



刘哲明

James A. Landay

Professor Computer Science

Co-Director HAI

@landay

BayCHI

February 13, 2024

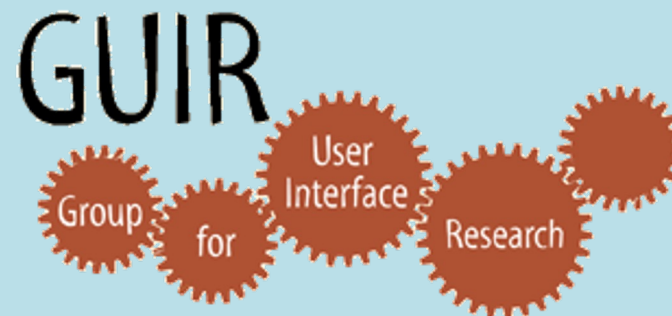
Stanford
University

Using Design Patterns to Create Customer-Centered Web Sites

Douglas K. van Duyne



James A. Landay
Jason I. Hong



University of California at Berkeley



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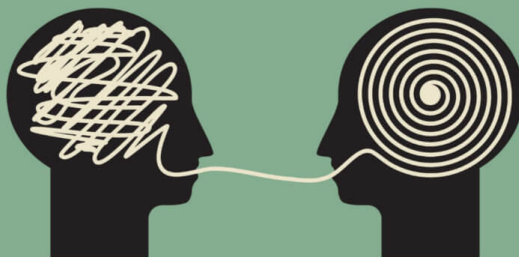
Stanford
University

AI IS TAKING THE WORLD BY STORM

scientific discovery



NLP

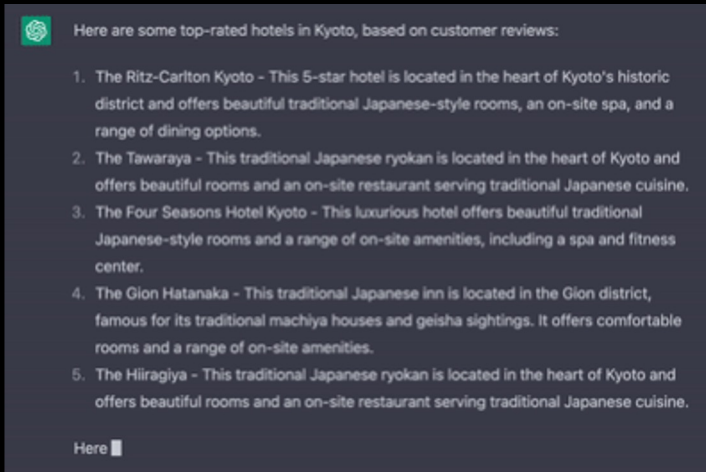


fashion



Illustration by Kathleen Fu
<https://www.wsj.com/articles/managers-mistakes-artificial-intelligence-11667596940/>

GENERATIVE AI IS TAKING THE WORLD BY STORM

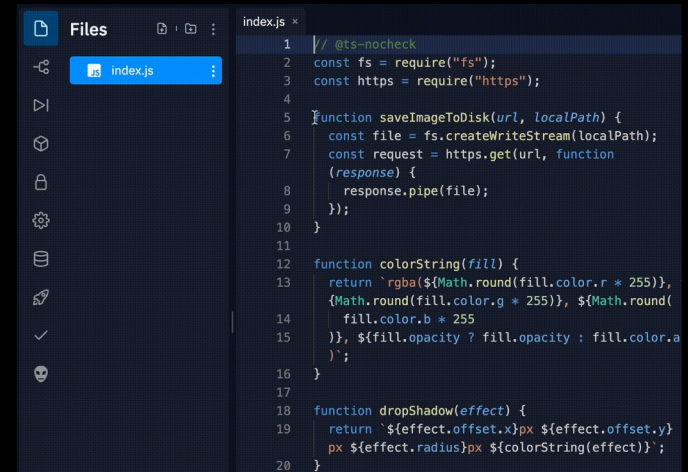


ChatGPT



Midjourney

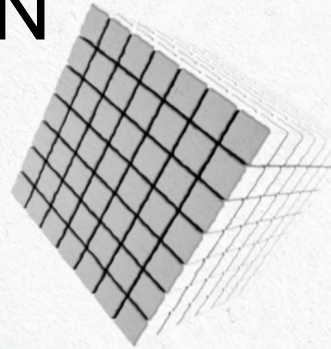
“Ben Stern’s fashion photoshoot with decaying peonies as main theme”



Copilot

FOUNDATION

Models trained using broad data & significant computational resources



MODELS

Often across multiple modalities, that power diverse downstream applications



A hand in a white sleeve holding a purple pen, positioned over a document with a halftone pattern. The document is tilted and partially obscured by a large, light green, semi-transparent shape that resembles a stylized letter 'E' or a similar graphic element. The background is a light, textured surface.

