UX STRAT EUROPE

Framework for Human-Centered AI Innovation

Sarah Tan
Founder, Formatif

about me

Sarah Tan

Founder and CEO of formatif
0 → 1 Venture Design Studio

Experience:

- Startup product design for over 26 startups
- VC investments in Silicon Valley (Incubate Fund
- Innovation and strategy consulting for MNCs
- Human-Centered AI research collaboration with AI Singapore

Designing with AI brings new product and ethical challenges

❓ Uncertain AI capabilities

- New constraints - what AI can do
- User-data technical feasibility
- Design for unknown?

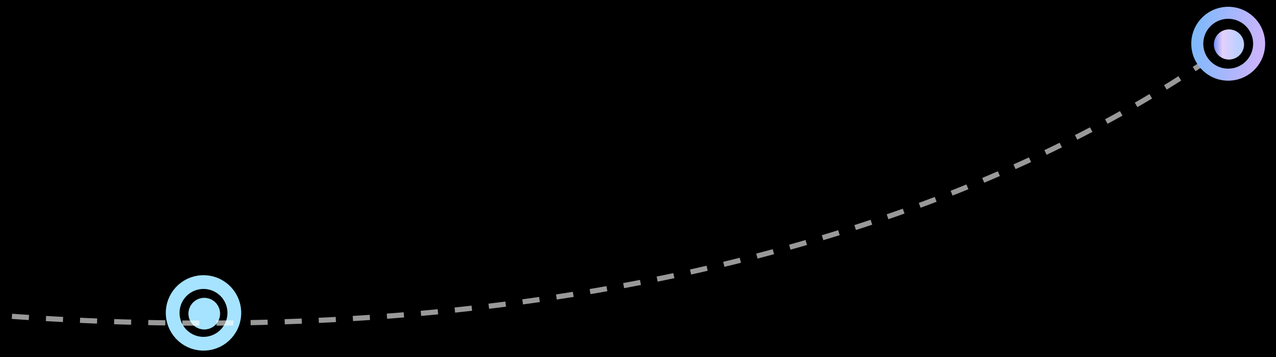
🤔 AI output is complex

- Never 100% accurate
- Infinite outcomes - unable to predict for infinite outputs

🌎 Responsible AI concerns

- Make or break society
- Trust and privacy
- Data regulations

History of AI



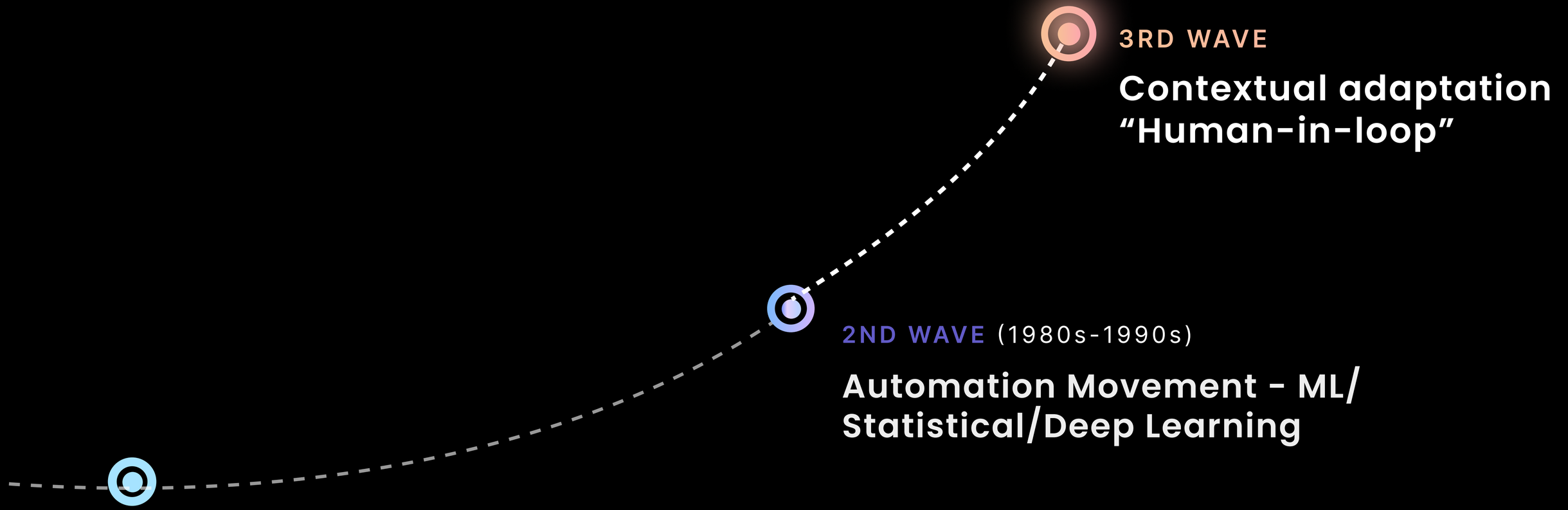
1ST WAVE (1950s-1970s)

Industrial Revolution - Traditional Programming

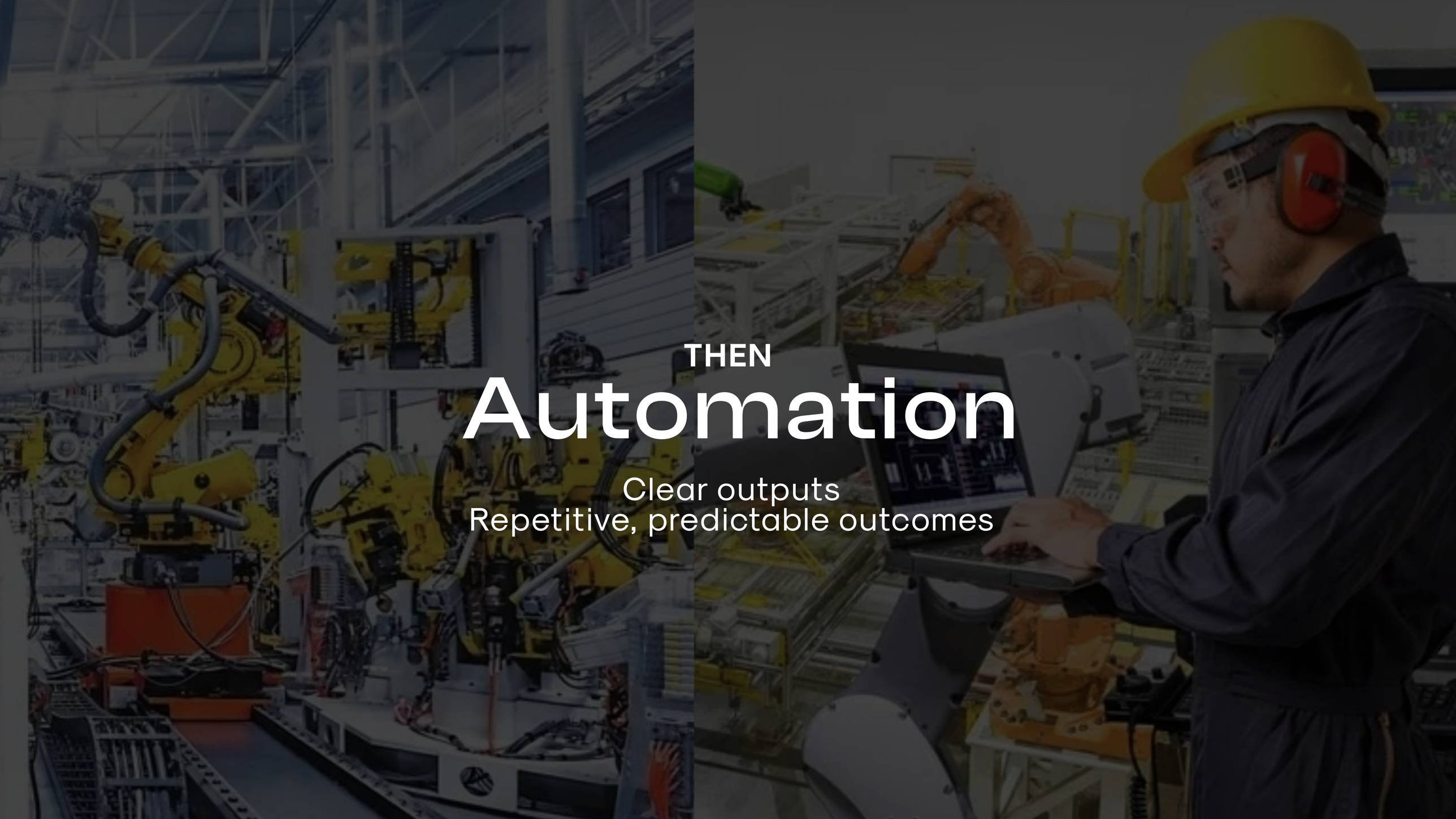
2ND WAVE (1980s-1990s)

