



Project Cybernetic being — Bridging Divides with Cybernetic Avatars



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EMBODIED MEDIA



Cybernetic being



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IEEE Technical Committee on Haptics / ACM SIGGRAPH / ACM CHI



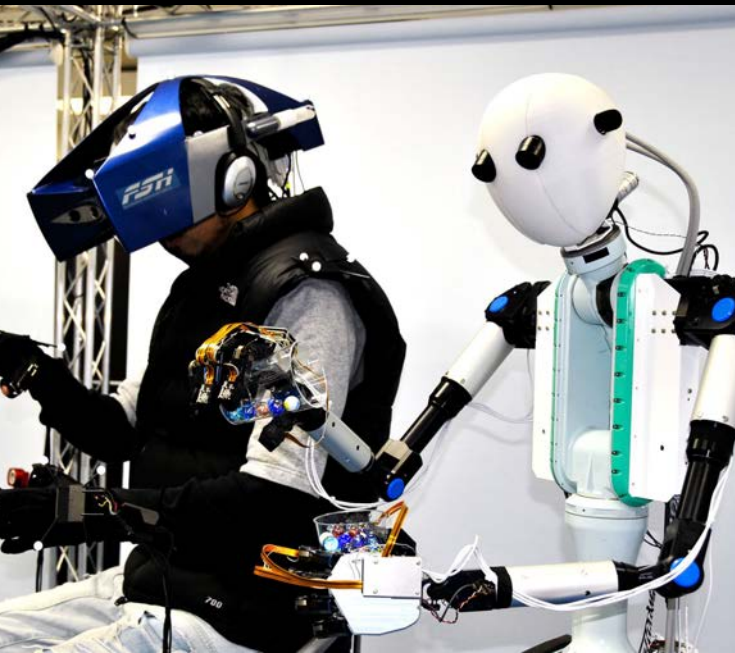
Empower / Enchant / Empathize human experiences