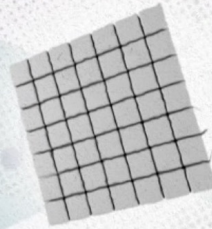
One model

One task

FOUNDATION MODEL

IDEAS

DATA



Summarizing documents

Generating stories

Answering questions

Writing code

Solving math problems

Synthesizing audio

+ MORE



MANIPULATING SOCIAL NETWORKS

Photo by cottonbro: <https://www.pexels.com/photo/a-sad-woman-looking-at-her-cellphone-while-sitting-on-a-bed-7341894/>



MANIPULATING SOCIAL NETWORKS



Eric Lee / Bloomberg via Getty Images file https://media-cldnry.s-nbcnews.com/image/upload/t_fit-1120w,f_auto,q_auto:best/rockcms/2022-06/220616-jan-6-riot-mi-1622-9fcfea.jpg

MANIPULATING SOCIAL NETWORKS



Sergio Lima | Afp | Getty Images | <https://www.cnn.com/2023/01/09/over-400-arrested-after-bolsonaro-supporters-storm-brazils-congress.html>

SIDEBAR

The New York Times

Sent to Prison by a Software Program's Secret Algorithms



Chief Justice John G. Roberts Jr., center, recently said that the day of using artificial intelligence in courtrooms was already here, "and it's putting a significant strain on how the judiciary goes about doing things." Stephen Crowley/The New York Times

By **Adam Liptak**

May 1, 2017

BIASED SENTENCING

PRO PUBLICA

Machine Bias

There's software used across the country to predict future criminals.
And it's biased against blacks.

by Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, ProPublica

May 23, 2016

ON A SPRING AFTERNOON IN 2014, Brisha Borden was running late to pick up her god-sister from school when



**AI SHOULD BE
GUIDED BY A
CONCERN FOR
ITS IMPACT ON
HUMAN SOCIETY**

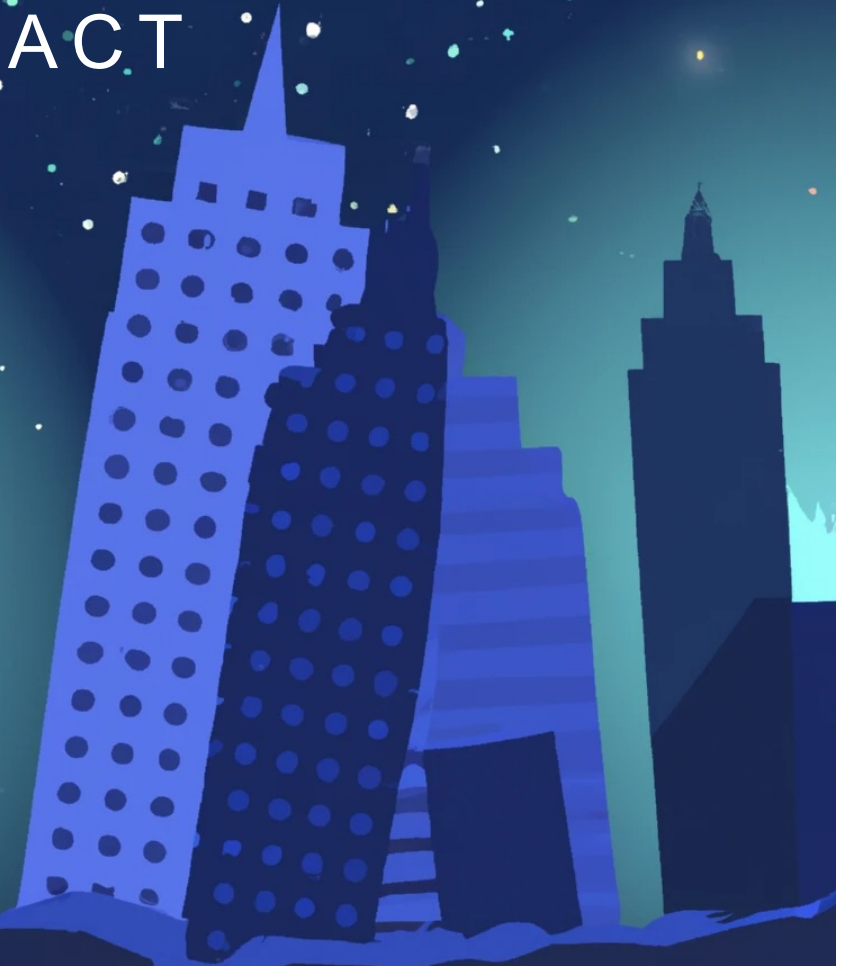
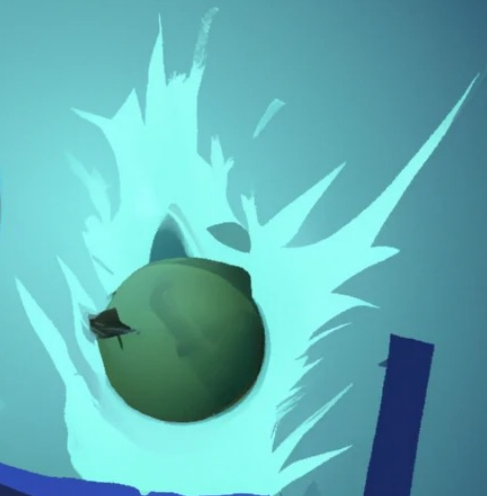
**AI SHOULD BE
INSPIRED BY
HUMAN
INTELLIGENCE**



**AI SHOULD
AUGMENT,
NOT REPLACE,
HUMAN
CAPABILITIES**



RECOGNIZING THE IMPACT IS NOT ENOUGH



DALL-E prompt "A tech bro looks through a telescope as a massive asteroid hits the planet earth" -- extended with "city buildings"



EXPERTS USE AI IN AN IMPACTFUL AREA BUT OFTEN THE AI FAILS

☰ MIT Technology Review

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ARTIFICIAL INTELLIGENCE

Hundreds of AI tools have been built to catch covid. None of them helped.

