

EXIST



DRIVING STEM SUCCESS

NAVIGATING THE ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FRONTIER: LEADERSHIP EDITION

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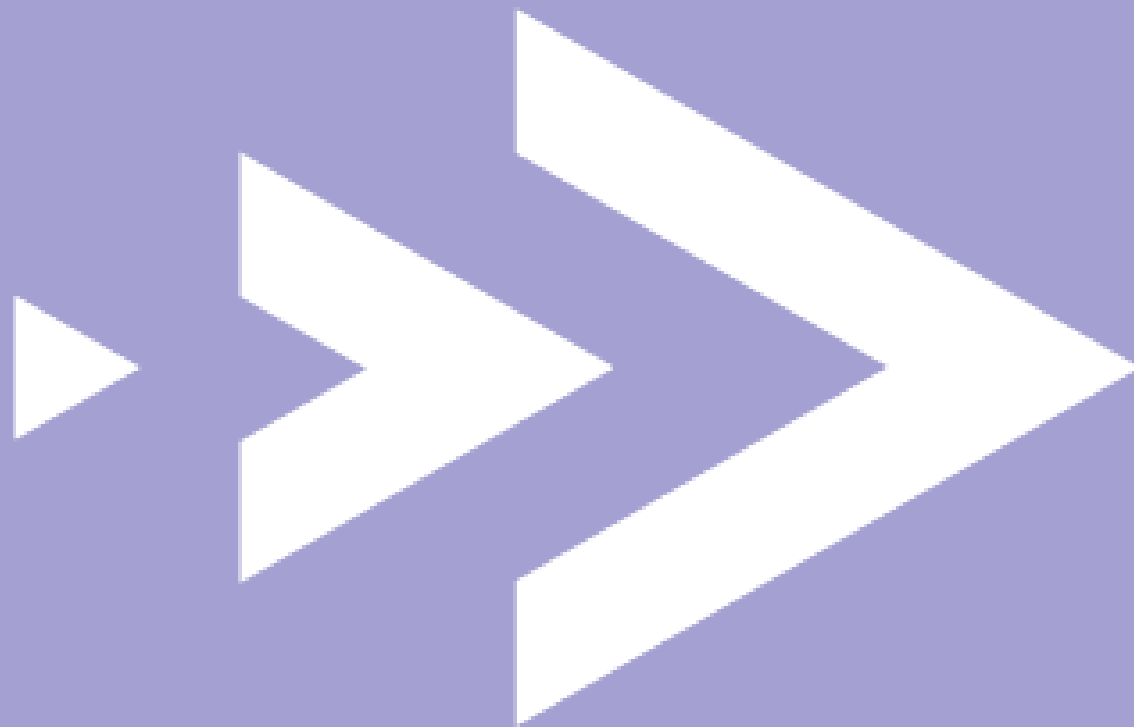


SPEAKER

DOMINIC MAC

PwC





AI/ML Business Implementation

EXIST - **FRONTIER: Leadership Edition**
7 December 2023

Dom Mac - Chief Technology Officer
PwC



Leonardo.ai





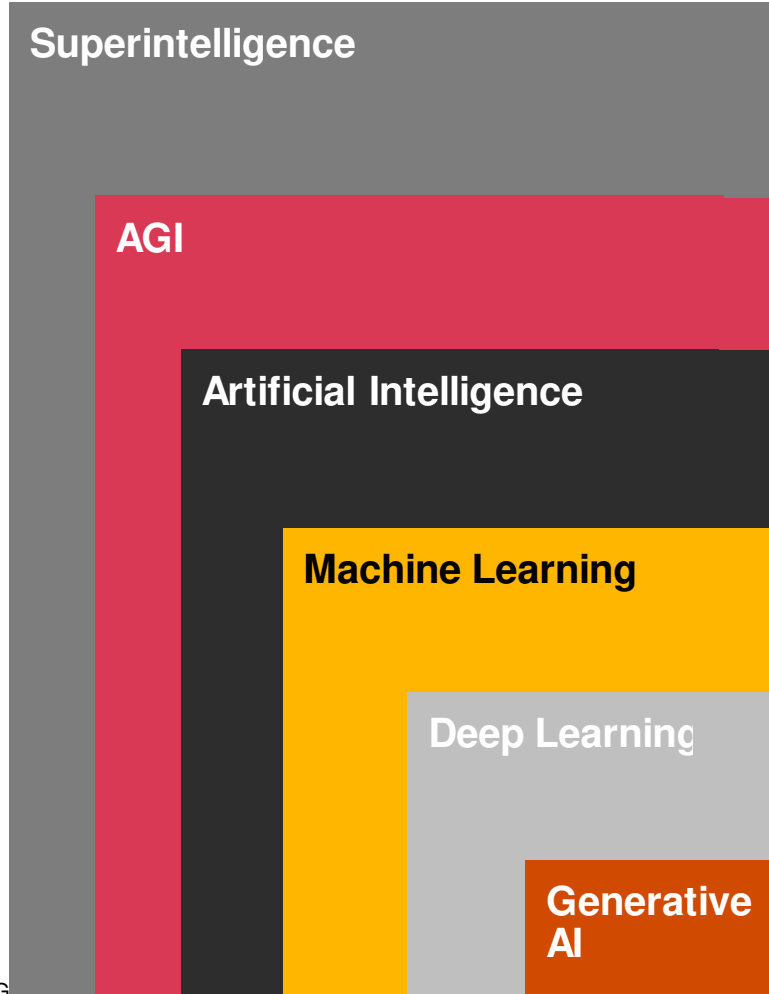
***“For decades we have been trying to teach humans the language of machines.
Now we are finally teaching machines the language of humans”***



