

Rhythm Rally: Entertainment Sport Combining Table Tennis and Rhythm Game

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Sports Sensing

Sensors attached to the body and tools

■
Sensing motion

■
Feedback based on sensing data

↓
Utilized for skill improvement
and other purposes

Need device for feedback

Entertainment Sports

Combines elements of sports
and entertainment
example: slipper table tennis



**Extend the entertainment value
of games with another tool**

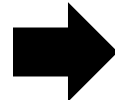
Research combining sports and rhythm games

Combining dribbling and rhythm games
Research aimed at improving rhythm sense in soccer

dribble



rhythm game



game screen

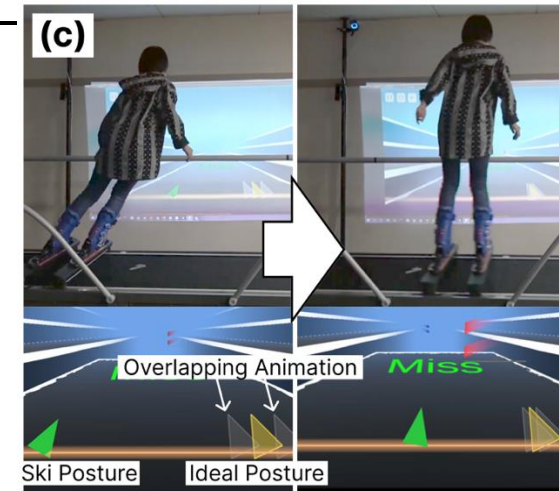


Images captured by a web camera

Tracking ball position with a webcam

Dribbling to music

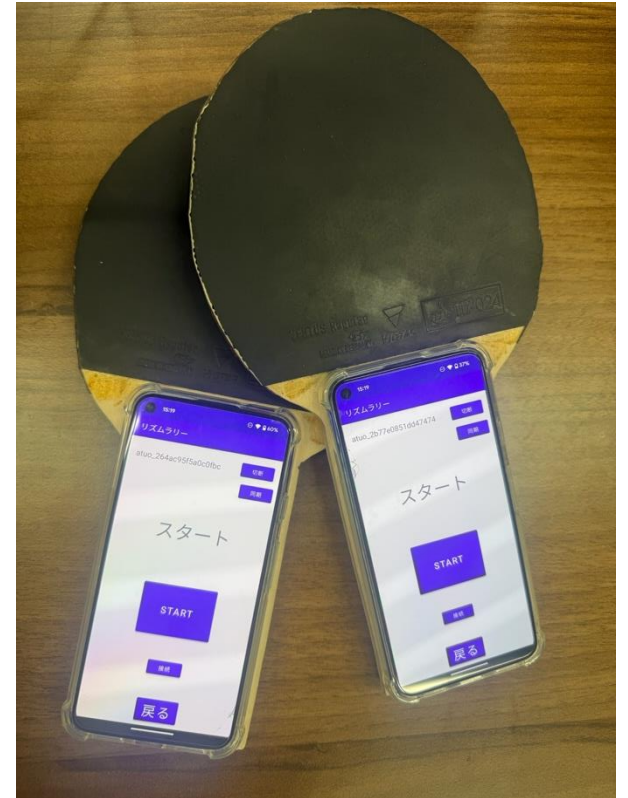
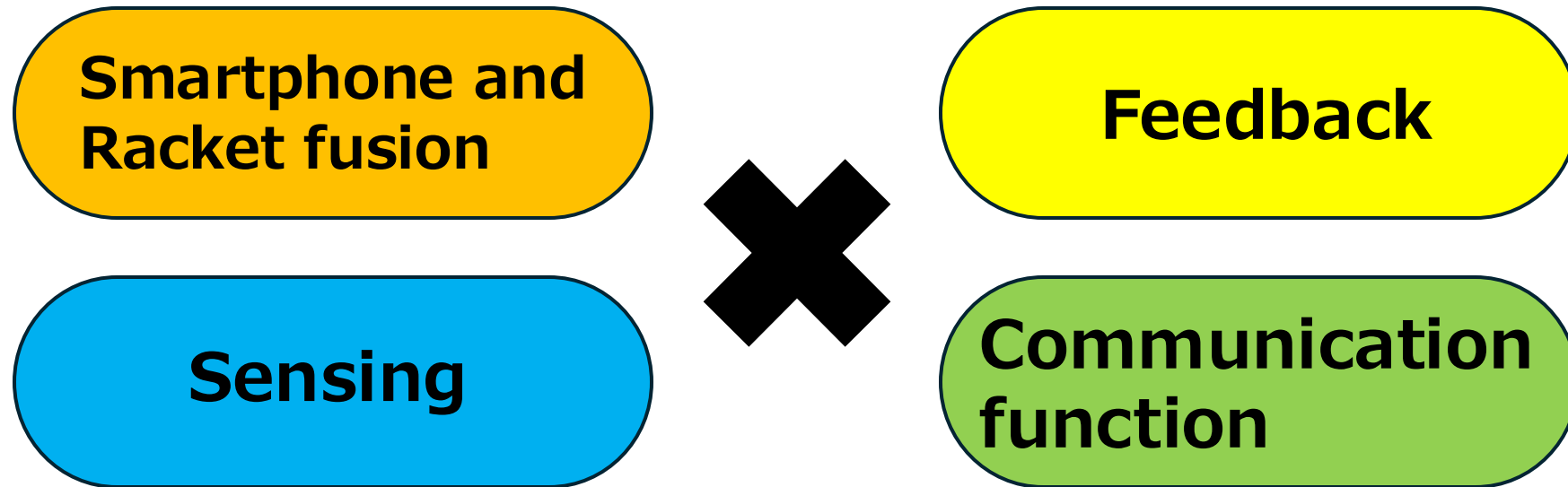
Research combining alpine skiing and rhythm games aims to improve motivation for practice