Automation Movement - ML/ Statistical/Deep Learning

Source: Toward Human-Centered AI: A Perspective from Human-Computer Interaction. Interactions ACM (2019)



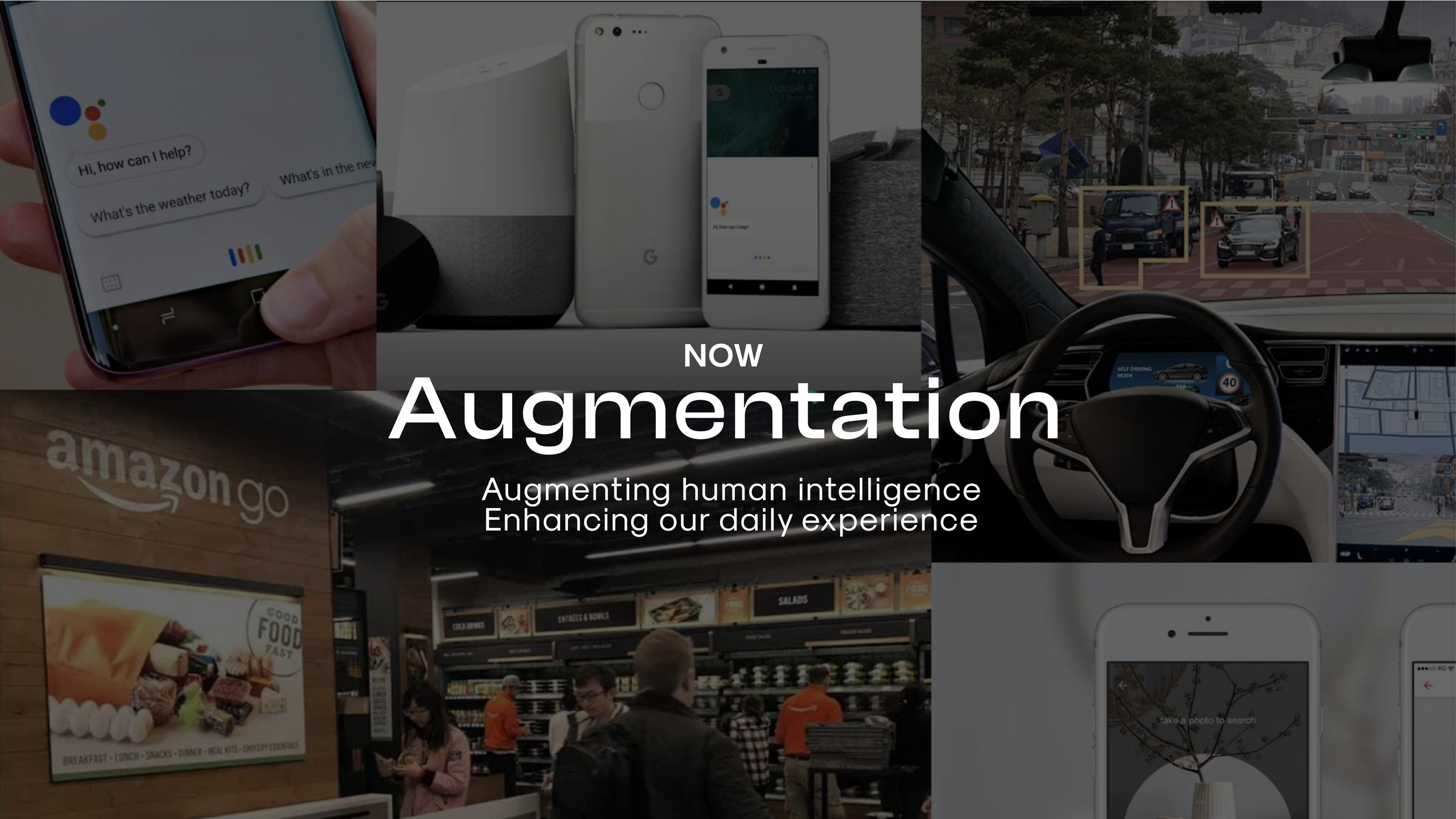
Source: Toward Human-Centered AI: A Perspective from Human-Computer Interaction. Interactions ACM (2019)



THEN

Automation

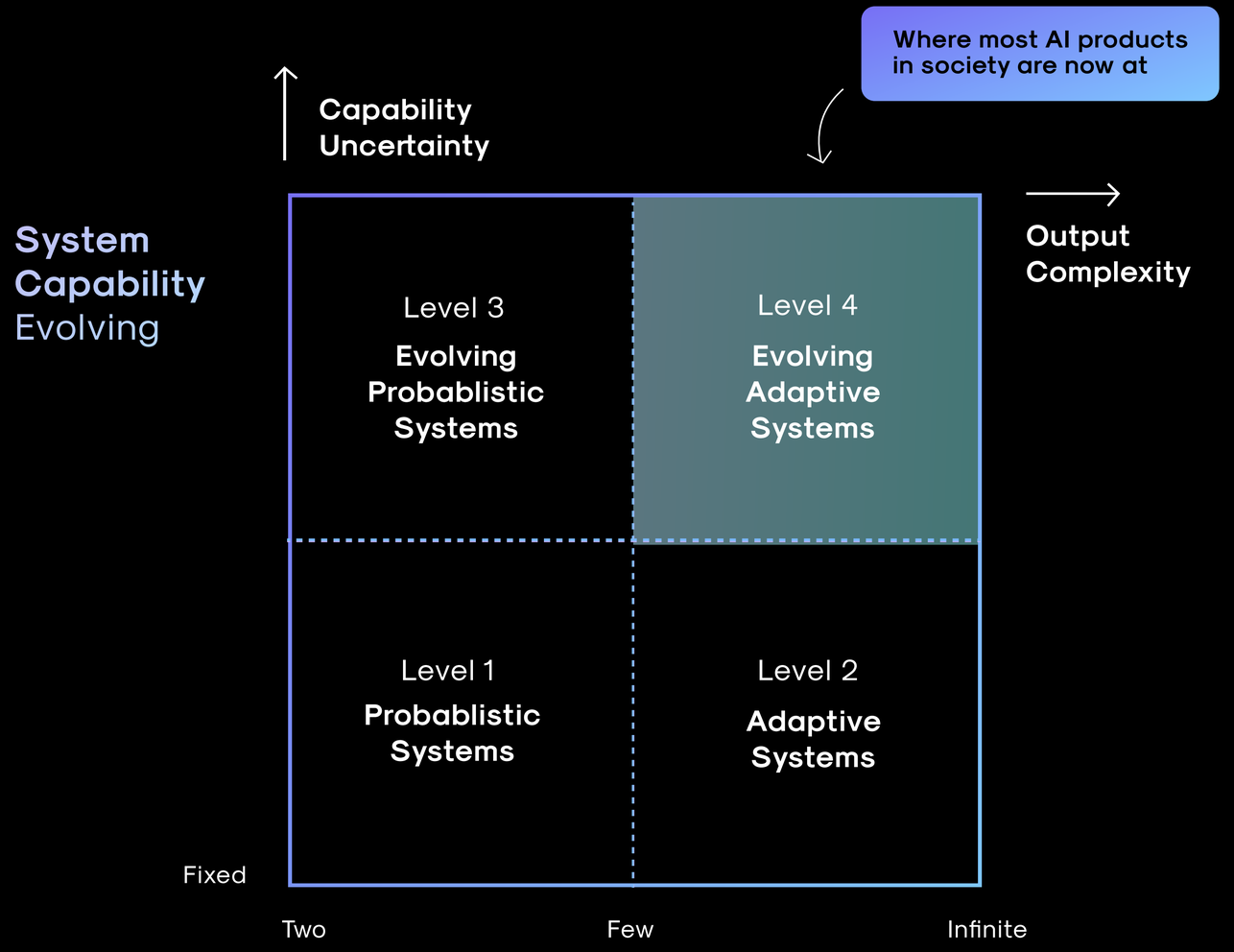
Clear outputs
Repetitive, predictable outcomes



NOW

Augmentation

Augmenting human intelligence
Enhancing our daily experience



Reference: Re-examining Whether, Why, and How Human-AI Interaction Is Uniquely Difficult to Design

Sam Altman: CEO of OpenAI calls for US to regulate artificial intelligence

16 hours ago

Economy | Technology

AI 'could be' danger to society, US President Biden says

Joe Biden says AI developers have a responsibility to ensure products are safe before releasing them to the public.

ARTIFICIAL INTELLIGENCE

Artificial Intelligence Will Do What We Ask. That's a Problem.

35 |

By teaching machines to understand our true desires, one scientist hopes to avoid the potentially disastrous consequences of having them do what we command.

