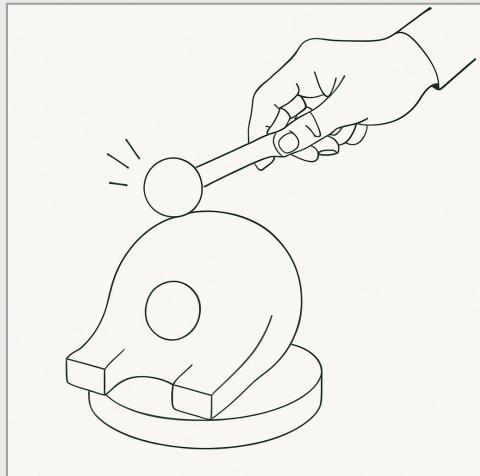
Site



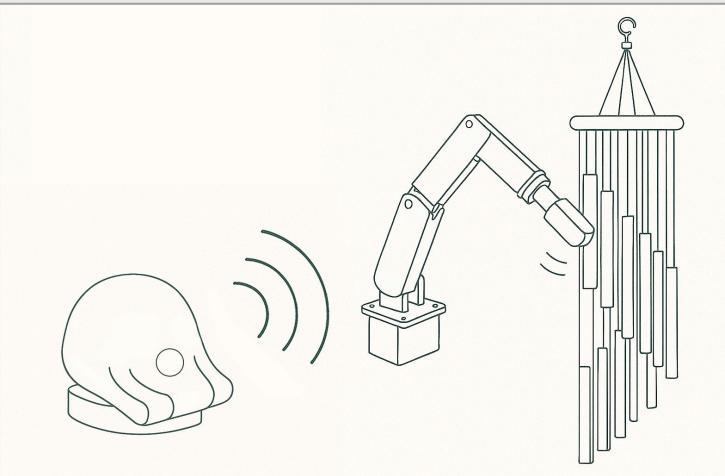
Entrance of Milstein Hall: (1)In front of Auditorium and AAP Gallery , it is the convergence of secular and non-secular spaces; (2) A large circulation of people to interact with.

Storyline

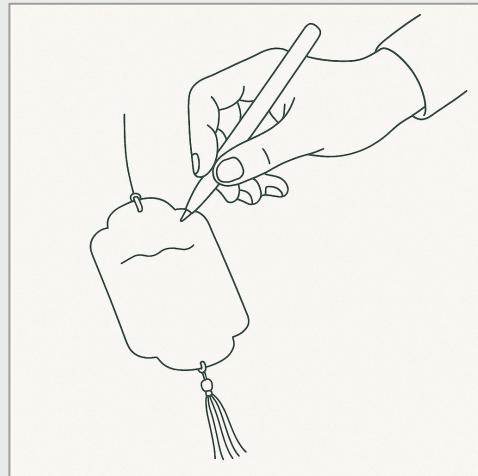
... invites participants on a journey of mindfulness and self-reflection through interactive rituals



Knocking the Wooden Fish:
(Heart Pulse Sensor Detecting)