Measure the angle of the skis as they pass through, the passing position, and the distance to the gate

The fusion of rhythm games and sports enables practice support and improvement of technical skills

Proposal for entertainment sports combining table tennis and smartphones



Combining these elements to offer a wide range of entertainment sports

Implementing feedback that is not possible in actual table tennis by utilizing smartphone functions

Speaker

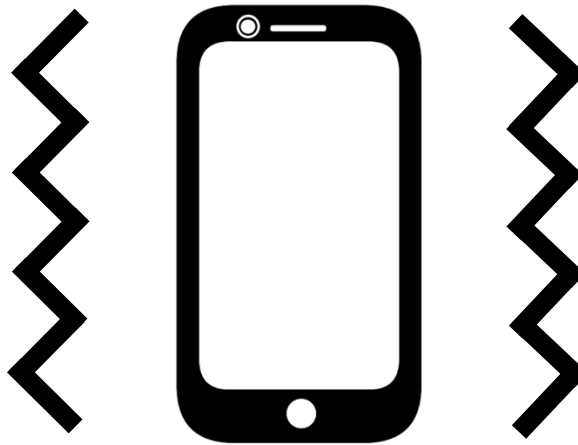
Hearing



rally count
sound effects

Vibration

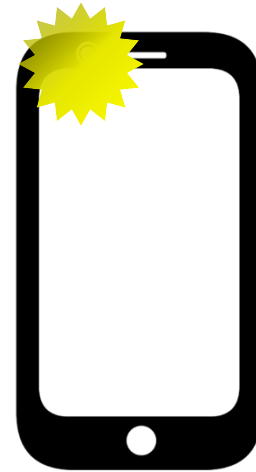
Touch



obstruction

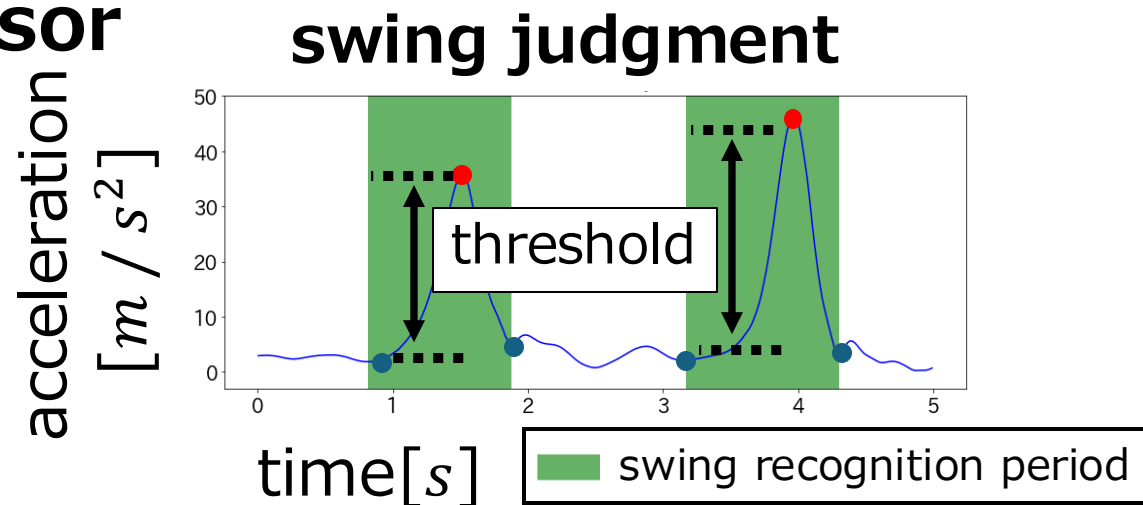
Flash

Vision

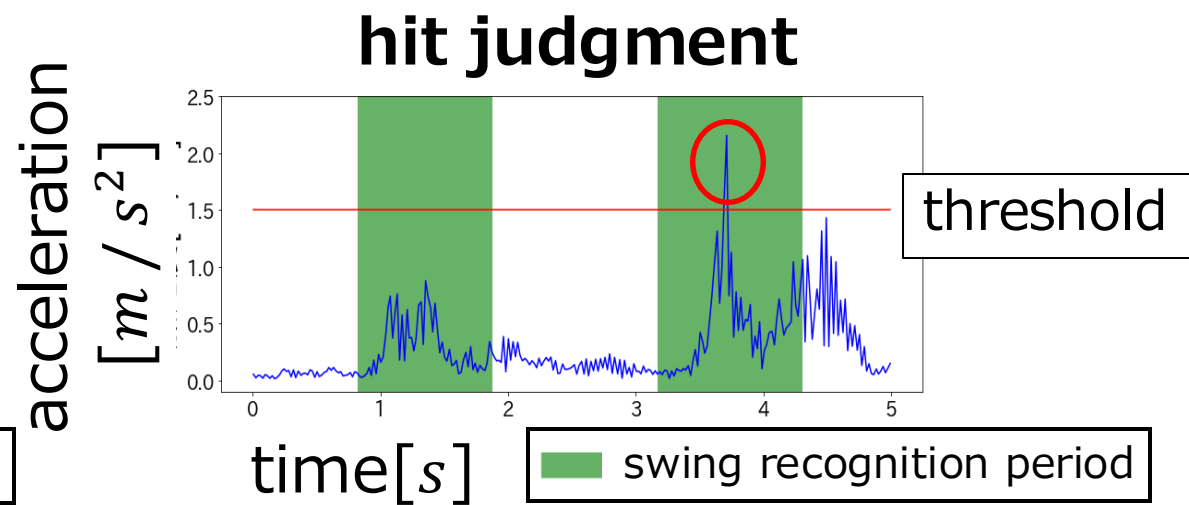


additional effects
for success
obstruction

Acceleration ► Hit: Both swing judgment and actual hit judgment are valid
sensor

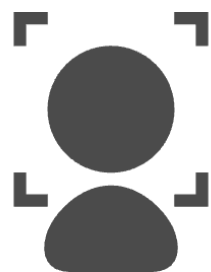


The difference between the maximum and minimum values is greater than the threshold value



Acceleration after high-pass filtering exceeds threshold

Image sensor *face recognition*
object recognition



Points awarded for
Interference due to recognition