Some have been used in hospitals, despite not being properly tested. But the pandemic could help make medical AI better.

By Will Douglas Heaven


July 30, 2021

EXPERTS USE AI IN AN IMPACTFUL AREA BUT OFTEN SOLVE THE WRONG PROBLEM

Q QUARTZ

FAULTY IMAGE

AI has a long way to go before doctors can trust it with your life



REUTERS/LUKE MACGREGOR

Job security.

By **Gary Smith & Jeffrey Funk**

Published June 4, 2021 · Last updated July 20, 2022

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The Guardian

News website of the year

News Opinion Sport Culture Lifestyle

UK World Climate crisis Newsletters Football Coronavirus Business



Skin cancer

AI skin cancer diagnoses risk being less accurate for dark skin - study

Research finds few image databases available to develop technology contain details on ethnicity or skin type

Nicola Davis *Science correspondent*

@NicolaKSDavis
Tue 9 Nov 2021 18.30 EST

EXPERTS USE AI IN AN IMPACTFUL AREA BUT OFTEN SOLVE THE **WRONG PROBLEM**



*“Will AI **replace** radiologists?”
is the **wrong** question...*

*The right answer is:
Radiologists who **use** AI will
replace radiologists who don't.*

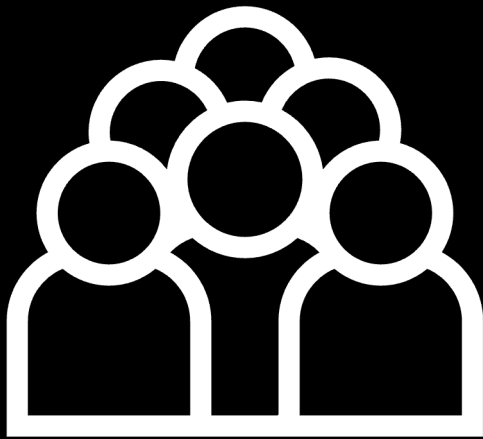
— Curt Langlotz
Stanford Radiologist &
AI Researcher

HUMAN-CENTERED AI

BETTER CHANCE OF CREATING
TECHNOLOGY WITH A POSITIVE IMPACT

WHAT IS HUMAN-CENTERED AI

who we study to



find problems

develop solutions

evaluate systems

people by [Anastasia Latysheva](#) from Noun Project


WHAT IS HUMAN-CENTERED AI

USER-CENTERED



DALL·E prompt "a person on the grass surrounded in a circle by many more people all surrounded by more grass"

WHAT IS HUMAN-CENTERED AI



COMMUNITY-CENTERED

DALL-E prompt "a person on the grass surrounded in a circle by many more people all surrounded by more grass"

An aerial photograph of a large crowd of people standing on a green grassy field. The people are wearing colorful clothing, primarily in shades of purple, blue, and pink. A thick cyan arch is superimposed over the top half of the image. A semi-transparent white horizontal band is positioned across the middle of the image, containing the text "SOCIETY-CENTERED" in a black, spaced-out, sans-serif font.

SOCIETY-CENTERED

DALL·E prompt "photorealistic image of 1000 more people standing on grass"

INTERDISCIPLINARY TEAMS

* FROM THE START



Photo by fauxels: <https://www.pexels.com/photo/colleagues-shaking-each-other-s-hands-3184291/>

HUMAN-CENTERED AI

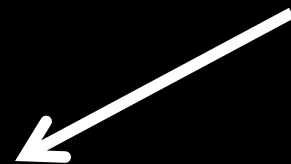
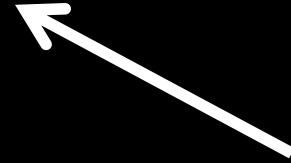
SOCIETY-
CENTERED



COMMUNITY-
CENTERED



USER-
CENTERED



INTERDISCIPLINARY
TEAM

HUMAN-CENTERED AI AUTONOMOUS CARS

SOCIETY-
CENTERED

COMMUNITY-
CENTERED

USER-
CENTERED



● Driver

HUMAN-CENTERED AI AUTONOMOUS CARS

SOCIETY-
CENTERED

COMMUNITY-
CENTERED

USER-
CENTERED



● Driver

HUMAN-CENTERED AI AUTONOMOUS CARS

SOCIETY-
CENTERED

COMMUNITY-
CENTERED

USER-
CENTERED



● Driver

HUMAN-CENTERED AI *AUTONOMOUS CARS*

SOCIETY-
CENTERED

COMMUNITY-
CENTERED

USER-
CENTERED

- Drivers of other autonomous & non-autonomous cars, pedestrians, bicyclists, etc.

Driver

HUMAN-CENTERED AI AUTONOMOUS CARS

≡ FORTUNE

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TECH · SELF-DRIVING CAR

One of the most important features of self-driving cars can fail to spot pedestrians at night, warns auto insurance watchdog

BY TRISTAN BOVE

August 30, 2022 at 3:47 AM PDT



Automatic braking technology has saved lives, but still has a few kinks to work out

Drivers of other autonomous & non-autonomous cars, pedestrians, bicyclists, etc.