TECH

Elon Musk, who co-founded firm behind ChatGPT, warns A.I. is 'one of the biggest risks' to civilization

PUBLISHED WED, FEB 15 2023·10:24 AM EST | UPDATED MON, MAR 6 2023·7:40 AM EST

Ryan Browne
@RYAN_BROWNE_

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AI Security: How Human Bias Limits Artificial Intelligence

April 15, 2021 | By **Mark Stone** | 6 min read

Smarter together: Why artificial intelligence needs human-centered design

Deloitte Review, issue 22

The dangers of trusting black-box machine learning

By **Ben Dickson** - July 27, 2020

Sam Charrington of TWiML&AI: Thinking AI is Magic is a Dangerous Proposition


Malicious use

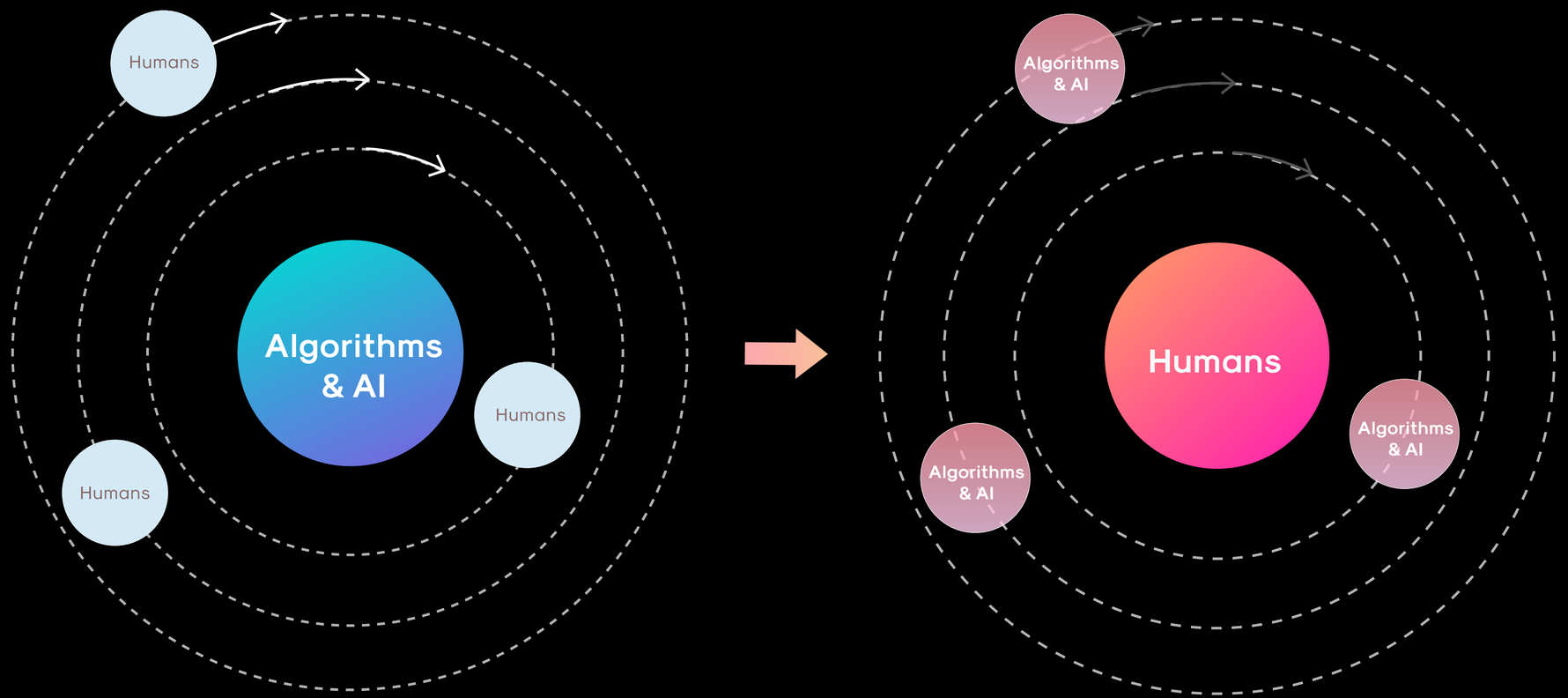

Lack of transparency
and control


Privacy issues


Data biasness

Human-Centered AI?

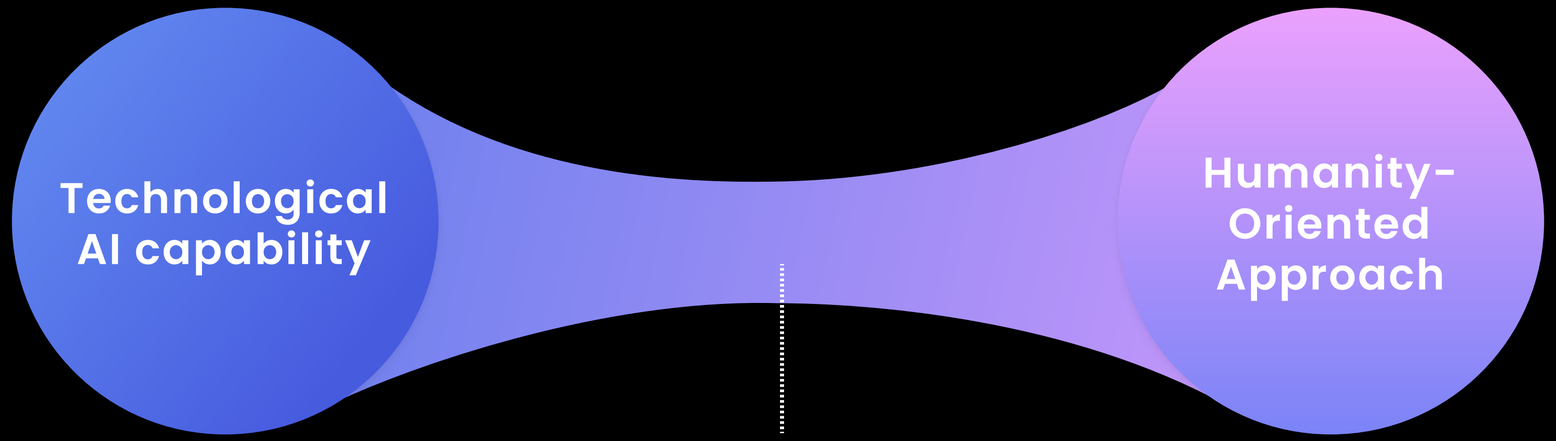
-Inniches



Human-Centered Artificial Intelligence: Three Fresh Ideas. Shneiderman B. (2020)

Technological AI capability

Humanity-Oriented Approach



Human-Centered AI

Human-Centered AI

Design using AI

AI as a tool to augment design materials

Design with AI

Integrate design processes with AI/ML life cycle stages

Design for AI

Design AI-driven products, interfaces and UX

Design

Create

Develop

using AI

AI-powered tools and softwares
(ChatGPT, Copy.ai)

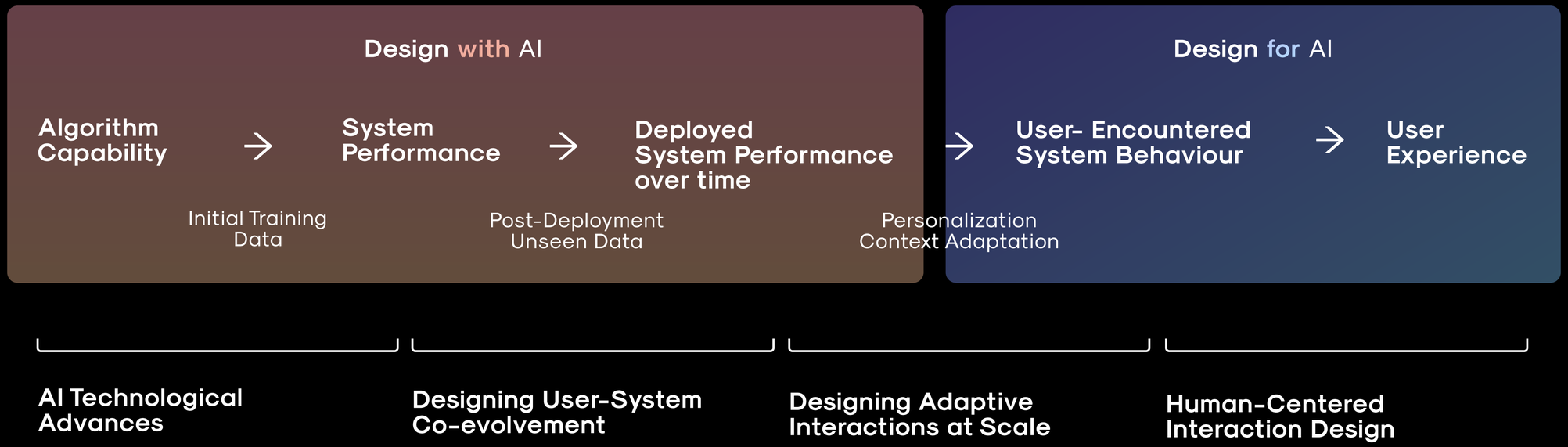
with AI

AI life cycle stages and processes
(Simulation, Wizard of Oz)

for AI

front-end AI driven products, interfaces
(Conversational UX, AI-enabled features)