Microphone

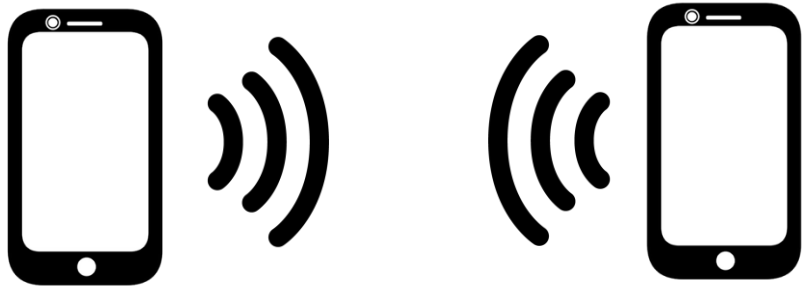
sound recognition



Additional elements based on
Player's voice
ambient sounds

Expanding gameplay through device connectivity

smartphone ✕ smartphone



Cooperative and competitive game modes can be implemented

smartphone ✕ server



Comparison with other users through data visualization

Connecting to external devices via a server

Spectator participation in the game

Created application

7

Implementation of four combinations of various sensors and feedback

	Nabeatsu rally	Shout smash	Facepong	Rhythm rally
racket	wooden monolithic	wooden monolithic	wooden monolithic	wooden monolithic
sensing	acceleration	acceleration microphone	Image sensor	acceleration
feedback	speaker	speaker	speaker	speaker
communication	Yes	Yes	No	Yes
entertainment format	collaborative	collaborative	battle	collaborative practice support

Created application

8

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Count the rally on your smartphone and
read it aloud from the speaker

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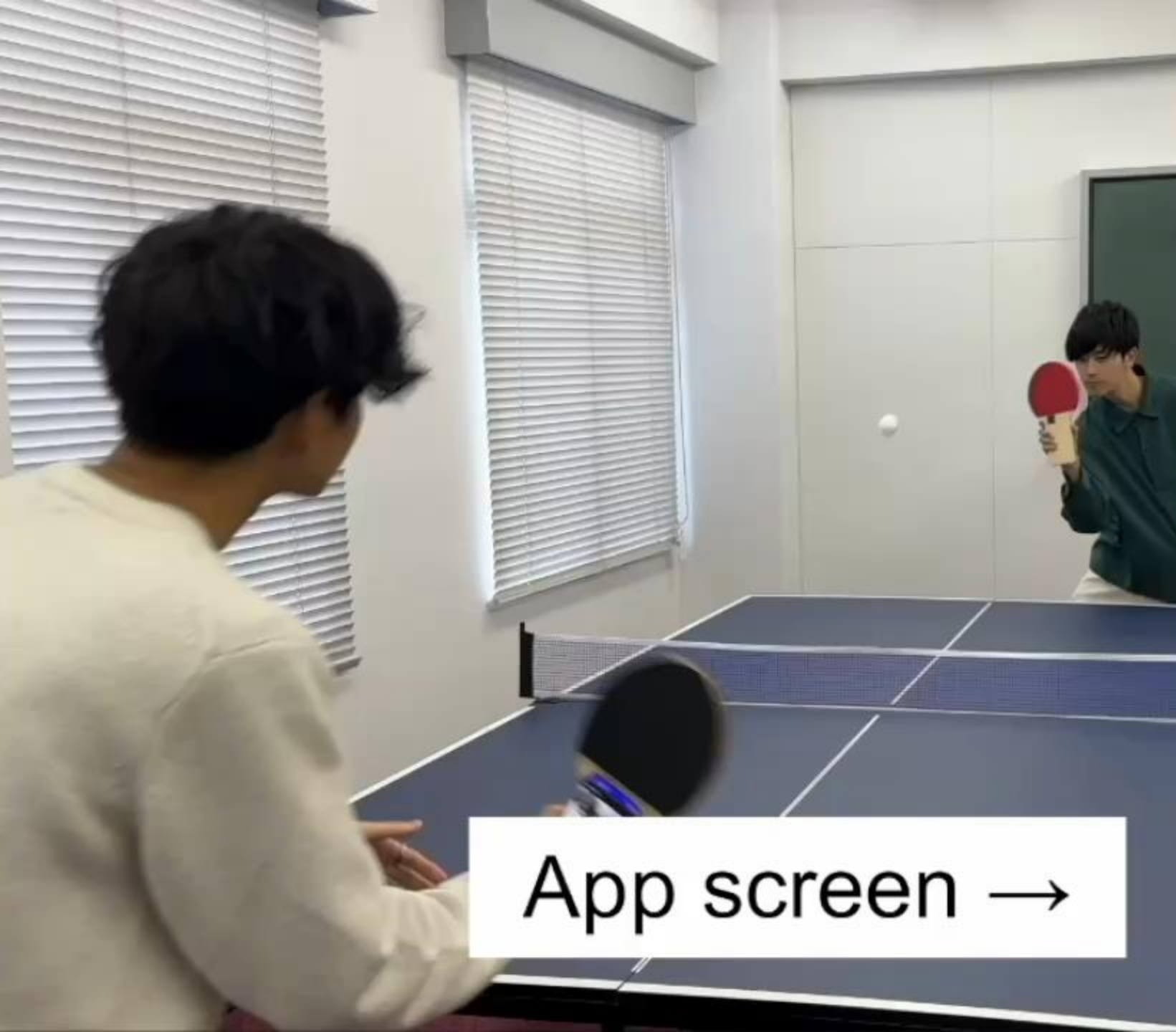