Driver

HUMAN-CENTERED AI AUTONOMOUS CARS

SOCIETY-
CENTERED

- A city or region

COMMUNITY-
CENTERED

USER-
CENTERED



The screenshot shows the homepage of 'THE DAILY TEXAN' with a navigation menu, search icon, and a banner for a PBR football game. Below the banner are 'News' and 'Research' tabs. The main article is titled 'UT researchers find how autonomous car features can offset road safety' by Rylie Lillibridge, dated August 20, 2022. The article text begins with 'The growing prevalence of autonomous features in cars has the potential to reduce...'. To the right of the text is an illustration of a blue car on a road with yellow and white light effects around it.

HUMAN-CENTERED AI *AUTONOMOUS CARS*

SOCIETY-
CENTERED

- A city or region

BUILD BETTER PUBLIC TRANSIT INSTEAD?

COMMUNITY-
CENTERED

USER-
CENTERED

HUMAN-CENTERED AI RELATED WORK

SOCIETY-
CENTERED

Algorithms of Oppression, Safiya Noble

COMMUNITY-
CENTERED

Value Sensitive Design, Friedman & Hendry
Design Justice, Costanza-Chock

USER-
CENTERED

HCI & Design

“Guidelines for Human-AI Interaction”, Amershi et al



overstressed



sedentary



uninspired



wasteful



isolated

WE SPEND 87% OF OUR TIME INSIDE BUILDINGS



: <http://snowbrains.com/wp-content/uploads/2014/06/Sad-love-sad-boy-alone-man-alone-in-dark-black-room-looking-out-from-window.jpg>

AWARENESS THAT BUILDINGS IMPACT WELLNESS

B B

FUTU

The h

Health and Wellness in
Buildings: Addressing
Challenges Now
and in the Future

Strategies for optimizing building health



More



u feel

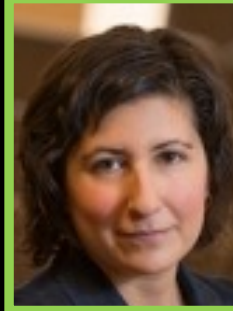
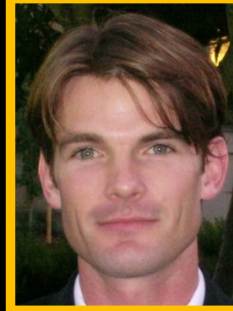
Buildings