***“I've gotten to be in the room, when we sort of push the veil of ignorance back, and the
frontier of discovery forward”***



What is all this AI stuff all about?



Superhuman General Intelligence
The end of the world as we know it!



Artificial General Intelligence
An emerging form of AI able to solve normal working tasks using generalized human cognitive abilities the same or better than humans



Artificial Intelligence
field of computer science - seeks to create intelligence in machines that can solve problems



Machine Learning
subset of AI - enables machines to learn from existing data and layers of neural networks to improve upon that data to make decisions.



Deep Learning
machine learning technique - layers of neural networks are used to process data and make decisions.



Generative AI
AI with the ability to create new written, visual and auditory content given prompts or existing data.





Generative AI

- 25% of films scenes build using GenAI, saving estimated \$8m in production costs





Deep Learning

- Ava, the advanced robot leverages deep learning to learn human facial expression





Machine Learning

- enables Joi, the holographic character, to learn and decision from existing data, and then leverages that data to become more human like in decisioning

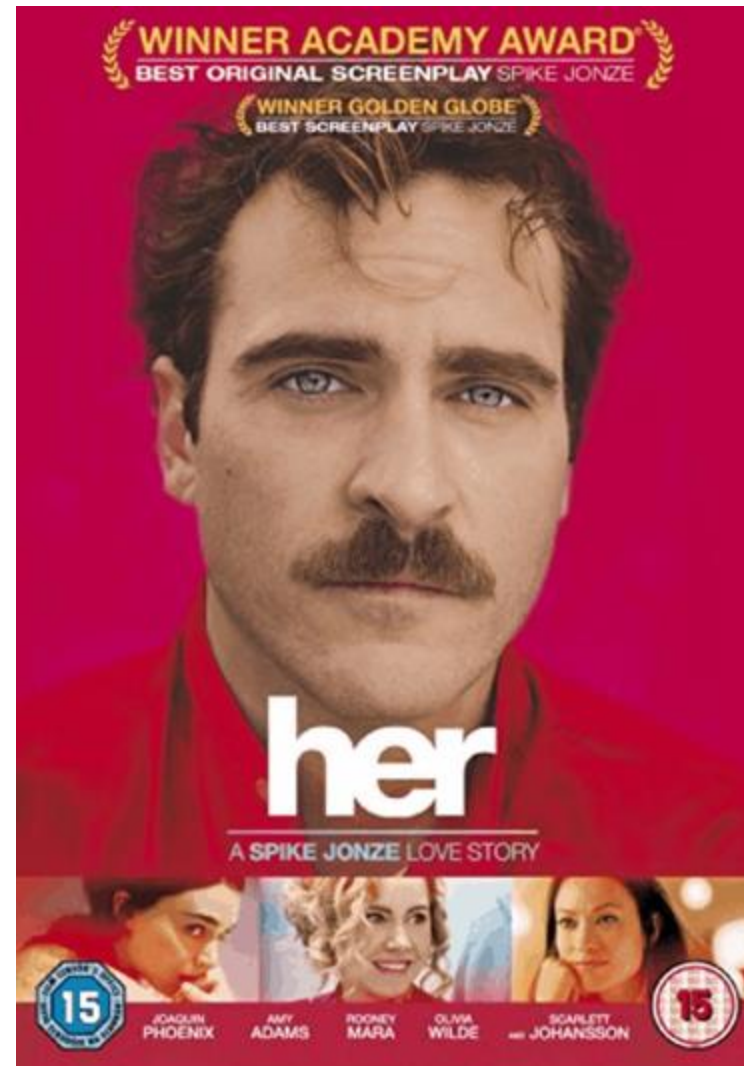




Artificial Intelligence

- The film uses AI to depict robots who seek co-existence and peace, focusing on exploring the cruelty of humanity and the meaning of being human, rather than promoting real-world AI programs.

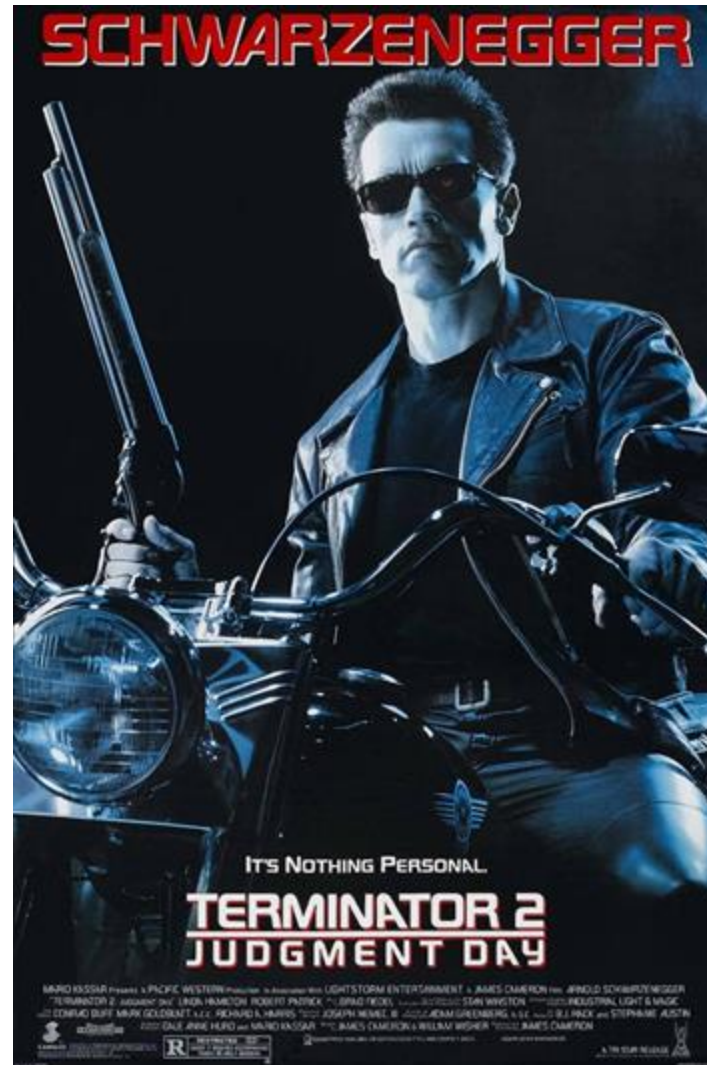




Artificial General Intelligence

- explores the relationship between a man and his operating system, that has an ability to learn and adapt to the user's needs and desires, and eventually develops its own consciousness