Count down from 5

Perform a smash while shouting "1" and a special move will be executed

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App screen →



0 点

FPS 17.91

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Purpose

Proposal of an entertainment sport that even beginners can enjoy
Improvement of rallying skills

Approach

Develop the application “Rhythm Rally,” which enables players to rally at regular intervals by combining table tennis and rhythm games

Beginners

Easy to get started with table tennis

Can enjoy rallying

Offers a different kind of fun
from traditional table tennis

Entertainment value

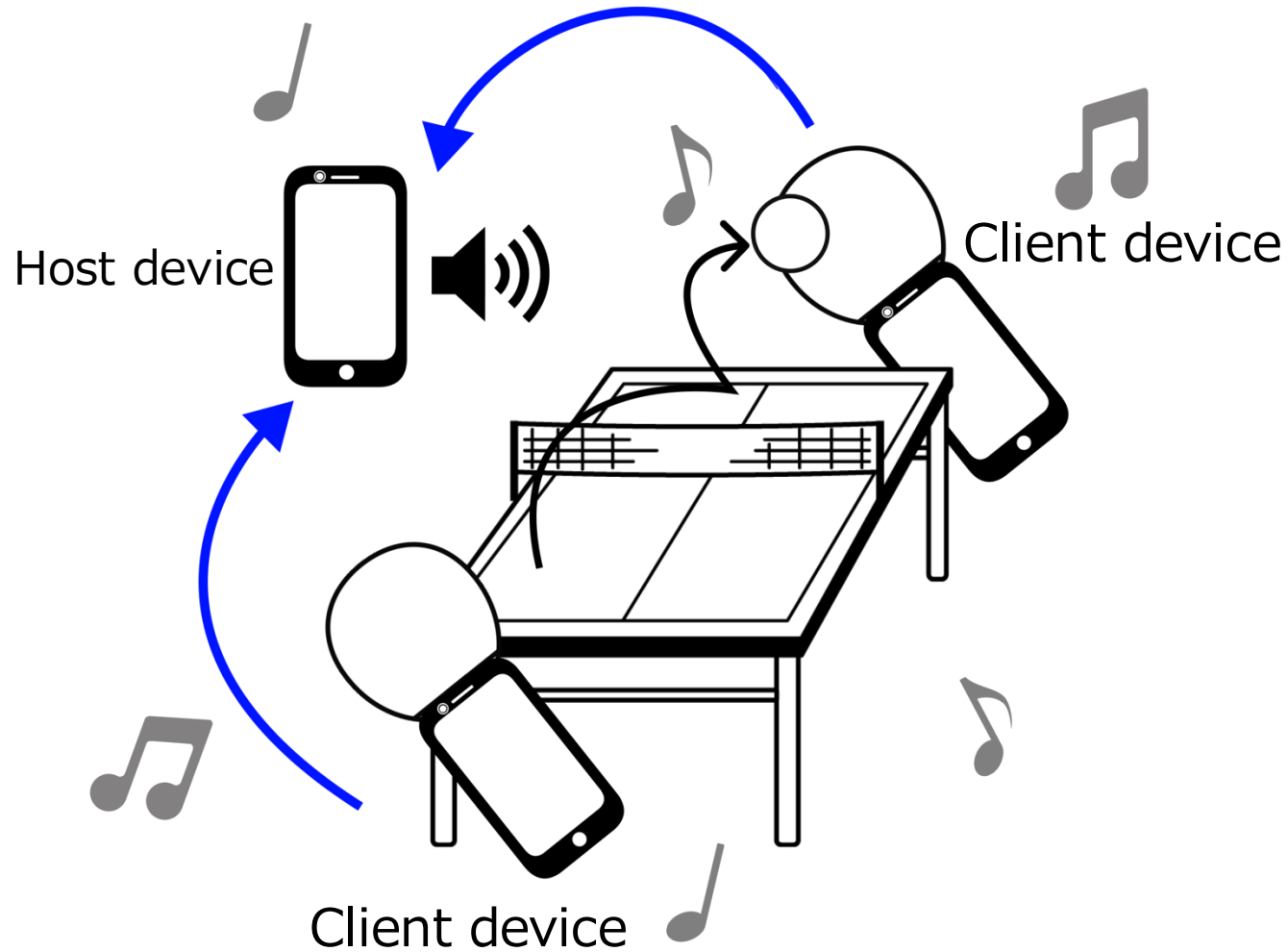
Advanced Beginners to Intermediate Players