Computing



People



USER-CENTERED

COMMUNITY-CENTERED

SOCIETY-CENTERED

Building Features

Noisy
Unnatural light
Artificial materials
No nature

Individual Outcomes

Stress
Anxiety
Distraction

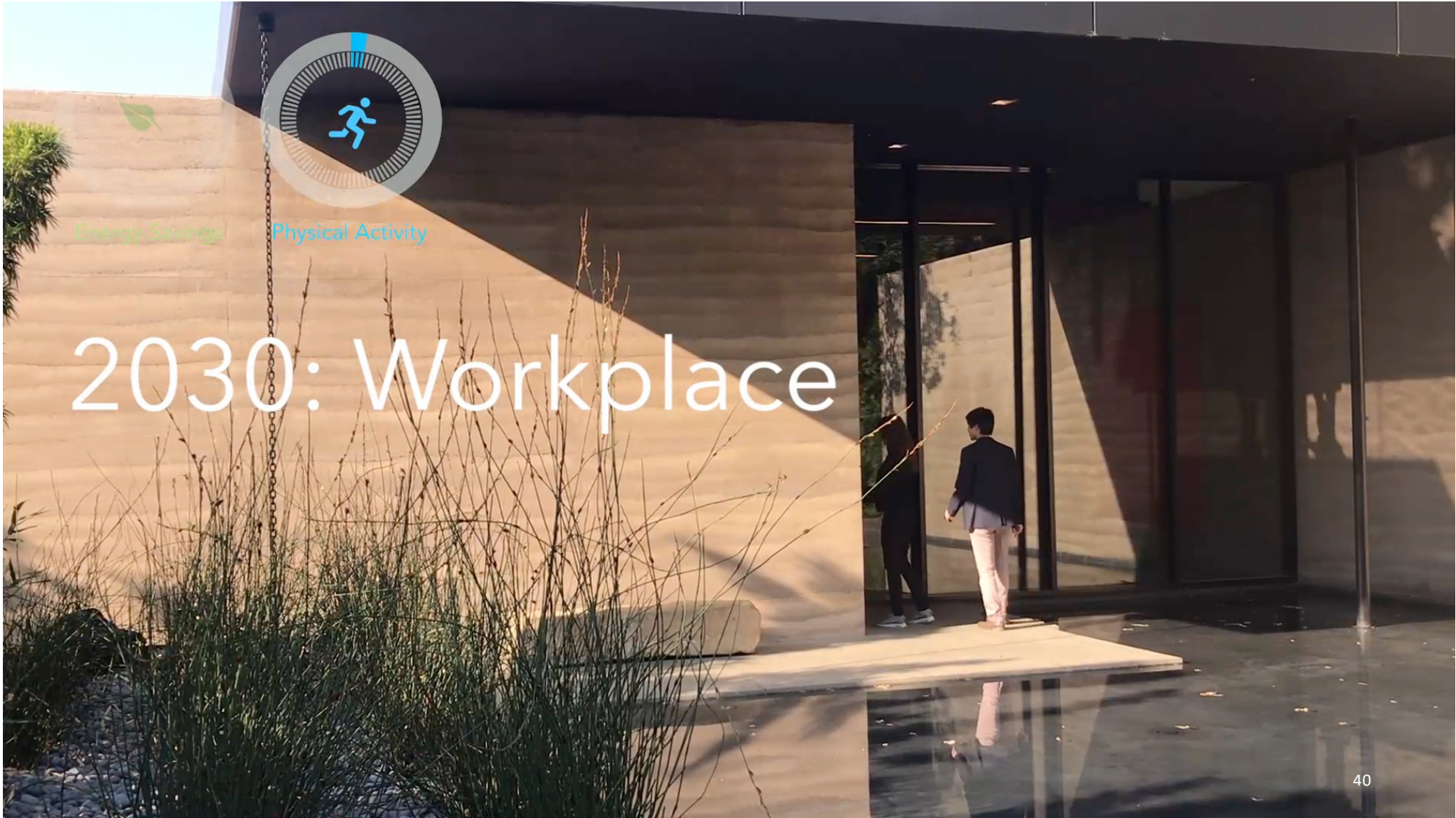
Organizational Outcomes

Unproductive
Wasteful
Disconnected

Societal Outcomes

Economic
Environmental
Public health





Energy Savings

Physical Activity

2030: Workplace

How do we get to this future?



KEY STEPS TO CREATING BUILDINGS THAT SUPPORT OUR WELLBEING

- 1) Establish the Science
- 2) Design Adaptations to Support Wellbeing
- 3) Understand Privacy Constraints

CONTROLLED LAB STUDY (N=412)