Human-Centered AI



Humanistic

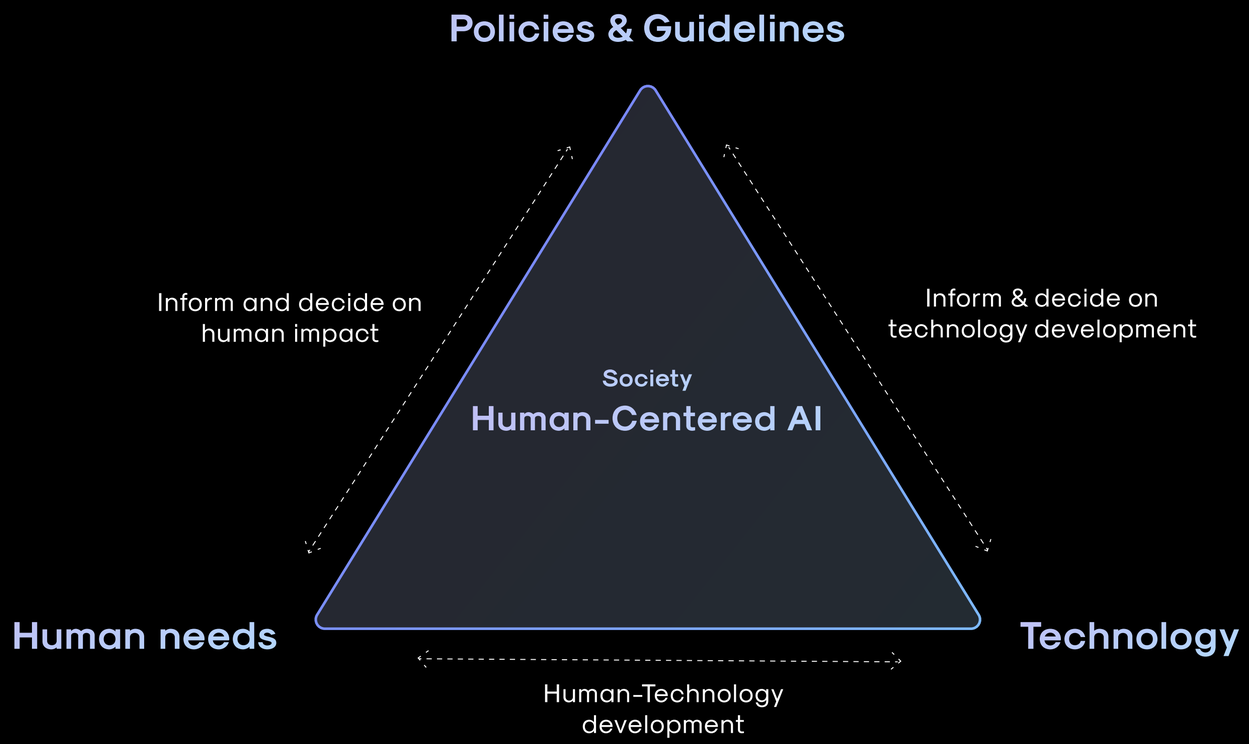
Considering ethics and societal impact

Technological

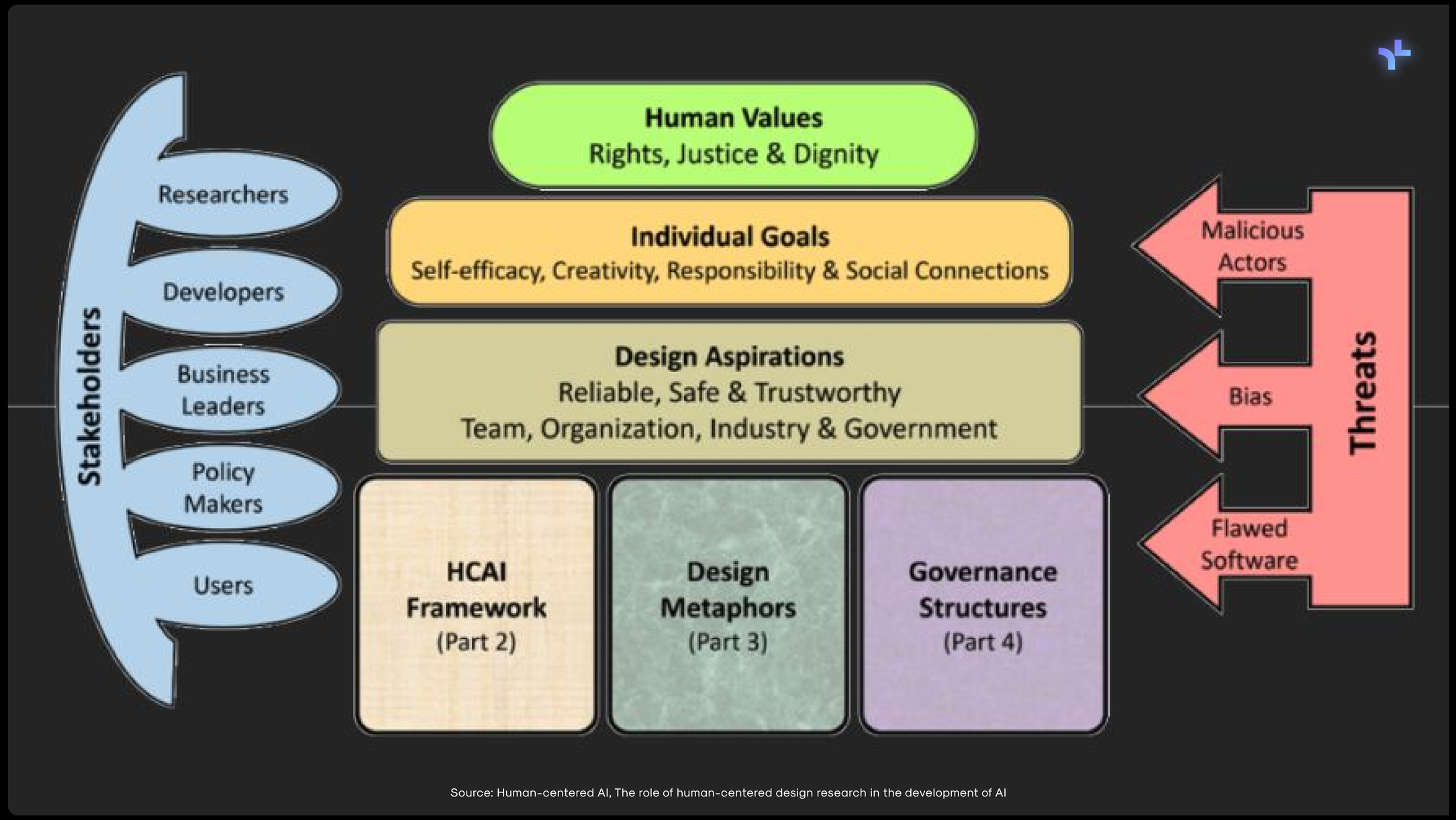
Understanding AI complexities and designing with AI capabilities