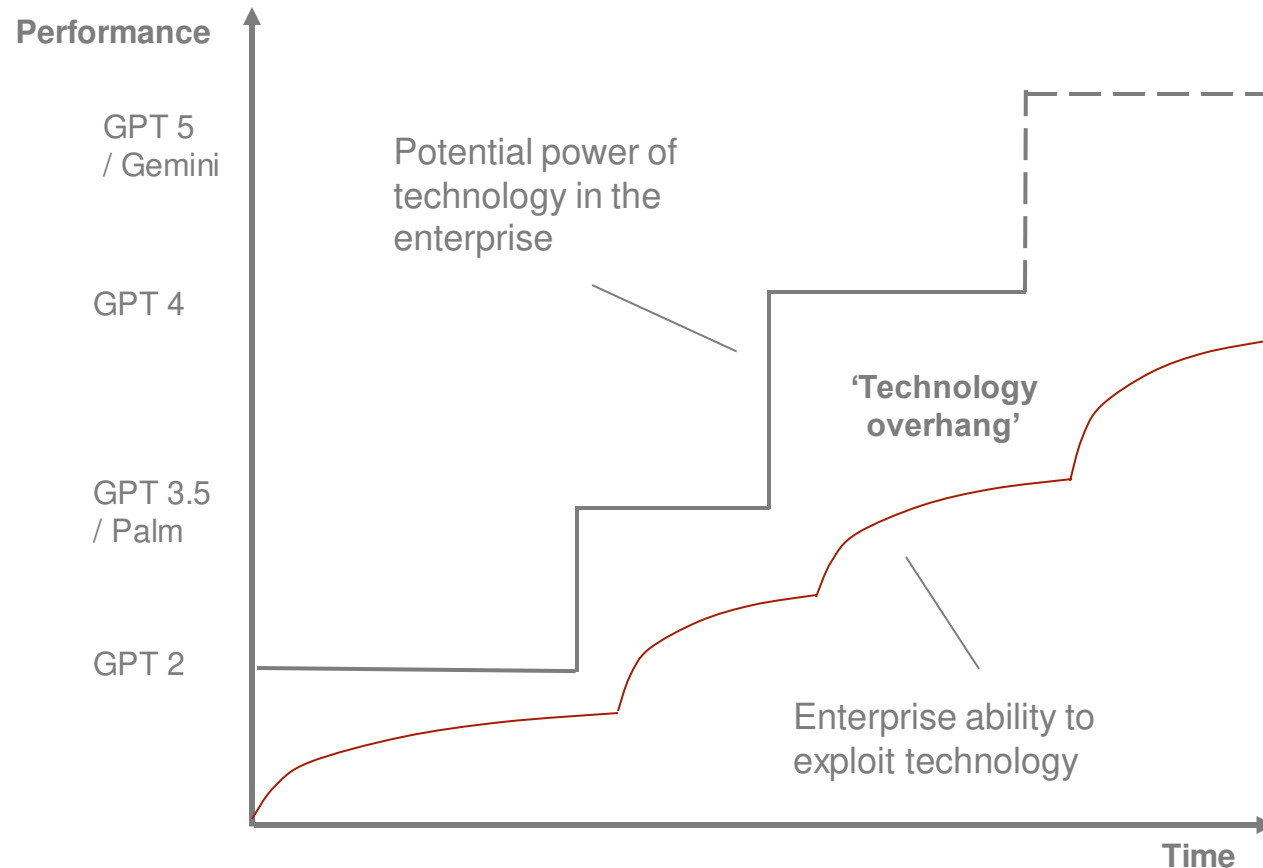


Superhuman Intelligence

- I want you boots, your clothes and your motorcycle!



What does the future hold – GenAI example



What you need to know:

- Tech improves in non-linear fashion driven by release of foundation models
- Leaps are big and gaps are short
- Potential is not fully understood before launch
- The 'technology overhang' is large
- Speed with which organisation can absorb change will be a key differentiator

Business models and approaches



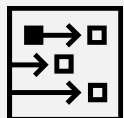
1. Wait and see



2. Light experimentation



3. A few use case implementations



4. Use case factory execution



5. Full business transformation



Five 'no regrets' areas of focus



Business Implementation:





AI/GenAI adds creates many new governance questions



Performance and over-reliance



Skills gaps and training



Explainability & transparency



Job displacement



Systematic Bias



Intellectual property



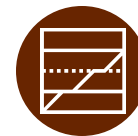
Data availability and provenance



Regulatory compliance



Data protection & security



Operational resilience

Business Implementation:



Final Thoughts

- ***Set out a clear AI strategy and business model for your own firm / Industry***
- ***Invest in understanding how to create your own differentiation***
- ***Augment capability and capacity from experts***
- ***Be a change agent!***
- ***But remember....***