2x2x2 conditions

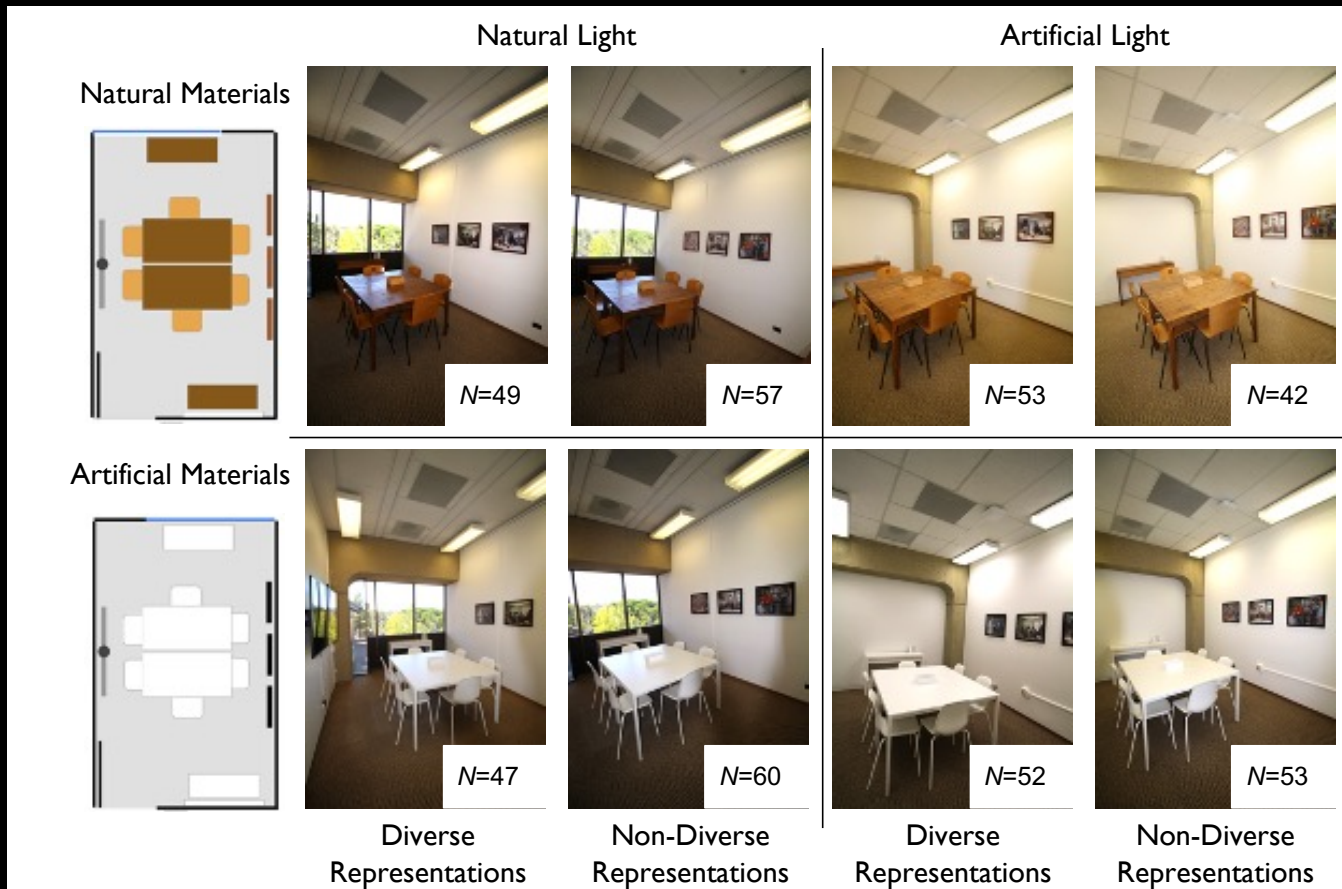
natural vs.
artificial materials

x

natural vs.
artificial light

x

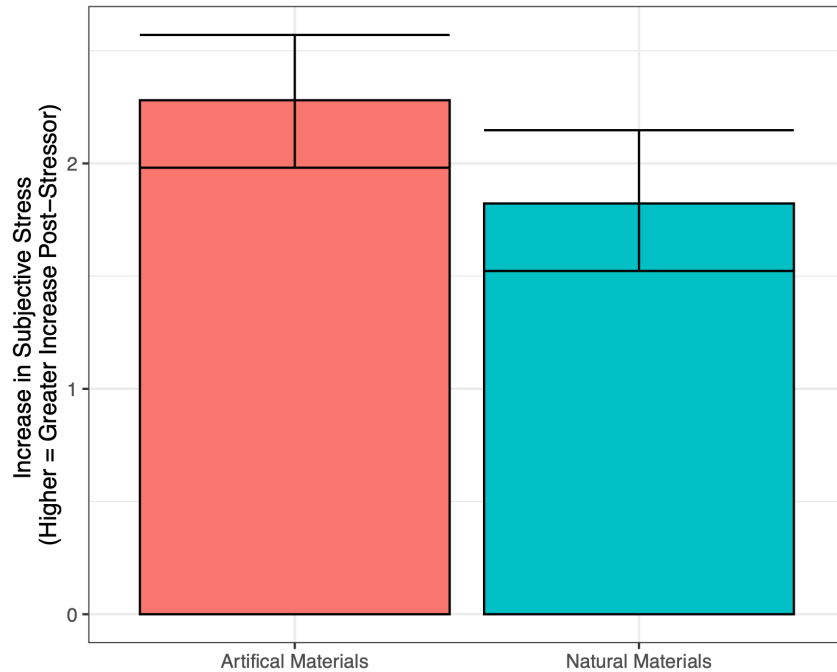
diverse vs.
non-diverse
representations



Douglas, et al.,
Building and Environment,
Volume 224,
2022.

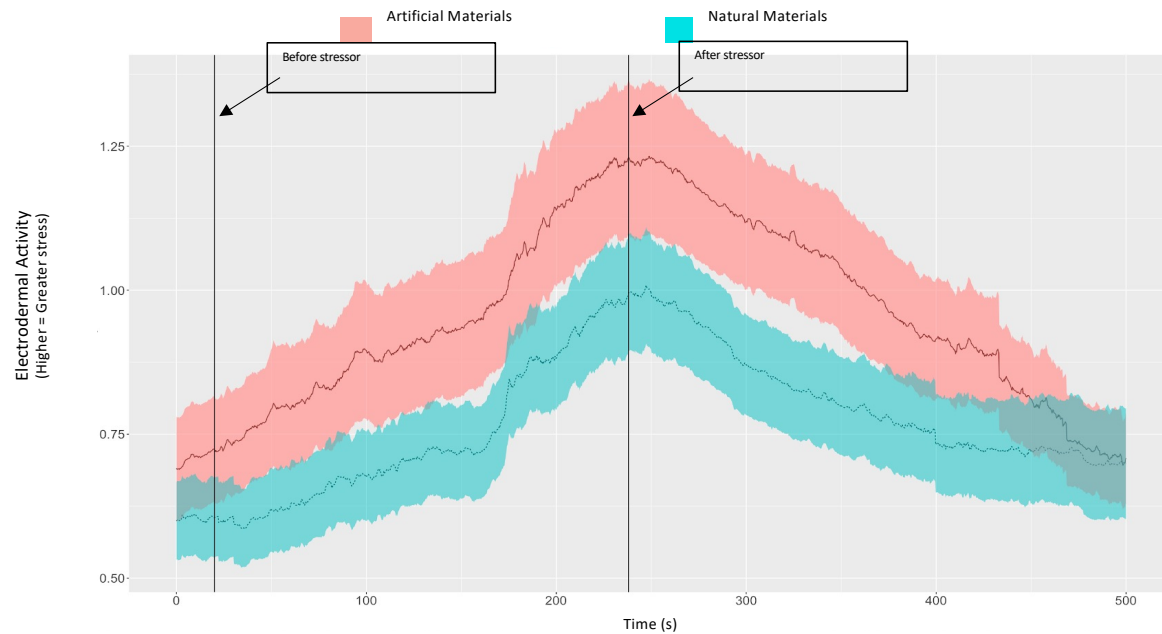
NATURAL MATERIALS & WINDOWS DECREASED STRESS