Judicial

Ethical AI, Responsible AI policies and guidelines

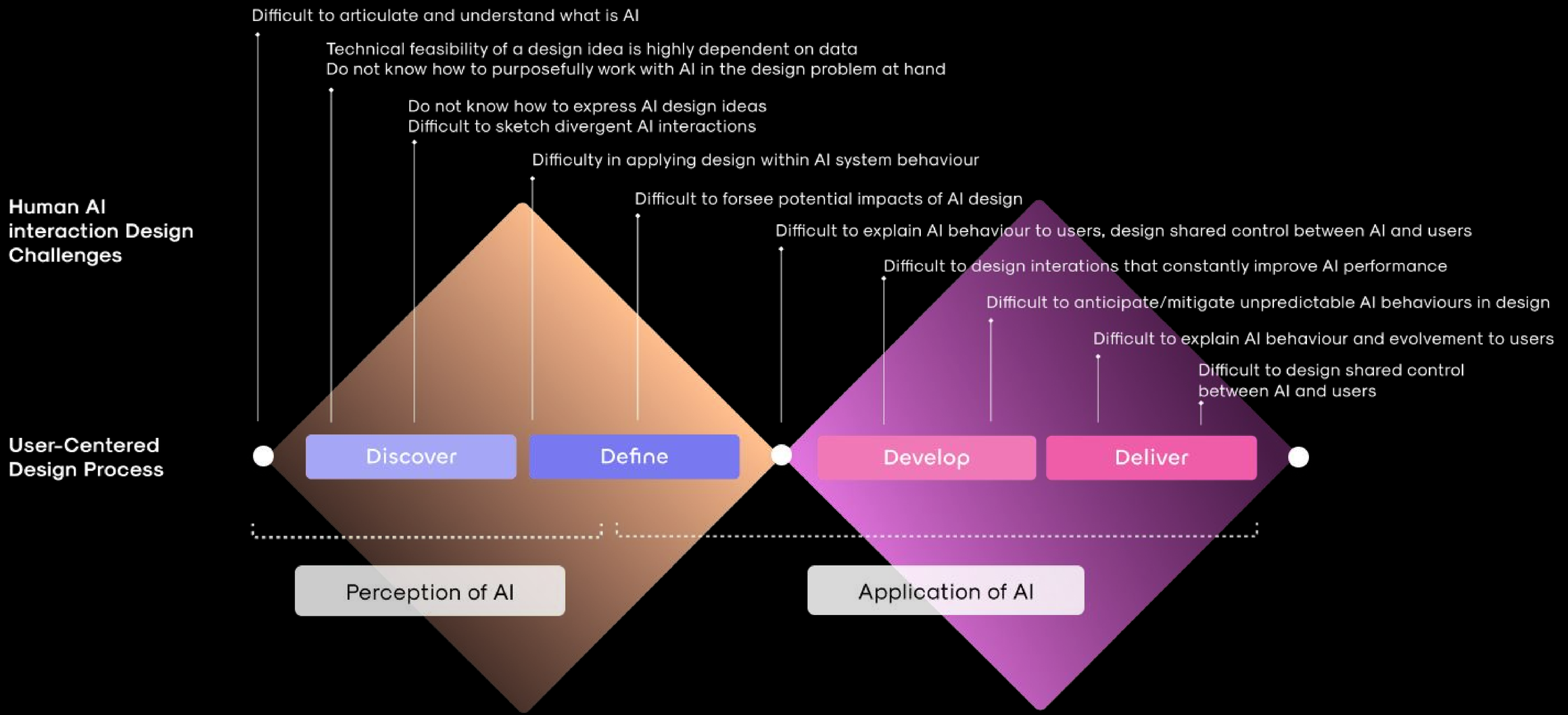


Source: Human-centered AI, The role of human-centered design research in the development of AI



Source: Human-centered AI, The role of human-centered design research in the development of AI

Limitations of design thinking in the context of AI



Reference: Re-examining Whether, Why, and How Human-AI Interaction Is Uniquely Difficult to Design