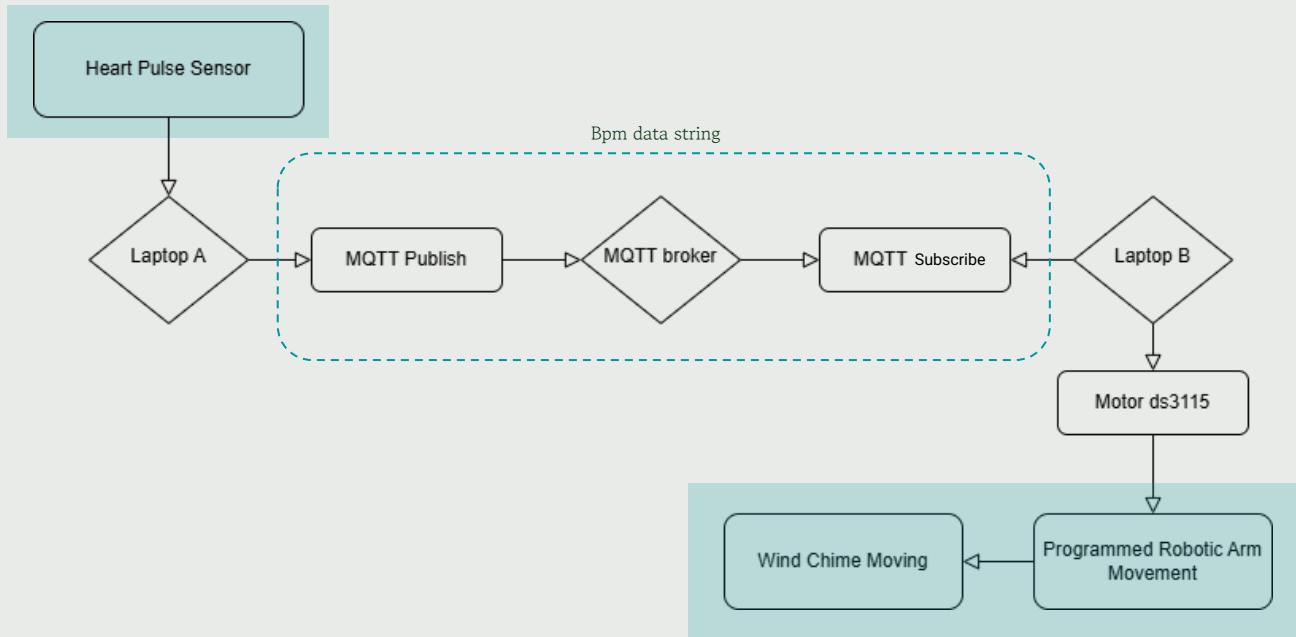


Heart Pulse reflected on the sound of wind chimes

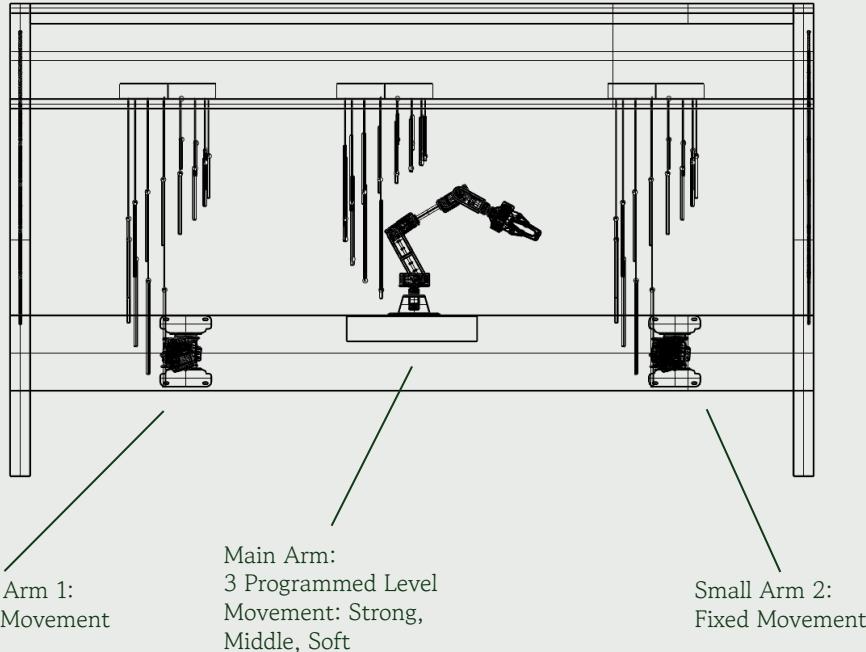


Mindfulness Reflection
(Make a wish or ask for a
fortune)

MQTT Workflow

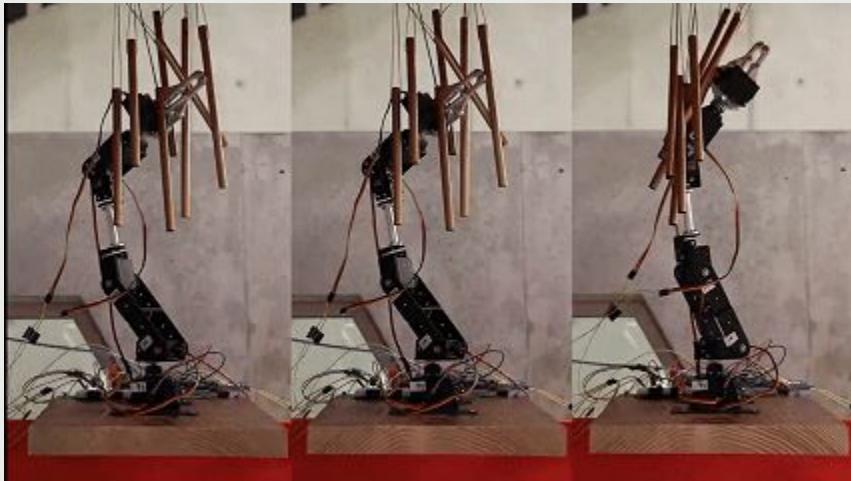


Programmed Robotic Action



BMP	Effect	Stroke
< 60	10 Seconds: Very slow, soft strokes, like a gentle breeze	Slight single axis tapping (such as Z-axis up and down)
60 ~ 70	8 Seconds: Gradually quickening rhythm	Multi axis coordinated motion (such as XY+Z stretching strike)
> 70	5 Seconds: Strong, short, and intense beats	Quickly swing and add a rotating axis (such as XYZ+Roll)