Maintains motivation for practice

Enables stable rallying

Practice support

Rhythm Rally is designed as a **cooperative** style of table tennis



Rally in time with the music



Send the current time
when you hit the ball

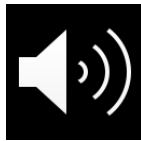
Feedback on the results

Check the results
after the game ends

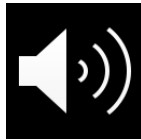
Two types of real-time feedback based on the assessment results

Sound effect playback

GOOD :



MISS :



Advantages

Feeling of exhilaration when GOOD

Disadvantages

Sound delay due to elapsed time

Pitch change

GOOD : Pitch returns to normal



MISS : Pitch decreases
(pitch is multiplied by 0.9)

Advantages



Minimal sound delay

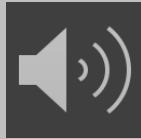
Disadvantages

Not very refreshing

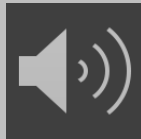
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Advantages



Minimal sound delay

Disadvantages

Not very refreshing

Purpose

To evaluate the potential of Rhythm Rally as an entertainment sport that beginners can enjoy while also improving their rally skills

Method

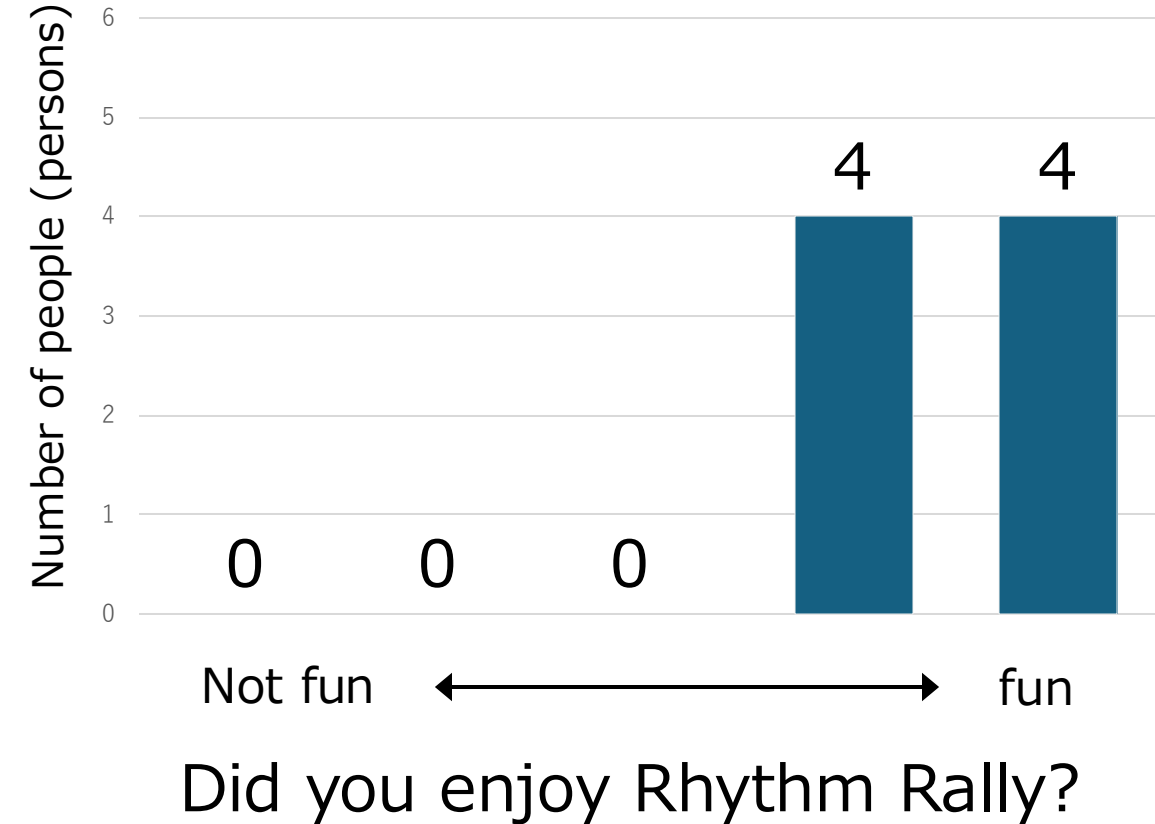
Participants actually played the game and responded to a questionnaire using a 5-point scale