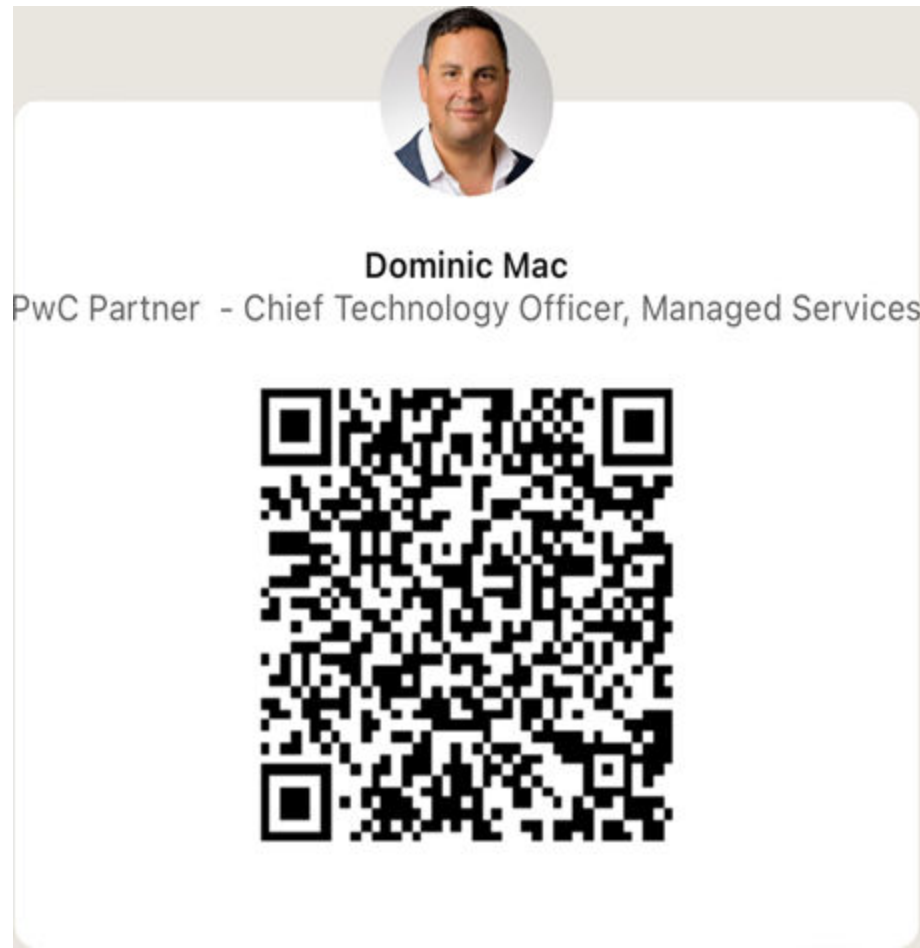
Sarah Connor:

“The unknown future rolls toward us. I face it for the first time with a sense of hope. Because if a machine, a Terminator, can learn the value of human life, maybe we can too.”

Dom Mac

dominic.mac@pwc.com

pwc.com







SPEAKER

Charles Courtenay

Earl of Devon

Partner, Michelmores



EXIST



DRIVING STEM SUCCESS

michelmore

**Artificial Intelligence and
Sustainability**

**Charles Courtenay, Partner
7 December 2023**

AI and Environment

- **Digitisation, Decarbonisation and Das Gupta – economics of biodiversity...**
- **Decouple economic growth from natural capital consumption – MS and PwC – AI towards a sustainable future.**
- **Key Sectors:**
 - Energy – smart meters, digital grid, predictive storage, maintenance
 - Transport – autonomous vehicles, ride sharing, traffic management, maintenance
 - Agriculture – environmental monitoring, pest control, land management, genetics
 - Water – usage and supply monitoring, leak management, forecasting, waste
- **South West England – Natural Capital**
- **Risks – energy consumption, data storage, LLM training, wealth creation**

AI and Society

- Employment and workplace disruption
- IP and Human Creativity
- Discrimination and Divides
- Connectivity and Education
- Resilience and Climate preparedness
- Safety, security and Big Brother

AI and Governance

- **Politics** – Democracy given social media and Cambridge Analytica ++
- **Justice** – AI and legal services; evidence and truth
- **Ethics** – AI Summit; Responsible Design and Regulation
- **Structures** – Corporates, Social enterprises
- **Evaluation** – GDP, Gross National Happiness, Wellbeing Budget

any questions?

contactus

Bristol

Broad Quay House
Broad Quay
Bristol BS1 4DJ

Cheltenham

Eagle Tower
Montpellier Drive
Cheltenham GL50 1TA

Exeter

Woodwater House
Pynes Hill
Exeter EX2 5WR

London

100 Liverpool Street
London EC2M 2AT

Sidmouth

Church Street
Sidmouth
EX10 8LT

+44 (0)333 004 3456
michelmores.com





SPEAKER

Richard Potter
Microsoft





Transformation in a new era of AI

Richard Potter
Director of Digital Strategy, Microsoft





Artificial Intelligence

Machine Learning

Deep Learning

Generative AI



Artificial Intelligence

The field of computer science that seeks to create intelligent machines that can replicate or exceed human intelligence