Programmed Robotic Action



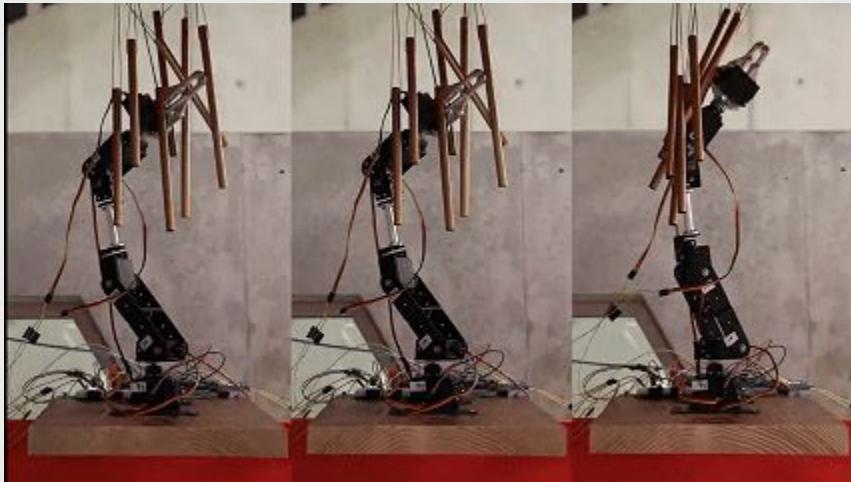
Phrase 2: Normal

8 Seconds: Gradually quickening rhythm	Multi axis coordinated motion XY+Z stretching strike
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transitionSmooth = 0.05;

amp1 = 60, amp2 = 0, amp3 = 50, amp4 = 20;

Programmed Robotic Action



Phrase 1: Slow

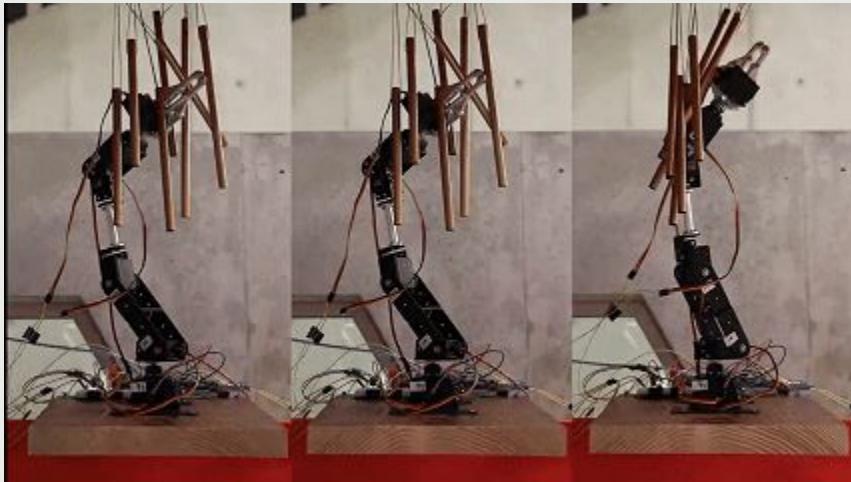
10 Seconds: Very slow,
Soft strokes, like a gentle
breeze

Slight single axis tapping
Z-axis up and down

`transitionSmooth = 0.03;`

`amp1 = 70, amp2 = 30, amp3 = 20, amp4 = 50;`

Programmed Robotic Action



Phrase 3: Fast

5 Seconds:
Strong, short, and
intense beats

Quickly swing and add a
rotating axis
XYZ+Roll

transitionSmooth = 0.01;

amp1 = 50, amp2 = 40, amp3 = 50, amp4 = 40;



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What We Learnt

Interdisciplinary Integration: How to combine traditional rituals (wooden fish, prayer) with modern physical computing and robotics.

Sensor-Driven Interaction: Using biometric data (heart rate) to generate responsive motion and sound.

Collaborative Workflow: Learned how to divide tasks efficiently within a multidisciplinary team (coding, prototyping, design, storytelling).

User Empathy: How to design experiences that evoke emotional and spiritual resonance in public spaces.

Limitation & Further Exploration

Limitations

- Wind chime placement is sensitive to environment noise and airflow.
- Robotic movements could be smoother and more fluid.

Future Exploration

- **Multisensory Enhancement:** Integrate scent, light, or projection for a fuller immersive experience.
- **Expanded Ritual Logic:** Include more bodily sensors or cultural gestures (e.g. bowing, incense lighting) as input.