Subjects

8 university or graduate students with little experience in table tennis

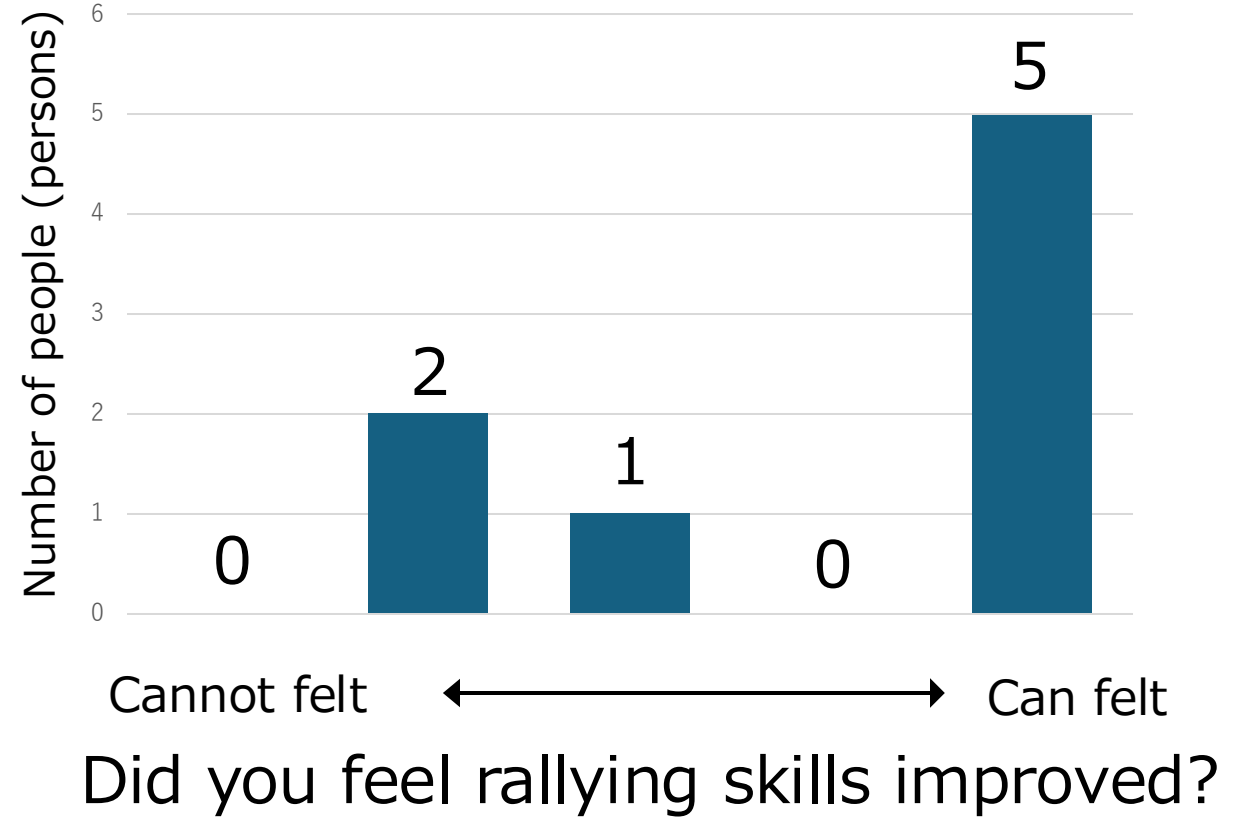
Evaluation Items

Whether they enjoyed Rhythm Rally,
and whether they felt their rallying skills improved



n=8

Entertainment value was recognized



Users felt an improvement in their technical skills

Summary

Proposal of an entertainment sport combining table tennis and rhythm games, aiming to enhance both enjoyment and technical skills

Judging performance based on differences in current timing

Demonstrated potential for entertainment and practice support, at least among the current participants

Future challenges

Prepare various songs and enable difficulty selection based on skill level

Explore unused sensors and feedback methods

Encourage more people to play

Evaluation of entertainment value based on absolute evaluation compared to actual table tennis