Natural Materials Buffer Subjective Stress Response



self-report

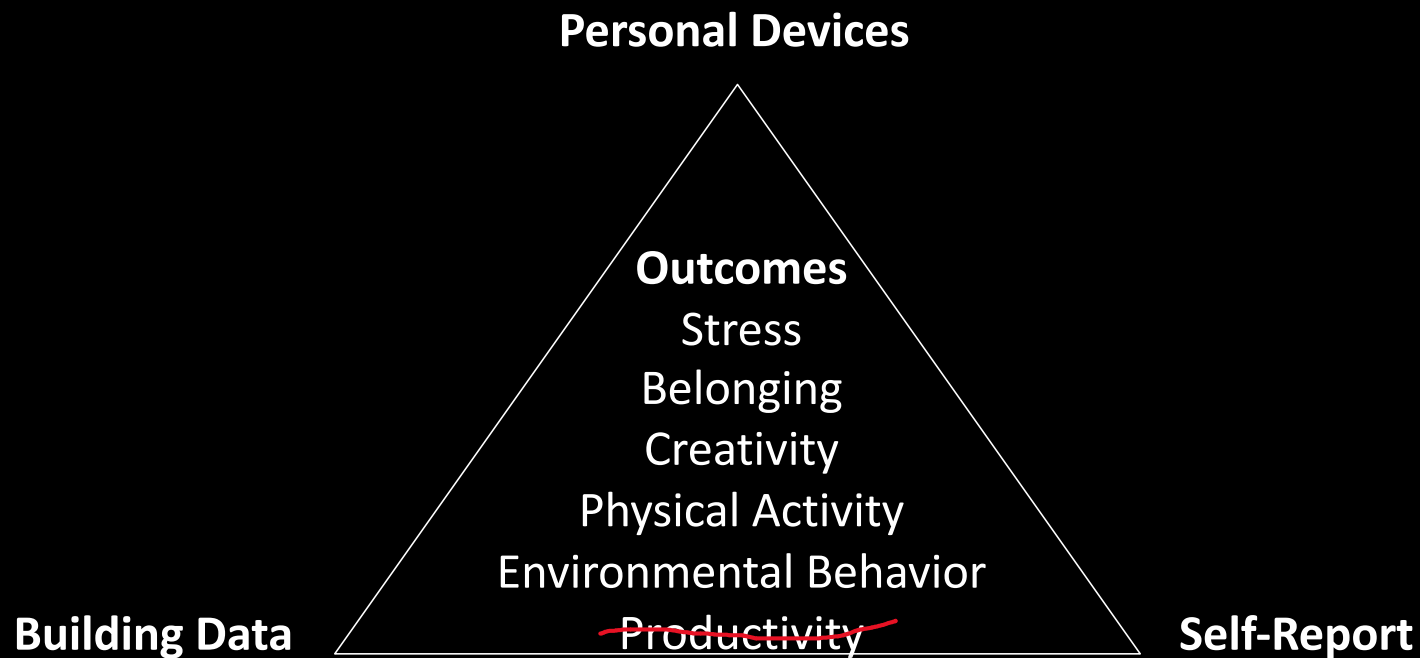
Natural Materials Buffer Physiological Stress Response



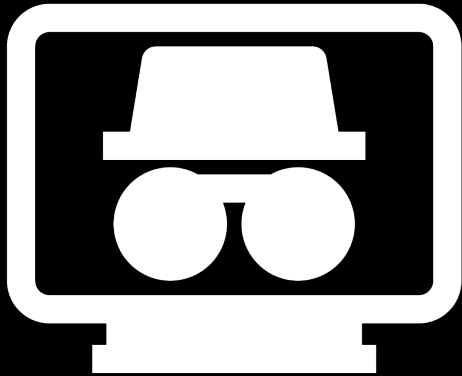
EDA sensed

Douglas, et al.,
Building and Environment,
Volume 224,
2022

AI TO MEASURE WELLBEING OUTCOMES



PRIVACY RESEARCH IS ESSENTIAL



User concern over data collection
& data security is legitimate

- Mixed methods assessments w/ stakeholders
- All studies are opt-in
- Security

... BUT THIS IS ONLY **USER-CENTERED**

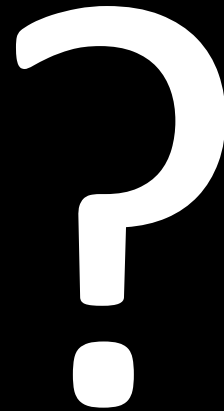
HUMAN-CENTERED AI

HYBRID PHYSICAL-DIGITAL SPACES

SOCIETY-
CENTERED

COMMUNITY-
CENTERED

USER-
CENTERED



Meeting people you don't know

Encouraging exercise
Sensing & adapting to worker stress
Keeping personal data private



DESIGN WORKSHOP

Haghighi, Jörke, et al.,
Designing Interactive Systems,
2023.



I Agree. Dima Yarovinsky, 2018

How do we communicate what is going on in a smart space?

Communicating

IMPLICATION DESIGN

embedding a product's designed artifact's ethical implications into its design



Eyecam is a webcam shaped like a human eye. It can see, blink, look around and observe you.

Teyssier et al., 2021

Protecting



Alias is a teachable “parasite” that is designed to give users more control over their smart assistants, both when it comes to customization and privacy. When you don't use it, Alias will make sure the assistant is paralyzed and unable to listen by interrupting its microphones.

