# parasitic

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## 1 Program Notes

“parasitic” is an improvised physical performance that generates movement and sound through the use of a parasitic relationship. The performance is structured around the relationship between a parasite, who intervenes in movement by operating another person’s wearable device, and a host, who responds to that intervention. Through this relationship, movement and sound are generated in a bottom-up manner. The host wears a specially designed suit from which a rod approximately 80 cm long extends from the chest. This rod is composed of three servo motors and two short rods, and it moves according to the parasite’s control.

By manipulating the rod, the parasite interferes with the host through actions such as “attacking” or “entangling,” thereby presenting a constant physical threat. In response, the host engages in actions such as anticipating the attack, bracing the body, or avoiding the movement. New movements continuously emerge during the performance, shaped by factors such as the host’s reflexes, physical ability, prediction, fatigue, and the evolving relationship between the performers.

All sounds in this work are generated from the host’s bodily movements. Contact microphones attached to the host’s suit capture sounds produced by physical motion, which are then processed and output. In addition, electronic sounds are generated based on data from a gyroscope sensor mounted on the host’s chest. Through this process, changes in the host’s posture are expressed as sound.

Acts such as avoiding attacks and predicting incoming interference—actions that arise directly from the parasitic relationship—are reflected in the host’s movement and transformed into sound. By utilizing the dynamics of parasitism as the core structure of performance, “parasitic” presents a new form of improvised expression.

## 2 Project Description

This section details the system architecture and performer roles of "parasitic." The parasite controls all device movements; the host's bodily responses generate all sounds. No algorithmic processes intervene—the performance outcome is entirely shaped by the two performers. Yet the result is far from predictable: fatigue, reflexive limits, and shifting anticipation produce movements that neither performer can fully foresee, sustaining mutual uncertainty throughout.

### 2.1. Host

The host generates movement and sound by responding to the parasite’s physical interventions. Wearing a rod-like wearable device attached to the body, the host reacts to the physical threats presented by the parasite—such as by evading or anticipating the next



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action. The movements that arise through this process are captured by the system and rendered as sound.

## 2.2. Parasite

The parasite remotely operates a wearable device attached to the host's body. This device moves in close proximity to the host, presenting a physical threat that carries the possibility of collision. The parasite cannot directly control the sound; instead, by manipulating the wearable device, they indirectly intervene in the host's body and shape the development of the performance.

Fig. 1. parasitic

## 2.3. Movement System / Wearable Device

In this system, a dedicated wearable device is used to establish the parasitic relationship between the host and the parasite. The wearable device consists of servo motors, a rod structure, and a wearable structure, each of which serves the following roles.

### Servo Motors

The wearable device is equipped with multiple servo motors, which function as actuators to drive the rod-like structure. Based on control signals from the parasite, the servo motors generate rotational motion, altering the orientation and reachable range of the rod. Each servo motor provides a single degree of freedom, with a rotational range of 270 degrees. By connecting these motors in series, the system as a whole achieves three degrees of freedom.

### Rod Structure

The rod is connected to the servo motors and amplifies their rotational motion into a perceptible physical influence on the host. Its length is designed to maintain a strong presence in close proximity to the host's body while minimizing actual physical contact. Through this structure, small angular changes in the servo motors are translated into noticeable spatial shifts of the rod, which are perceived by the host as distance modulation and physical threat.

### Wearable Structure

The servo motors and articulated rod are integrated into a unified structure using an aluminum plate–based mounting mechanism. This framework is designed to withstand vibration and

bodily movement during performance. The wearable structure adopts a suspender-style harness system and is mounted around the host's chest. This configuration allows the rod to remain in close proximity to the host's body without excessively restricting the host's range of motion.

The wearable device possesses a wide range of motion, and the rod has sufficient length to interfere with various parts of the host's body, including the arms, legs, neck, sides of the torso, underarms, and inner thighs. In response to the host's posture and movement, the parasite can select positions that are difficult to evade or that may induce a sense of threat, strategically choosing points of intervention that effectively generate movement. As a result, variations in the parasite's decisions and patterns of interference produce diverse forms of evasive behavior and postural transformation in the host.