Thank you for listening

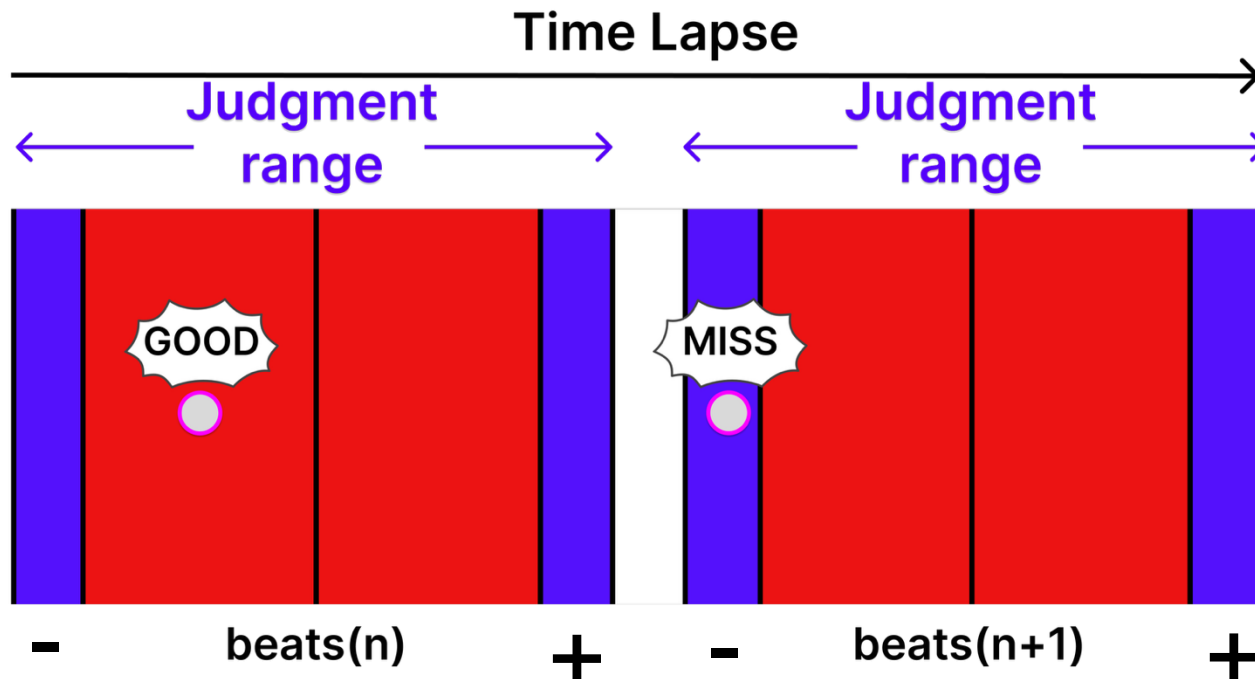
Time of acquisition
by the host device



Time of acquisition by
the client device



Time difference 「D」



D is within the
red frame

D is within the
purple frame

GOOD

MISS

Ex. Music beats at
a cycle of 1 second

The judgment range is ± 0.5 seconds
per beat

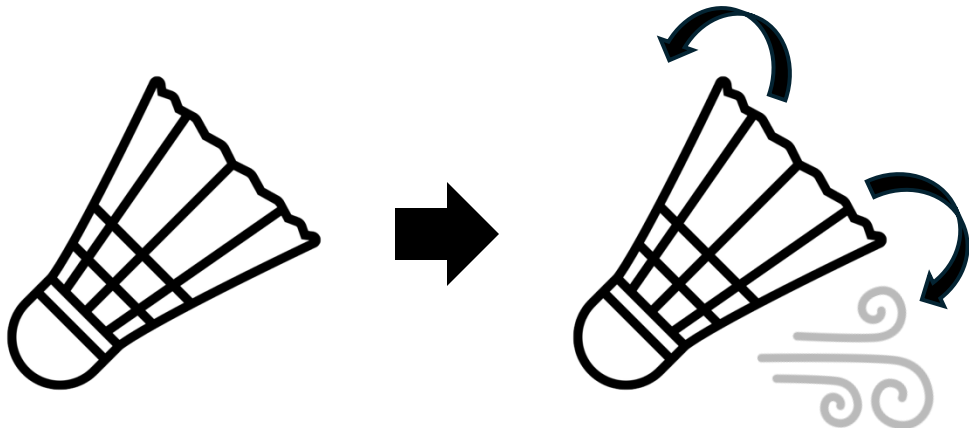
GOOD: D is from **-0.4 to 0.4s**

MISS: D is **-0.5 to -0.41s,**
0.41 to 0.5s for MISS

GOOD : D is within the specified range
MISS : D is outside the specified range

n : Any natural number

Research on entertainment extending sports



Open and close shuttle wings

Distance changes due
to changes in air resistance

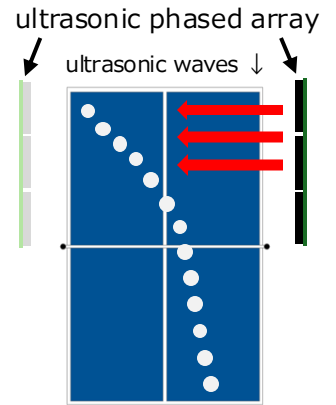
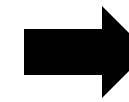
Unpredictable movements occur



racket



controller



Ultrasonic waves from the controller

Ultrasonic waves alter
the trajectory of the sphere

Capable of hitting changeable pitches.

Extending the gameplay of sports with tools

The fusion of smartphones and rackets

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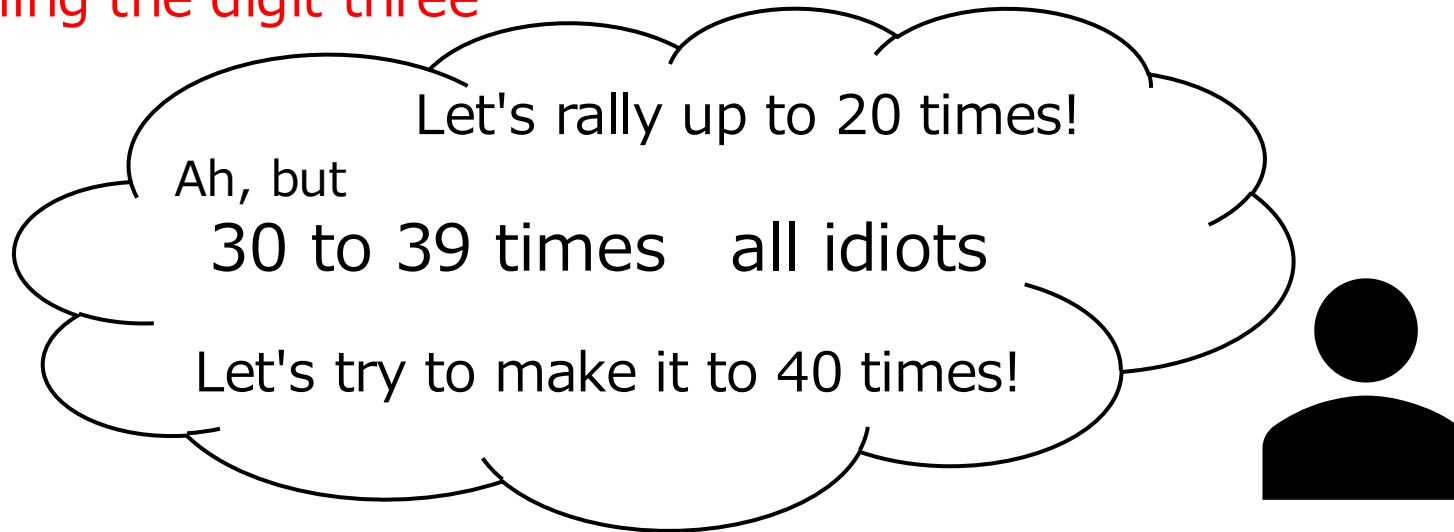