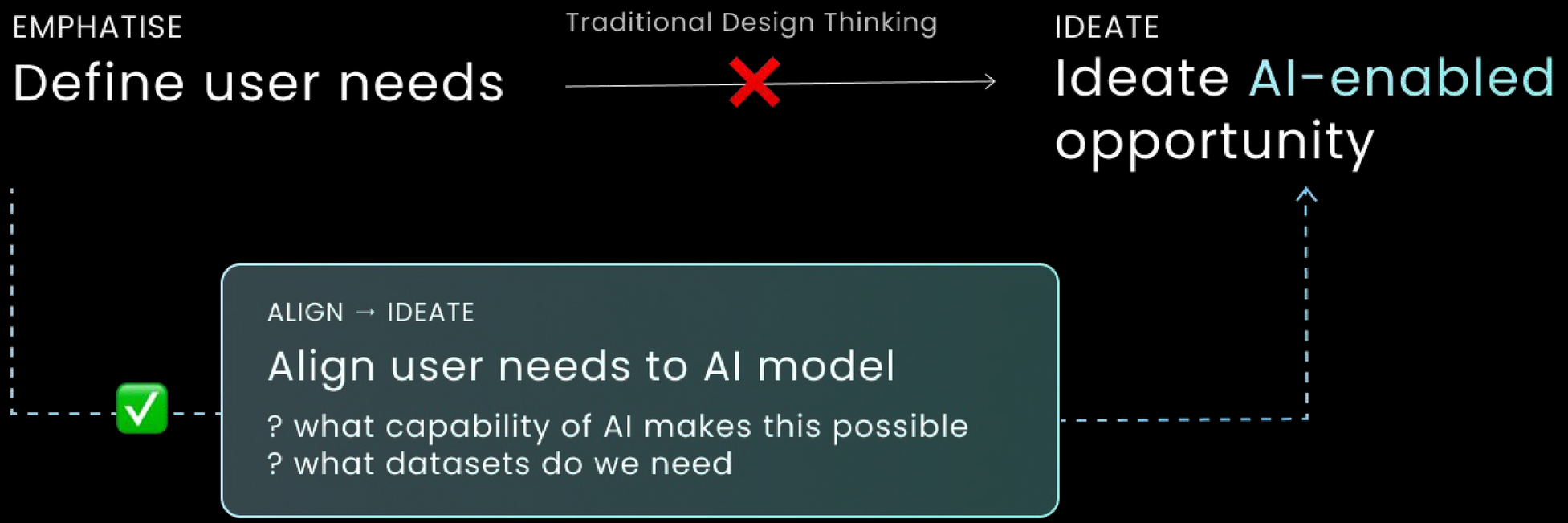
-Inniches

Design thinking with the new context of AI models

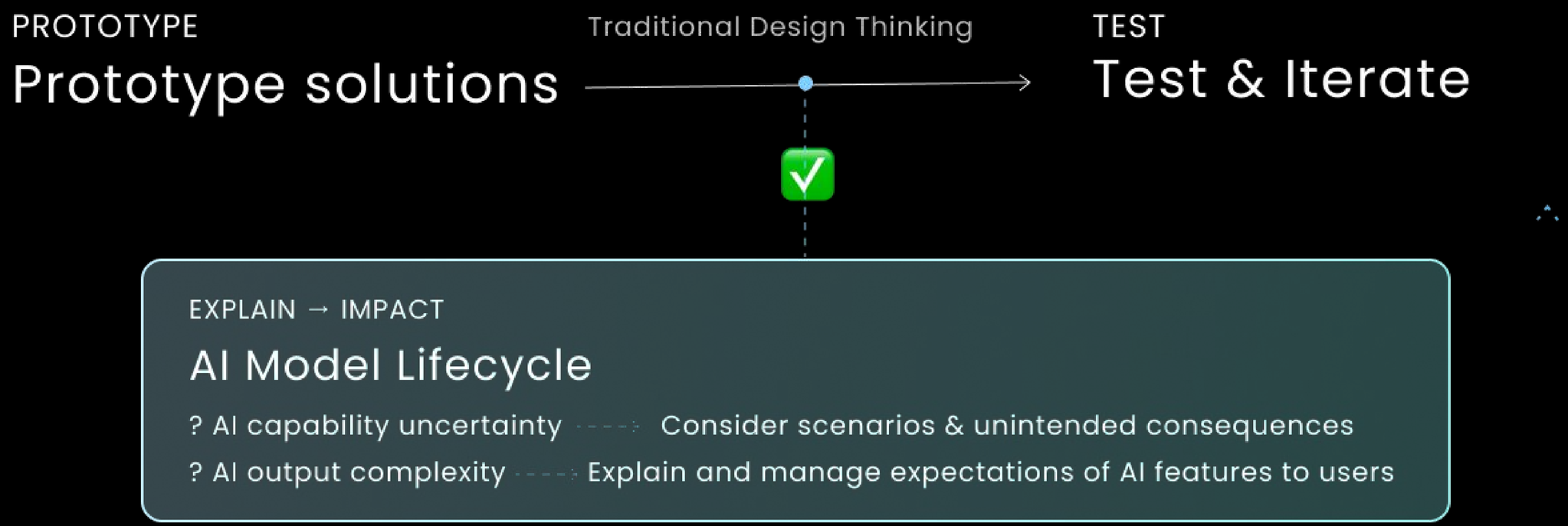
01 AI capability uncertainty

02 AI output complexity

01 AI Capability Uncertainty



02 AI Output Complexity

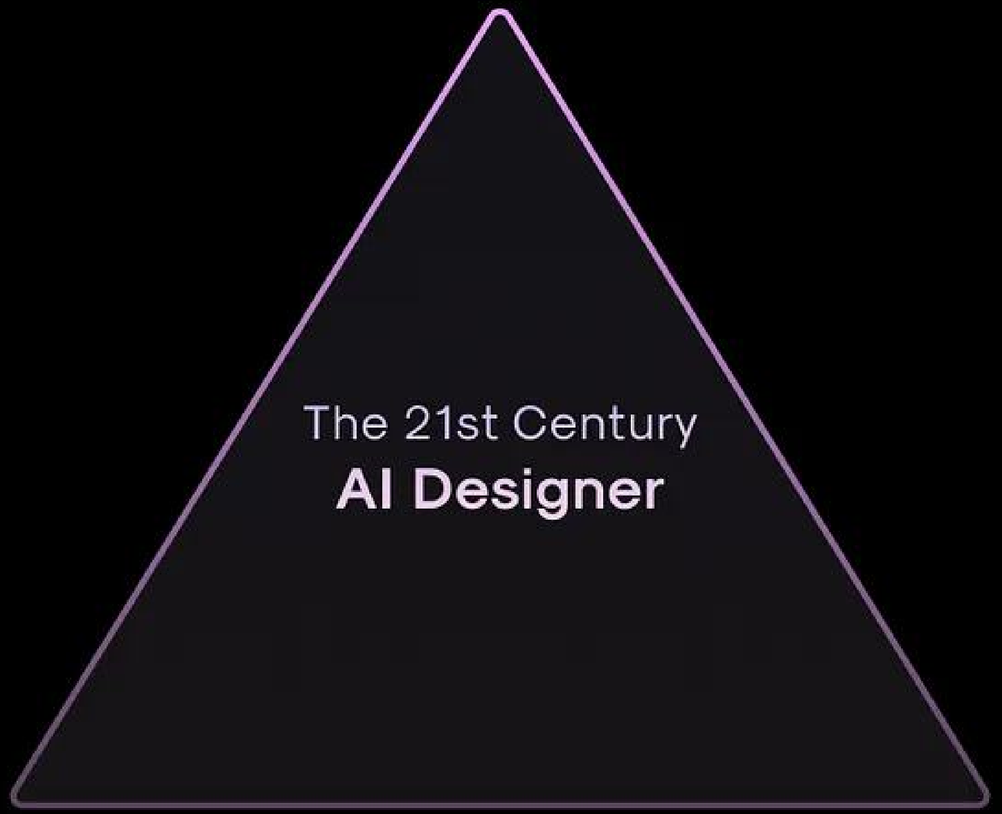


The 21st Century AI Designer

-Inniches

Design **FOR** AI

Front-end UX for AI



Design **USING** AI

Creative AI tools

Design **WITH** AI

Design Thinking in AI model development

Everyone talks about HCAI, but how?

Stanford
Human-Centered
Artificial Intelligence
HAI

MARCH 18, 2019

Stanford University launches the Institute for Human-Centered Artificial Intelligence

The new institute will focus on guiding artificial intelligence to benefit humanity.

14 October 2021 | Impact Press Releases Research Highlights

NUS, Facebook AI and other world-class universities collaborate to teach AI to understand the world through our eyes

MIT launches MIT IQ, aims to spur human, artificial intelligence breakthroughs, bolster collaboration

Perhaps the biggest takeaways from MIT IQ are that algorithms need new approaches and multiple disciplines and research areas need to collaborate to drive AI breakthroughs.

Google AI

Toward Human-Centered Design for ML Frameworks

Tuesday, March 3, 2020

How IBM Is Working Toward a Fairer AI

by Francesca Rossi

November 05, 2020

Microsoft

Advancing Human-Centered AI

Published March 18, 2019

-Inniches

Human-Centered AI

the new pan-disciplinary product design thinking for AI

HCAI Innovation Framework

1. Define

Identify business opportunities, user painpoints, and areas where AI can add value

2. Align

Align business and user needs to achievable data needs and AI inputs

3.Ideate

Brainstorm and generate ideas for new possibilities enabled by AI capabilities

4.Explain

Communicate what AI does to manage user's expectations and build trust

5. Impact

Consider impact of AI solutions across different aspects of society and evaluate unintended consequences

-Inniches

Before we put it into action...

02

AI Modeling: Building the model using algorithms and data.

03

Deployment: Implementing the model in real-world applications.

04

Simulation & Test: Evaluating the model's performance and accuracy

01

Data Preparation: Gathering and organizing relevant data

Step 1

Identify AI-enabled opportunities 🔍

Identify current painpoints and potential areas where AI can provide value

~~Can we use AI to solve _____~~

~~How might we solve _____~~

“Can AI solve this problem in a unique way?” 🤔

Identify if AI adds unique value

Pattern	Is there a user need and associated pattern behaviour?
Success	Is there a definition of success to optimize for?
Value	What is the additional non-value add of AI?
Type	Who are the stakeholders involved?

Example: Flight app

- Opportunity: How might we improve flight booking conversion for users of our app?
- User journey: Flight booking experience for user on app
- User personas: Parents looking for family vacations, Corporates travelling for business, individual travellers

user value

Improve flight booking experience + conversion of flight bookings of flight app

business value

- User need: "When to book for best price"
- User Pattern: "Check multiple sites and find the best price to book"
- Success: "Buying at the right time and price"
- Optimize" Best time to buy, avoid false price predictions"

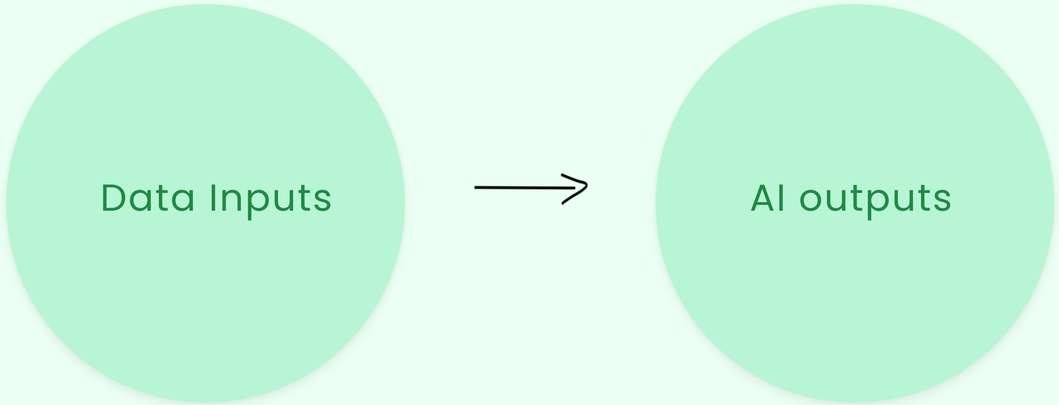
Step 2

Align user needs to data inputs 🤖

Assess how feasible to turn user needs into tangible data and AI outputs

AI model

✓ large quantity
✓ accessible data
✓ training material



? initial: inaccurate
? learn over time
? never 100% accurate
? anticipate failures

Align user needs to data

Align	Is there a user need and associated pattern behaviour?
Map	Is there a definition of success to optimize for?
Source	What is the additional non-value add of AI?
Access	Who are the stakeholders involved?

Questions to ask:

- User needs: What are the associated user needs and actions?
- Data inputs: What data needs to be collected to address this user need?
- AI outputs: What is the intended new user value? What business impact will this bring?

Example: Flight prediction

User need	AI output	Data need
when to book	• Live flight price (current) • Price prediction (future)	• Market (etc SG→ SFO) • Dates (depart, return) • Prices (current, historical)