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TECHTILE toolkit

A rapid prototyping tool for design and education of haptic media

HAPTIC DESIGN: 触覚デザインの社会実装



Synesthesia Wear

Full-Body Haptic Clothing Interface

Synesthesia Wear: ウェアラブル全身触覚



Spatial Animacy: 情報と呼応する空間

Haptics

Spatial Interactions



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Human Augmentation

トレイグジスタンスによる遠隔行動

身体拡張・身体融合

Emotion & Expression

感情でつながる新たな表現



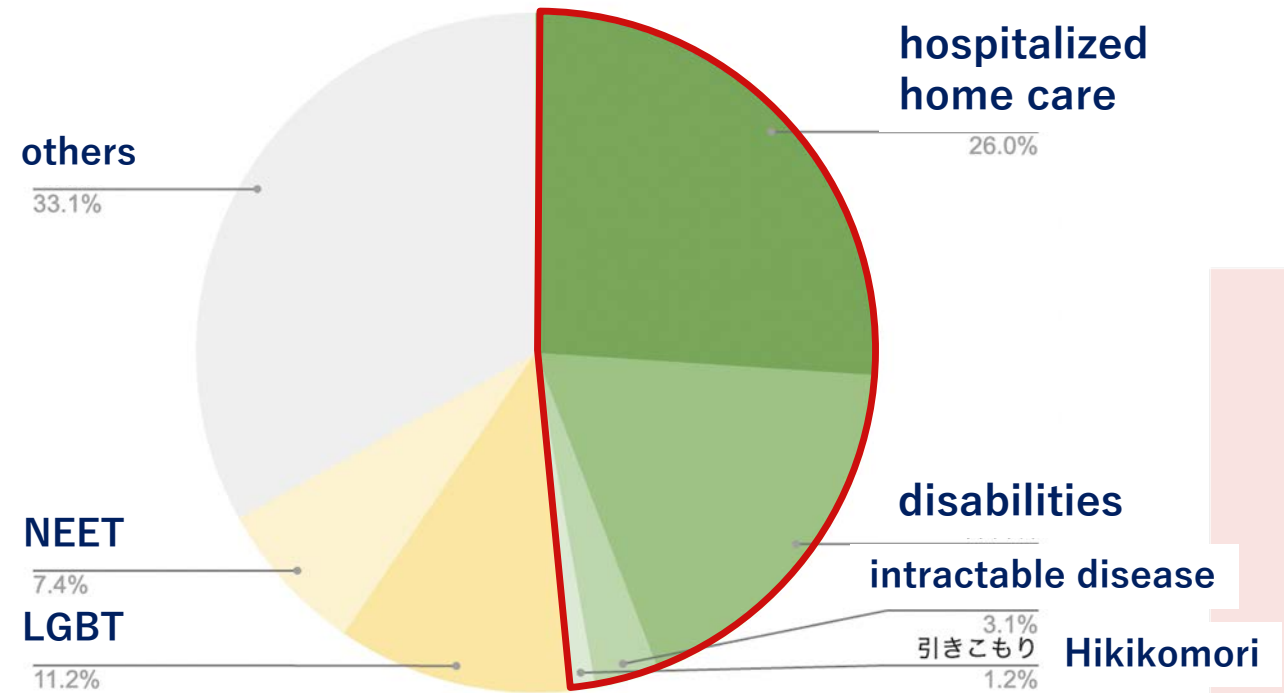
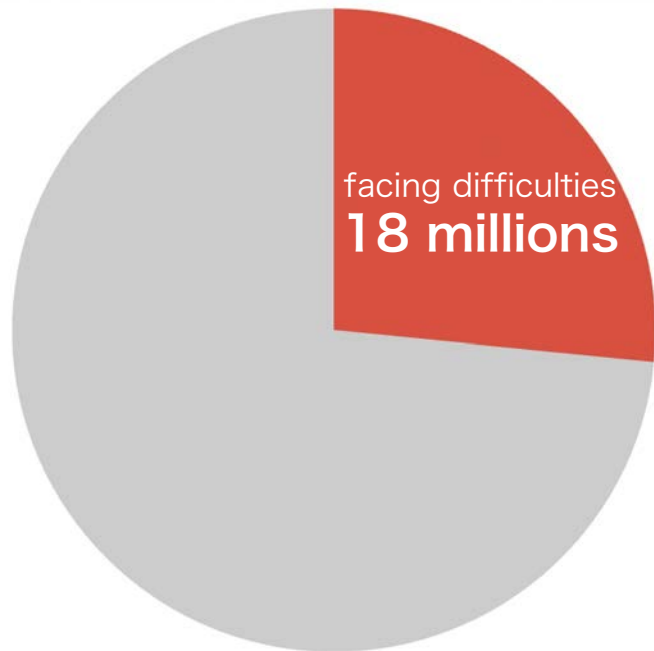


TELEXISTENCE inc.

A quarter of the work population in Japan is facing difficulties

But half of them have possibility to be resolved with remote work

Work population



We are living in a highly evolved modern society
However, there are still many "difficulties" to live with,
and every person has the possibility of having disabilities
for various reasons.

As eyeglasses have freed many people from "bad eyesight,"
Cybernetic avatars can be a new option
to overcome various obstacles
that hinder people's "**Well-being**"



SUSTAINABLE
DEVELOPMENT
GOALS



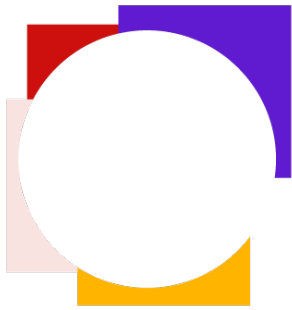
Promote empowerment of all people with CA regardless of age or disability



Toward a society where anyone can work freely and be active through CA



Supporting lifelong growth of people through education and skills transfer
by sharing experiences through CA




**Cybernetic
being**



内閣府／科学技術振興機構・ムーンショット型研究開発事業・目標1
身体的共創を生み出すサイバネティック・アバター技術と社会基盤の開発

Cybernetic Avatar Technology and Social System Design
for Harmonious Co-experience and Collective Ability

<https://cybernetic-being.org>



マサ

OriHimeパイロット

通称 マサと呼ばれております

Parallel Avatar Experiment in AVATAR ROBOT Café DAWN β – Project Cybernetic being, 2022

Project Cybernetic being - 2050 Moonshot Goal



Create a future society where people have Cybernetic Avatars as **"another bodies"** and **share our skills and experiences** to freely engage in social activities **regardless of our disabilities or limitations of our bodies**



Cybernetic being



MOONSHOT
RESEARCH & DEVELOPMENT PROGRAM



① Cognitive Augmentation

A body that can freely draw out your potential according to the situation and environment