	Diary-style	Separate type	Integrated	Integrated
Material	Synthetic leather	Nylon	Nylon	Wooden
Ease of holding	△	○	△	○
Ease of use	△	△	○	○

A natural approach that keeps you rallying

Sekai no Nabeatsu's material

"He turns into an idiot when it's a multiple of three or a number containing the digit three"



The surreal quality of the voice, the sense of accomplishment when the rally continues until the target is reached



Connecting to **entertainment elements**

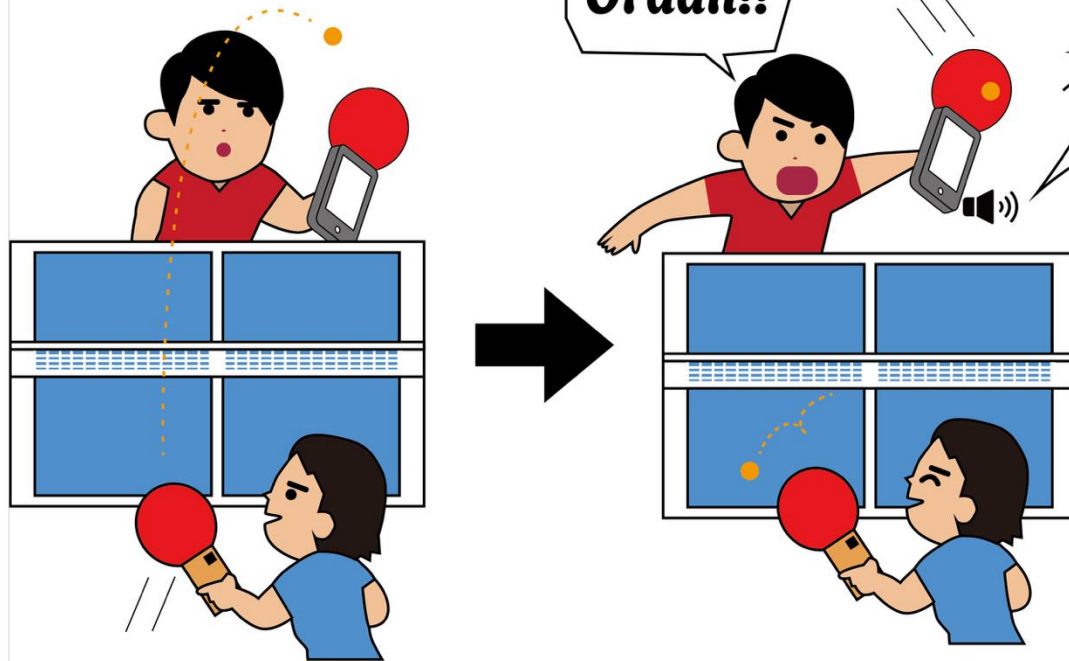


Sekai no nabeatsu

Smash x Special move!!

Oraah!!

**Shaki
iiiiii
nn!!**



Perform 5 rallies

Shouting and smashing will
produce the sound of
a special move

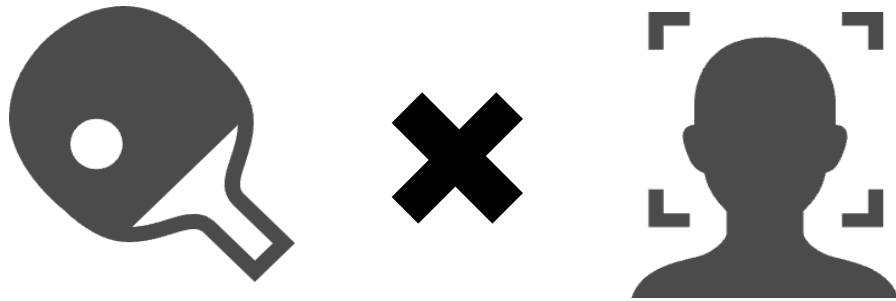
The host side return **an easy ball**
(not smashing)

**You can gain a sense of
accomplishment from working
together to succeed**

Smash side shout loudly

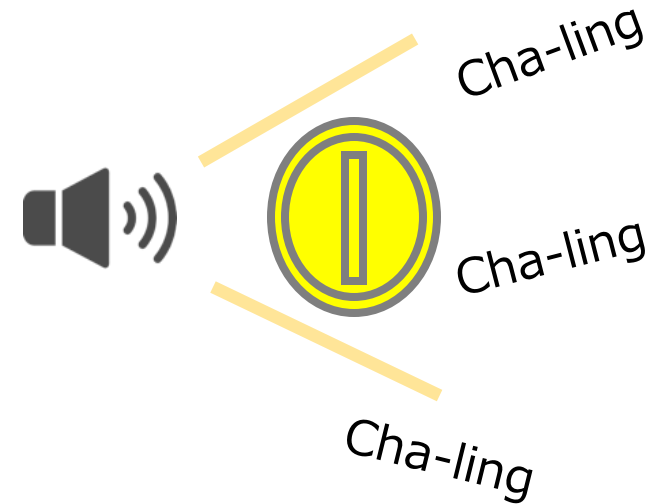
**The exhilaration of smashing
while shouting
your finishing move**

**Combining table tennis scores
with facial recognition points
to determine the winner**



Depending on
your facial recognition score,
you can win
even if you're not good at ping pong

Feedback from the sound of coins



catching faces in succession gives
a sense of exhilaration

選定楽曲

オクラホマミキサー

指定BPM：69.0

目安ラリー回数：約32回

楽曲時間：約30秒

マイムマイム

指定BPM：58.9

目安ラリー回数：約26回

楽曲時間：約30秒