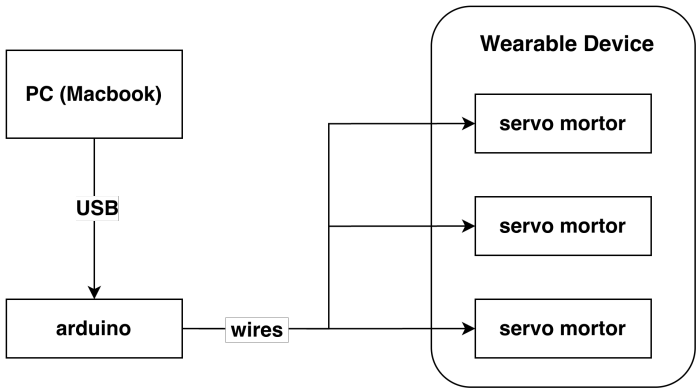


Fig. 2. Movement System Diagram

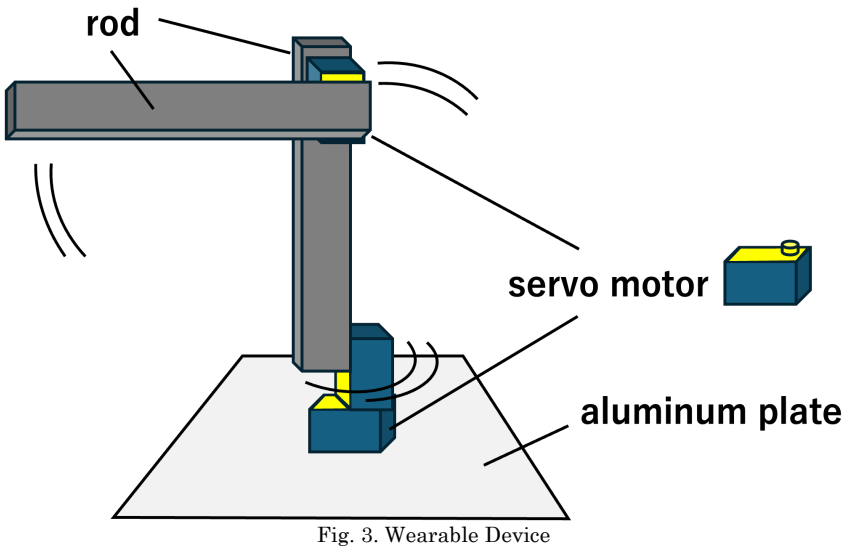


Fig. 3. Wearable Device

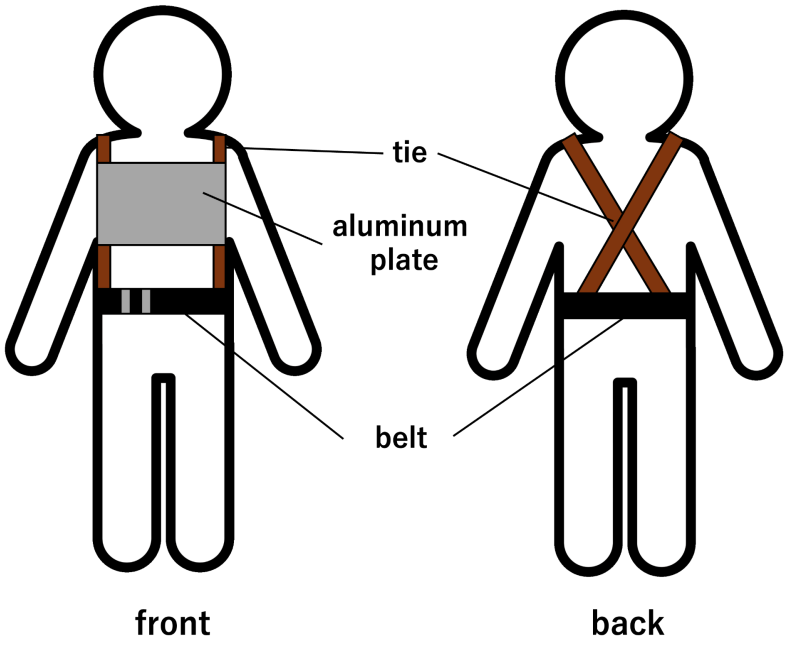


Fig. 4. Wearable Structure

### 2.4. Movement System / Wearable Device

In this system, sound is processed according to the following procedure.

1. **Input**
   A gyroscope attached to the host's chest captures three-axis angular velocity of the upper body. The acquired data are transmitted to a laptop computer via OSC communication. In addition, a contact microphone is suspended from the host's clothing. This microphone captures impact sounds generated by collisions between the body and the floor or clothing, as well as friction sounds produced when the device is dragged across the floor. Through this mechanism, subtle bodily phenomena that cannot be captured by the gyroscope—such as minute shifts in center of gravity and tremors resulting from fatigue—are obtained as audio data.

2. **Sound Processing and generation**
   Using a laptop computer, the microphone input is processed in real time to transform the raw acoustic sound. At the same time, the received gyroscope data are analyzed and used as parameters for generating electronic sound Sound processing and synthesis are carried out as follows.