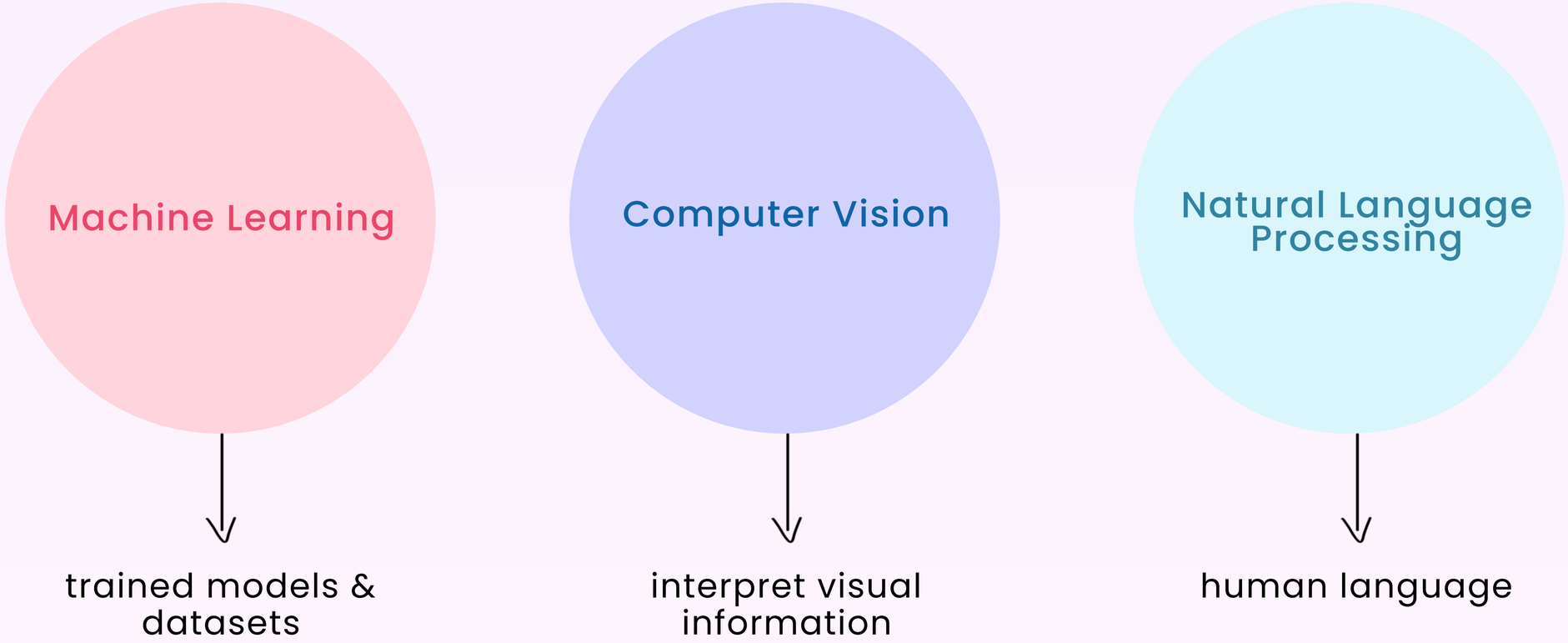
Step 3

Ideate possibilities with AI capabilities 💡

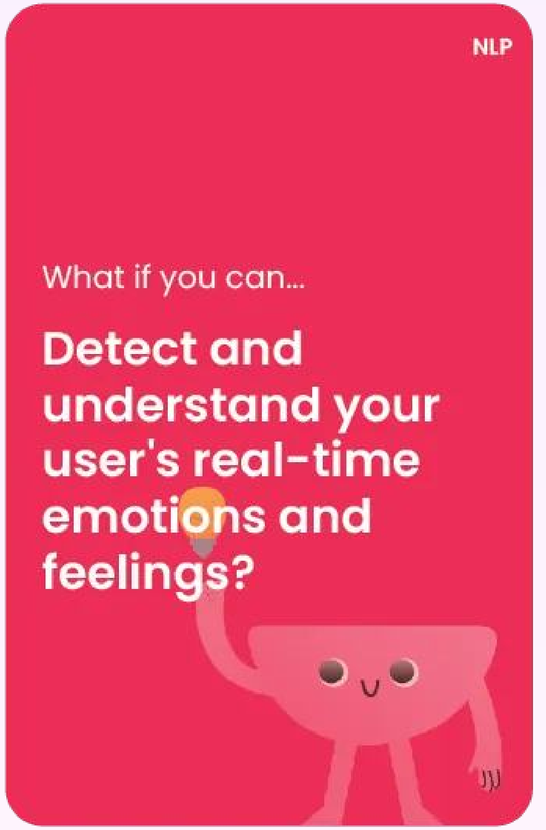
Understanding unique capabilities of AI and ideate opportunity to use AI

Ideate AI solutions

Capability	What is the unique capabilities of AI that makes this possible?
Features	What are some AI enabled features that solves your user’s painpoints?
Datasets	What datasets needs to be obtained for this AI technology to work?


Machine Learning
trained models & datasets
Computer Vision
interpret visual information
Natural Language Processing
human language

AI capability cards



What If Design Opportunity

NLP

HOW?

Emotion Recognition Systems

Detect users' emotions through facial expression detection and speech emotion recognition

Affectiva's Affex SDK, Empath's or DeepAffects' Emotion Recognition API

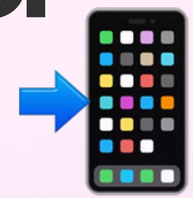
Applications

- Customer Experience Enhancement
- Virtual Meeting Analysis
- Emotion-aware Content Delivery
- Mental Health Monitoring

AI capability

Step 4

Explain AI-enabled features to users



How to explain UX of AI to users, to communicate what AI does to manage user's expectations and build trust

Explain AI solutions

Understand	How do you communicate how the AI works to users?
Accuracy	What if your AI is wrong in scenarios?
Literacy	How will users of different tech literacy understand and use your product?
	How do you build trust with users?

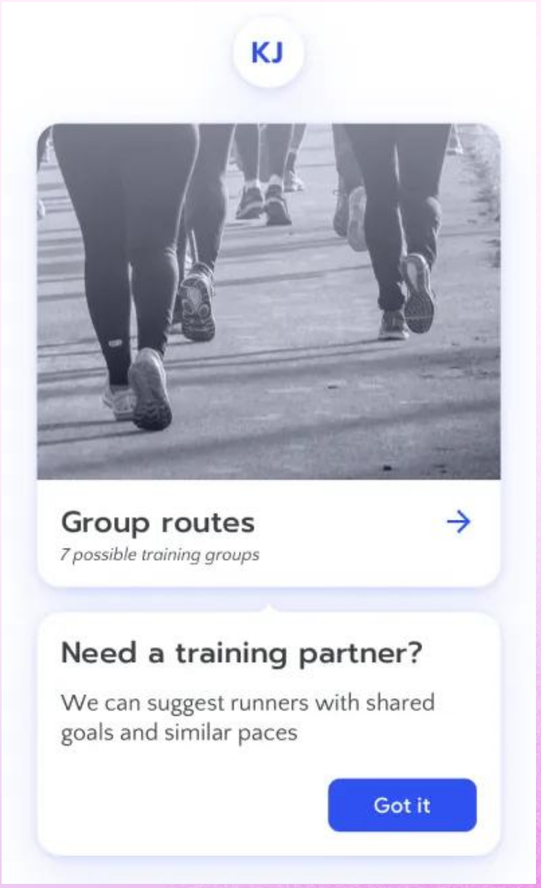
Manage user's expectations

Enable user's feedback

Empower user autonomy

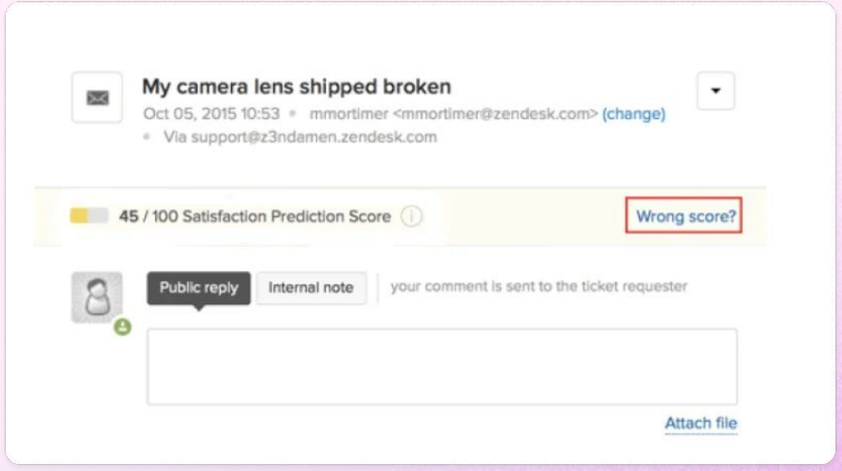
Manage user's expectations

- Never assume that users understand how to use your feature
- Introduce it at the right time of user action, in the most appropriate and relevant context



Enable user's feedback

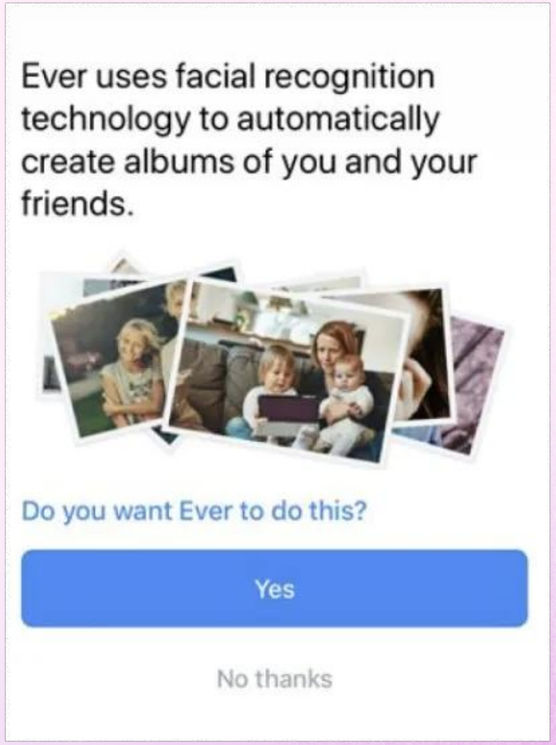
- Allow for users to provide feedback easily
- Empower users to help AI model learn from data through feedback
- Regularly communicate updates or improvements



Example - Zendesk

Empower user autonomy

- Clearly communicate how data is collected, used, and secured
- Enable user controls and customization
- Promote transparency and ownership in data handling - always ask!