② Parallel Agency & Experience Sharing

Multiple bodies that can perceive and act in different spaces at the same time

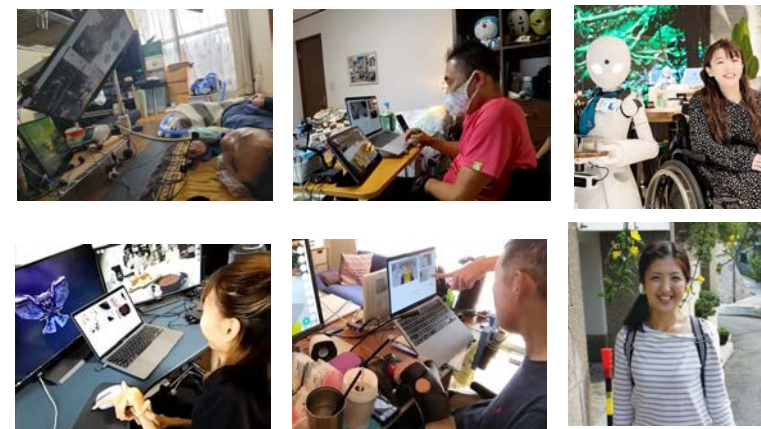


③ Collective Abilities

A body that can combine multiple peoples' skills to go beyond individual capabilities

How will human lifestyle and workstyle change in the era of “**Cybernetic beings**”, where bodies and technology merge through **Cybernetic Avatars**?

Ability integration: Two disabled CA operators collaborating remotely



Nov. 2022, 「Collaborative Avatar Experiment in AVATAR ROBOT Café」



Results

Parallel avatar / Collaborative avatar experiments in the Café



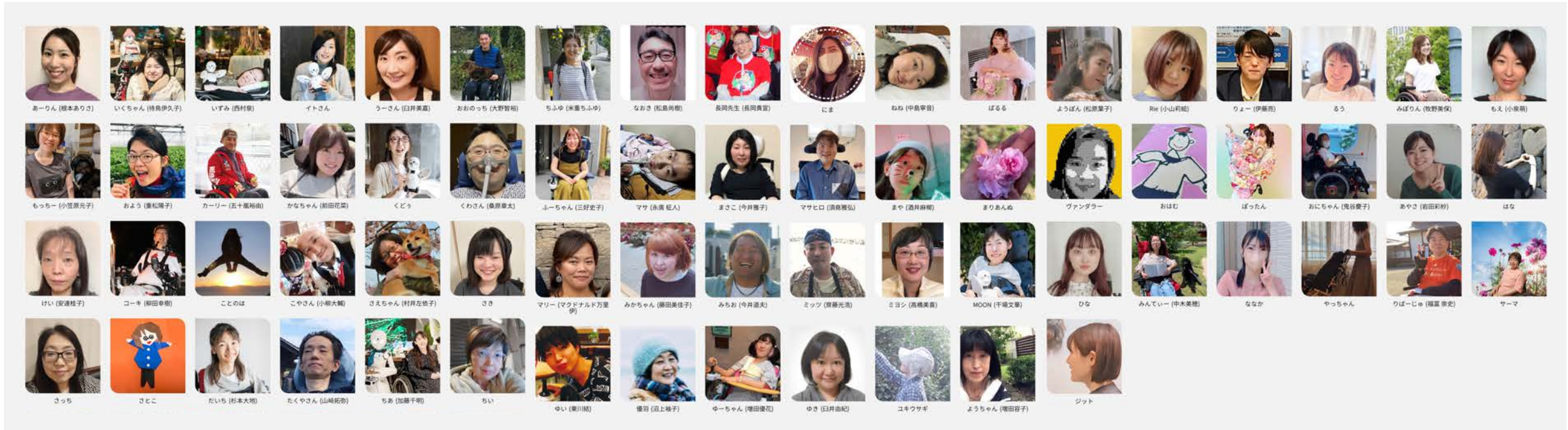
【CA Pilots】

- **Sense of self-efficacy** from doing everything by oneself, from start the end
- The feeling of being able to move around freely inside the store
- **Becoming a pâtissier from the bed**
- Wanting to try out more things

【Visitors】

- **Hospitality** where one is attended to by the same person from start to the end
- A sense of hospitality similar to that of a Japanese traditional hotel
- The feeling of creating together