   **Sound generation based on gyroscope input**
   The angular velocities obtained from the x-, y-, and z-axes of the gyroscope are each mapped to the amplitude of independent percussive pulse sounds, processed through Ableton Live and Max for Live. Each axis is assigned a distinct timbral character—combining different synthesis engines, physical modeling resonators, and spectral processing—so that rotational directions of the host's body are audibly distinguishable. The percussive envelope of each pulse is designed to correspond to the reflexive,

instantaneous nature of the host's bodily responses. When multiple axes are activated simultaneously, the resulting mixture of distinct timbres produces a complex sonic texture that reflects the multidirectional quality of the host's movement. When the host remains still, no sound is produced.

**Contact Microphone Processing**

The sound captured by the contact microphones is processed through multiple parallel channels in Ableton Live, each applying distinct transformations—including pitch shifting, physical modeling resonance, bit reduction, and spectral diffusion with reverberation. These processes preserve the raw, tactile quality of the contact microphone signal while adding timbral complexity and spatial depth. As a result, subtle phenomena emerging within the parasitic relationship—such as anticipatory postural shifts in response to perceived threat, and tremors caused by fatigue—are sonically emphasized.

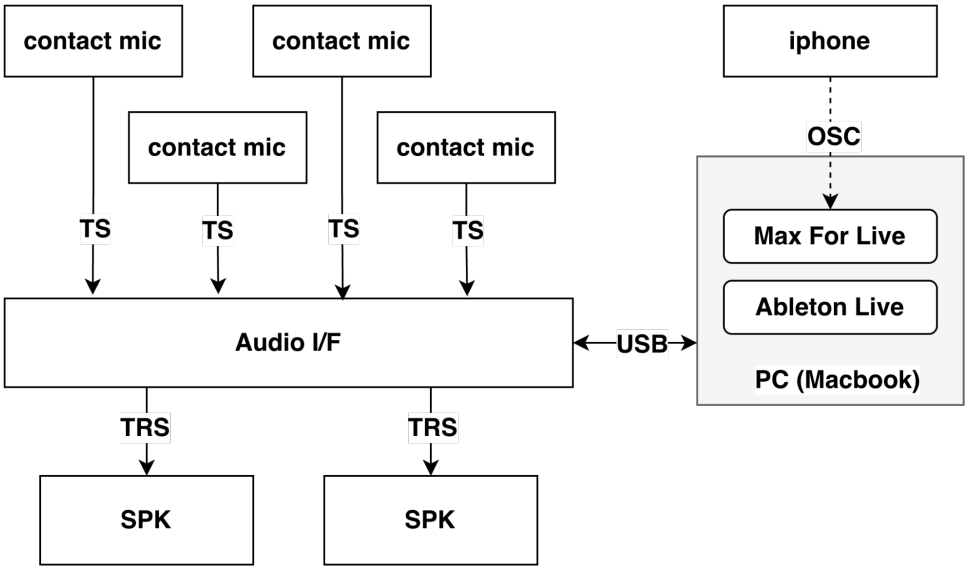


Fig. 5. Sound System Diagram

Table I. Hardware Configuration

| Hardware | Quantity | Note / Purpose |
|---|---|---|
| Laptop PC | 1 | Process Performance System |
| Arduino Leonardo | 1 | Control servo motors |
| TRS Cable | 2 | Connects audio interface to speaker |
| Wearable Device | 1 | Physically interferes with the performer's movement |
| Switching power supply | 1 | Powers the servo motors |
| PA Speaker | 2 | Outputs processed sound |
| Audio Interface | 1 | Inputs contact mic signal and outputs processed audio |
| iphone | 1 | Captures performer's motion via gyro sensor |
| Contact Microphone | 4 | Captures sound from performer's movement |

## 3 Technical Notes

The work is ideally presented on a stage that can accommodate an area of approximately 4 m × 4 m. It can be performed in both indoor and outdoor environments.The optimal performance duration is

between 4 and 7 minutes; however, the length can be adjusted according to the time constraints of the venue or program.
Regarding setup, the system is prepared in advance in a backstage area or wing space, and the equipment is brought onto the stage immediately before the performance. This workflow enables rapid system activation. As most components of the system consist of wearable devices, the work can also be dismantled and cleared quickly after the performance.
The feasibility of the system has already been demonstrated through its exhibition debut at ZOU-NO-HANA FUTURESCAPE PROJECT 2025 in December 2025, confirming that the work can be realized promptly in an exhibition or performance context. In all cases, the production team will make a best-effort response to the given spatial and technical conditions in order to achieve the highest possible performance quality within the provided environment.

## 4 Media Link(s)

- Video: https://youtu.be/TzUkfj8-LF8
- Audio: https://drive.google.com/file/d/1nIV3U-MRCZRyij9hDtd9D54LLV-Ki80M/view

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## Ethical Standards

This work was conducted with careful consideration for the safety and well-being of both performers and audience members. The system was designed to avoid excessive physical strain and minimize the risk of injury. Performers retained the right to suspend or modify their participation at any time. Participation in the performance was entirely voluntary, and no form of coercion or forced role assignment was involved.