Project Alias. Bjørn Karmann & Tore Knudsen, 2018



DESIGN WORKSHOP

Diverse set of participants
engaging in collective speculation

Lightweight format

- 1) Anticipation Round
produces a deck of cards
- 2) Implication Design Round
practice implication design
- 3) Action Round
uses card deck to play a role-playing game



DESIGNING ETHICAL TECHNOLOGY WITH OLDER ADULTS



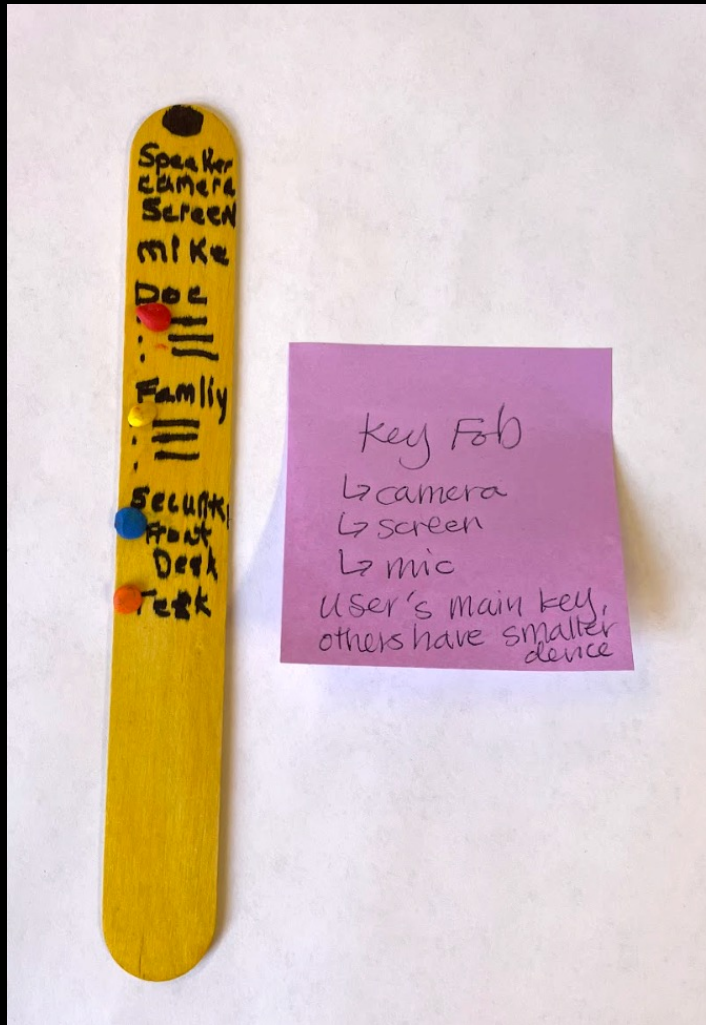
Group 1



Group 2



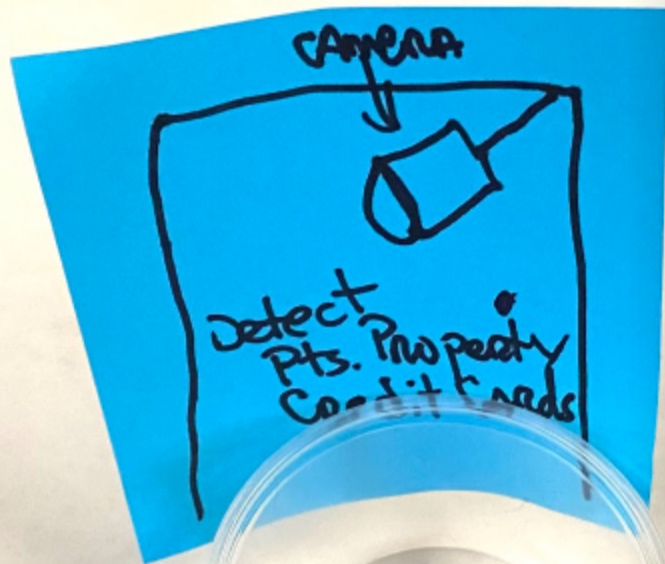
Group 3



“The main doctor could have some things on the screen.. a nurse ... [would] also have access ability ... and then the other one would be like the security in your building. They would have a different level of interaction and family and then friends like and all your senior friends, junior club or whatever. But it would have a variable of security.”



“If there's a problem, then you can press the buttons. Blue button: if you are panicking, you can press blue button and it will regulate your breathing, relax/calm down. Red: stop everything. Yellow: resume life.”



“Doorway device detects how much money you have in case a caregiver steals money, so if a caregiver leaves with more money than they came with, it will stop them. Also detects chips on your credit card to see how many credit cards you entered and left with.”

HUMAN-CENTERED AI

HYBRID PHYSICAL-DIGITAL SPACES

SOCIETY-CENTERED

Privilege—who has access to these fancy buildings

- People with invisible disabilities or marginalized identities that they don't wish to disclose;

COMMUNITY-CENTERED

Anyone who comes into a building (e.g., delivery people, visitors) or food vendors working outside

-

USER-CENTERED

- Building residents, management...

Q: What can artists & designers do in creating an anti-racist society?

A: What is missing is an analysis of power... We live in a moment when different identity groups are advocating for their rights, their power, their presence, and pushing back ... What is missing are the bridges of solidarity. We need to constantly be building those bridges. Historically, you know who has built those bridges? Artists [and designers]!

– Ibram X. Kendi, Prof. Boston University
@Rhode Island School of Design
October 8, 2022

Photo from <https://www.radcliffe.harvard.edu/people/ibram-x-kendi>





Stanford University
Human-Centered
Artificial Intelligence

“AI FOR GOOD” *ISN’T* GOOD ENOUGH:
A CALL FOR HUMAN-CENTERED AI

刘哲明

James A. Landay

@landay