Example - Ever

Step 5

Impact of AI on society 

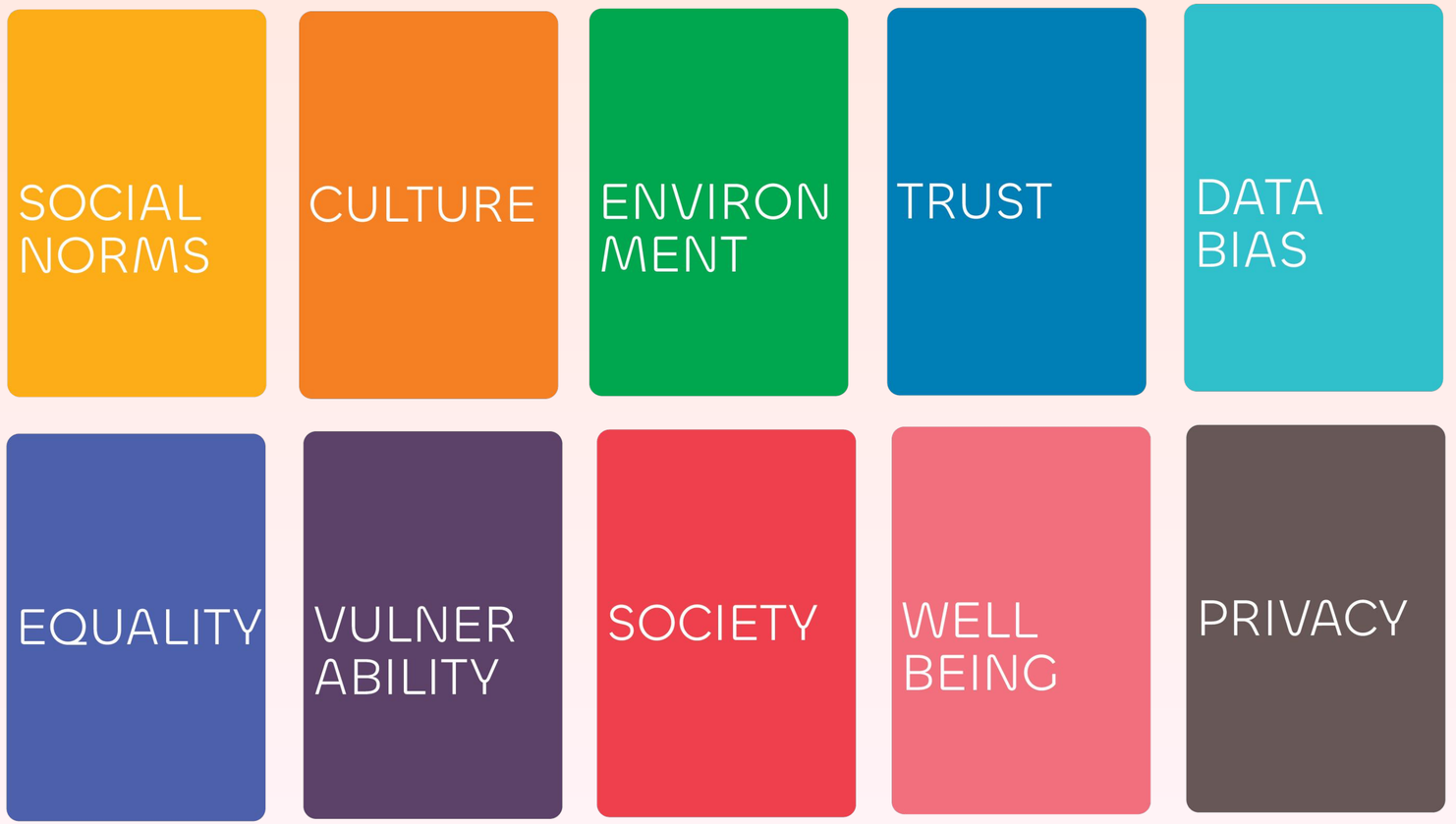
Evaluate potential societal impact of your AI solution + unintended consequences

Adopt
various lens
& scenarios

Evaluate impact
of your AI
solution

Impact of your AI solution

Impact	How will AI be used for good and bad?
Influence	How will your product affect aspects of society?
Usage	What are potential scenarios where the AI might be misused? What may be some outliers?
Scale	What may potentially happen as your solution scales?


SOCIAL NORMS
CULTURE
ENVIRON MENT
TRUST
DATA BIAS
EQUALITY
VULNER ABILITY
SOCIETY
WELL BEING
PRIVACY

SOCIAL NORMS

What happens when 100 million people use your product?

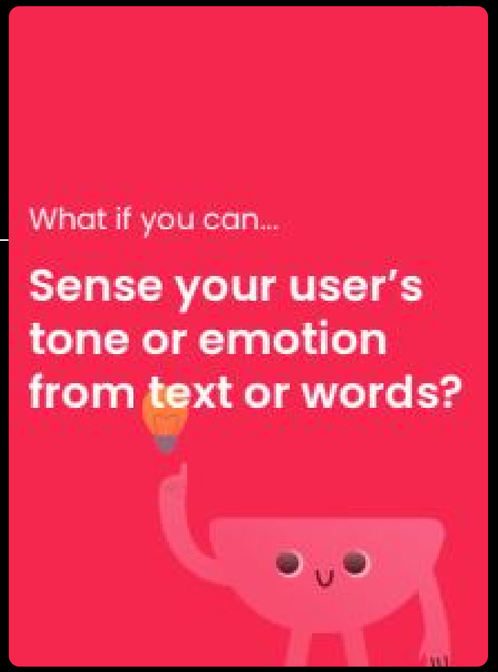
What would mass scale usage of your product reveal or cause?

In what ways can mass usage potentially become a liability?

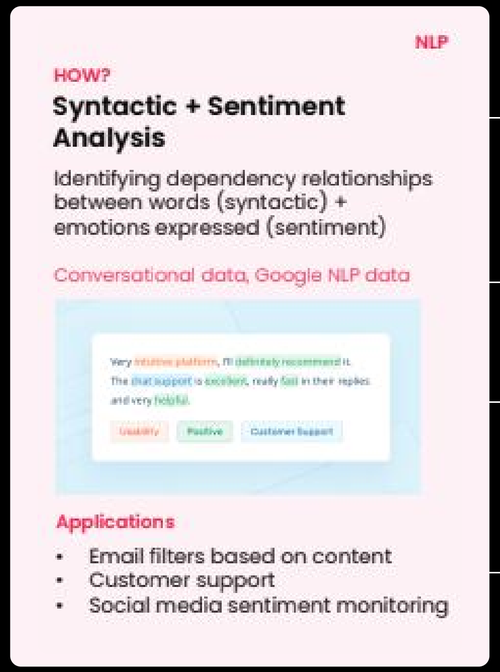
Human-Centered AI Workshops

Example: AI Capability cards

User opportunity enabled by AI



Card segmented by AI themes: ML, CV & NLP



AI Capability enabling design opportunity

Open-source public datasets available

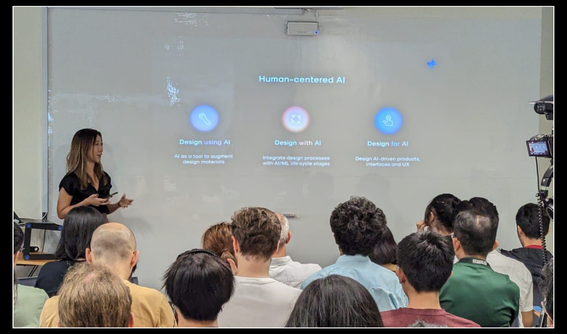
Visual graphic of AI capability

Real-life applications

Recent initiatives

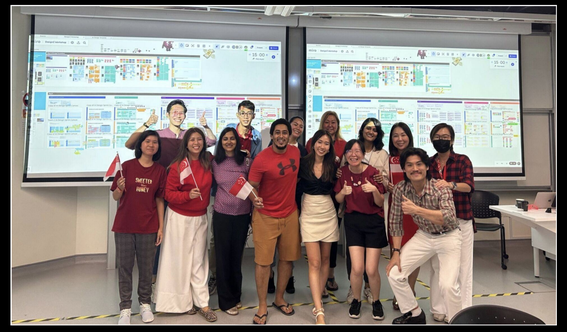
Led a 1-day HCAI sprint workshop at **UX STRAT APAC 2024** in Bangkok

AI Innovation Workshop Panelist during **Singapore Design Week 2023**



HCAI Talk at **SUTD AI Mega Center**

Developed **Human-Centered AI Design Toolkit** and card set



Conducted 2-day HCAI Workshop for **School of Technology & Design (SUTD)**

Speaker for Neural Networking event by **National AI Office** Singapore

formatif

More about my research on HCAI

Get latest dips on our upcoming HCAI workshop

Sarah Tan

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