In the three years since June 2021, a total of 80 people with mobility difficulties have been employed as 'OriHime Pilots'.



and some of them are already starting to work outside of the Avatar Robot Café

Legal Guidelines for working with robotic avatars



アバターロボットを用いた 働き方の導入ガイドライン 2024～労働者性と国際私法を中心に～



THEME 01

1.労働基準法

THEME 02

2.労働契約法

THEME 03

3.労働組合法

法的
働き
労働

技術

契約と

14

22

26

未来の課題

アバターロボットをつかった 働き方の未来をつくる 国際私法とELSI課題



「だれでもどこでも」の 働き方のための自由と制限

アバターロボットをつかった働き方の最大のメリットは、国境を越えて働くことができることです。世界中の人が自分の希望する場所から自分の国境を越えて、社会参加ができることは、とても魅力的です。では、働いている場所が特定できないような働き方によって、誰から誰まで、社会参加できるのか、と考えると、事業者(または雇用者)と働く人はそれぞれ、どの国の法律でその権利が守られ、行使できるのでしょうか。このセクションでは、働く場所が世界半ば(どこでも)になるための課題とELSI課題(ELI:倫理・法律・社会的課題)の考え方について解説していきます。

また、世界中のどこからでも働けるようになることは、お互いに獲得しやすくなるための課題(ELI:倫理・法律・社会的課題)に対しては、国境を越えて働くことが前提となります。このセクションの中で、国境を越えて働くための課題とELSI課題の考え方を紹介していきます。

また、働く人が遠隔地の自宅から仕事を始めるとき、どの国の法律に権利を受けるのでしょうか。これは法的に難しい働き方である(ノマドワーカー)(雇用と労働の関係を定めない働き方、フレックスタイム)が多くなる可能性があります。そのため、働く人の自宅がある国の法律

1.国際私法

国際私法とは一般に、国境を越えた法律関係のうち、私人間に適用する法律を規定する法のことを意味します。この法は、国際取引や国際結婚、他国の方の相続など、様々な場面で必要となります。労働も例外ではありません。そこで、以下では国境を跨いだ働き方を中心とする国際私法を考えてみます。

1.1 国境を越えてアバターロボットを用いる働き方に向かう課題

アバターロボットを用いて働きたい人は、必ずしも国内に在住ではありません。労働者性(労働者の権利)を確保する必要があるため、国境を越えて働くことが必要となります。また、国境を越えて働くことは、労働契約法(以下、「労働法」といいます)という法律がこれを規定しています。以下では、まず国境を跨いだ働き方を軸として、アバターロボットを用いた働き方について解説します。

1.2 適用法の確定と国境を越

労働法は、労働者の権利を決定する法律であり、労働者が働く場所によって適用される法律が異なります。アバターロボットを用いた働き方では、労働者が働く場所が異なるため、適用する法律が異なる可能性があります。このため、労働者が働く場所によって適用される法律を事前に確認する必要があります。また、労働者が働く場所によって適用される法律が異なる場合、労働者の権利が異なる可能性があります。このため、労働者が働く場所によって適用される法律を事前に確認する必要があります。





Skill sharing experiment from artisan (Okinawa) through robotic CA



Brain Body Jockey Project

Development and deployment of BMI-operated CA targeting individuals with physical disabilities caused by ALS

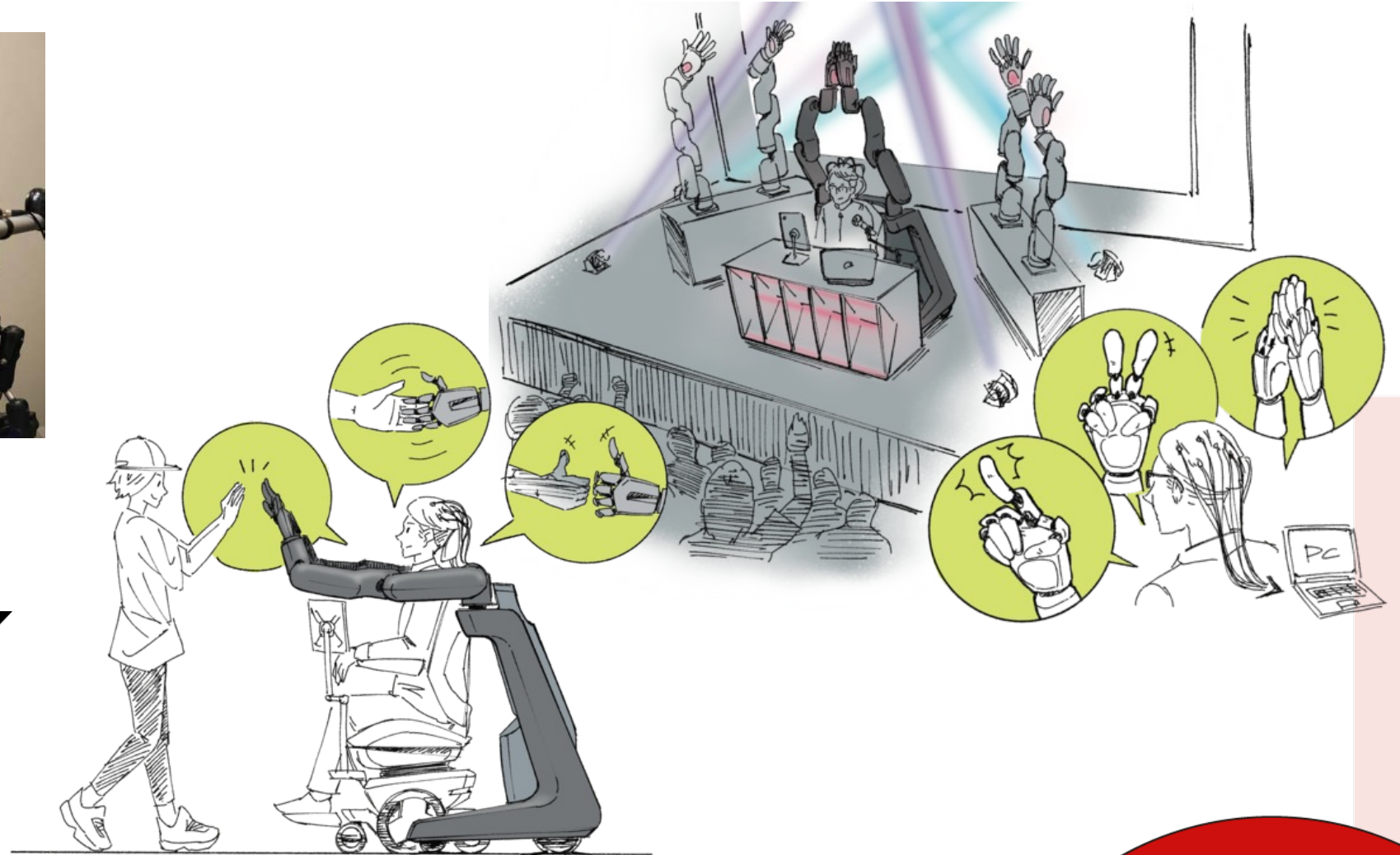


Masatsune MUTO

ALS patient since 2013

WITH ALS

NO LIMIT, YOUR LIFE.



A close-up profile of a person's face, illuminated with a blue light. Several EEG electrodes are attached to their forehead and temples, with thin wires extending from them. A stylized, glowing brain graphic is overlaid on the person's face, with the text "BRAIN BODY JOCKEY PROJECT" written across it in a yellow, blocky font. The background is a soft, out-of-focus blue light.

BRAIN BODY JOCKEY PROJECT

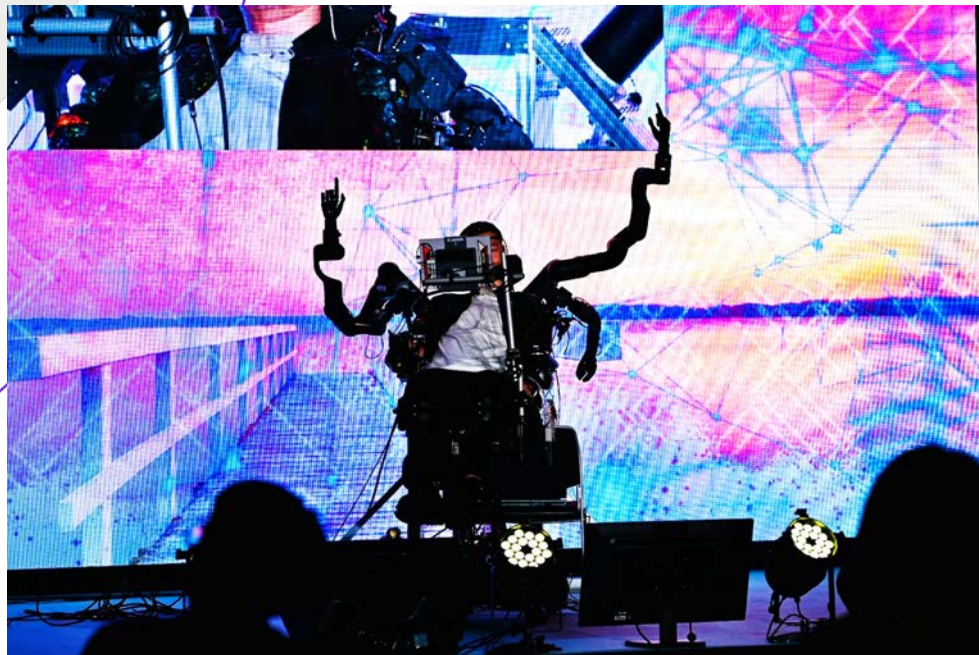
Social interactions

How people react to his augmented body behavior and how he can feel it?



Brain Body Jockey Project

Development and deployment of BMI-operated CA targeting individuals with physical disabilities caused by ALS



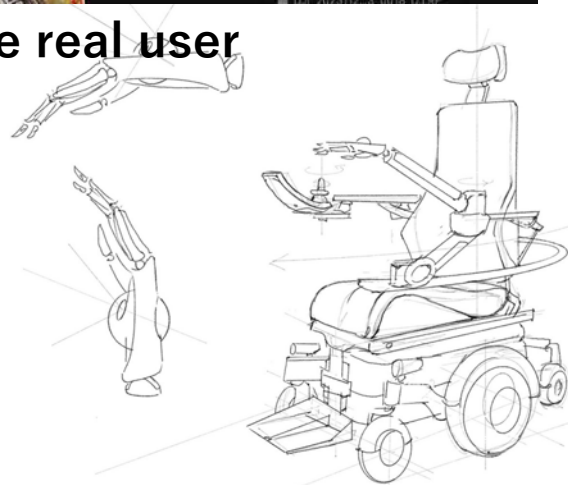
**selecting one from three options in 10 seconds
with 90% success ratio with BMI**



Design process for daily-use human augmentation CA



fieldwork with the real user



sketch & prototyping



trial





Brain Body Jockey project "MOVE Wear" trailer – Project Cybernetic being, 2024

Project Cybernetic being - 2050 Moonshot Goal



by developing “**Experience Enhancing/Sharing CA**” that shares and extends human physical experiences and skills



1. Realize **Inclusive work/life environment**, where disabled people can engage in social activities

2. Realize a digital platform for **Skill & Experience sharing**, where diverse skills and experiences can be stored and people can get the necessary skills at their own will

= Digital transformation of human bodies



Research Groups (as of 2024)

① Cognitive Augmentation WG



Univ. Tokyo
Takuji NARUMI
Narrative VR



Meiji Univ.
Sotaro SHIMADA
Cognitive
Brain Science



Meiji Univ.
Ryuma NIIYAMA
Robotics

② Parallel Agency WG



Sony CSL
Shun. KASAHARA
Hyper perception



RIKEN CBS
Kazuhisa SHIBATA
Brain Science



Keio Univ.
Kai Kunze
Physiological
Sensing



Rikkyo Univ.
Wen WEN
Psychology

③ Collective Ability WG



Nitech
Yoshi. TANAKA
Haptics



Univ. Maryland
Jun NISHIDA
Body sharing



Nagoya Univ.
Hitoshi HIRATA
Neurosurgery

④ CA Platform WG



Keio Univ., KMD
Kouta MINAMIZAWA
Embodied Media



avatarin Inc.
Akira FUKABORI
Avatar startup



Tokai Univ.
Masaaki SATO
Internet tech.

⑤ Social Co-creation WG



OryLab Inc.
Ory YOSHIFUJI
Social startup

⑥ Social System WG



Osaka Univ.
Ryota AKASAKA
Low of Robots



Univ. Tokyo
Arisa EMA
STS



Keio Univ.
Hiroataka OSAWA
Design fiction



EMBODIED MEDIA

<http://embodiedmedia.org>



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being**

<http://cybernetic-being.org>