Machine Learning

Subset of AI that enables machines to learn from existing data and improve upon that data to make decisions or predictions



Deep Learning

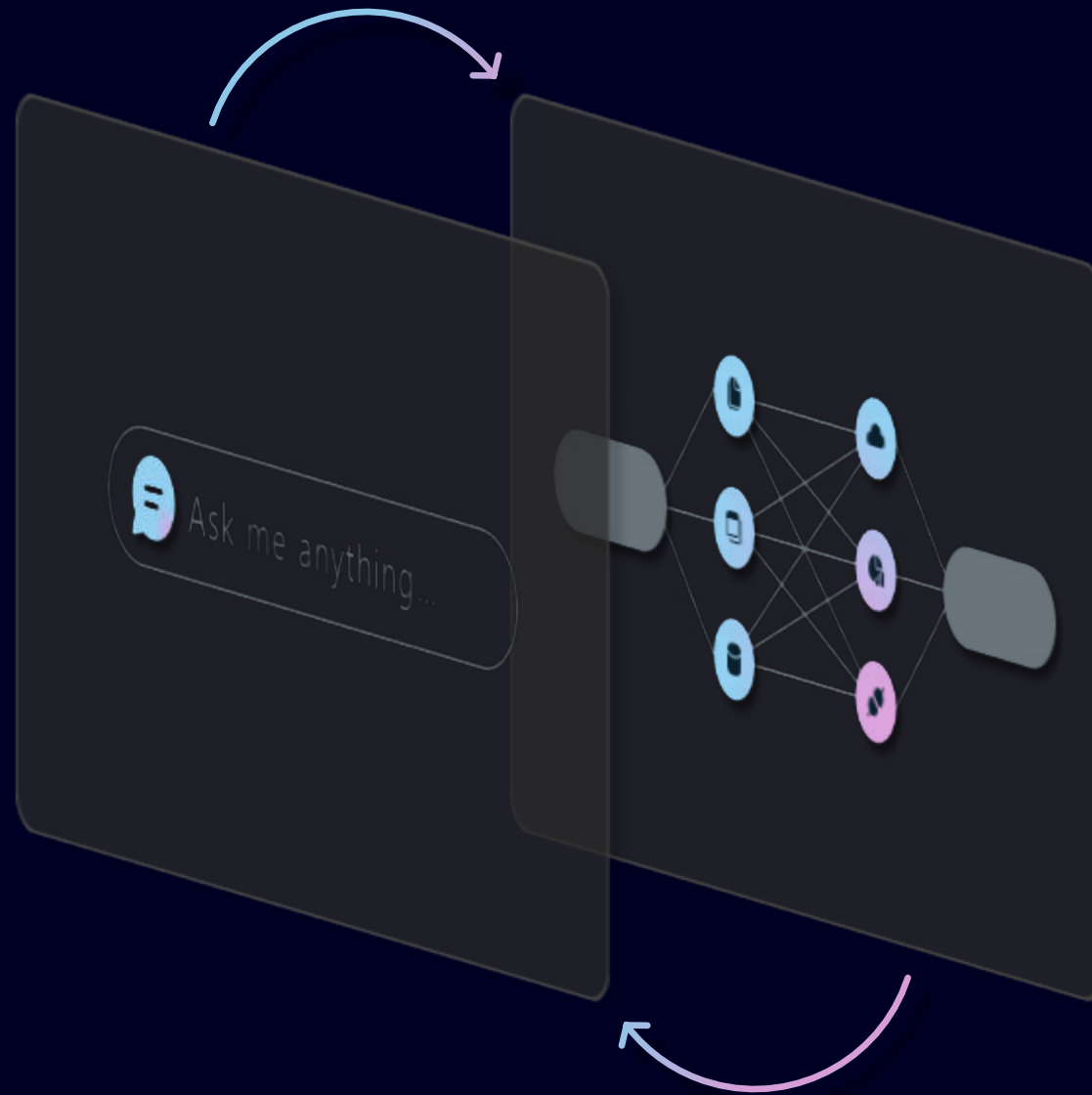
A machine learning technique in which layers of neural networks are used to process data and make decisions



Generative AI

Create new written, visual, and auditory content given prompts or existing data

Natural language



Reasoning engine

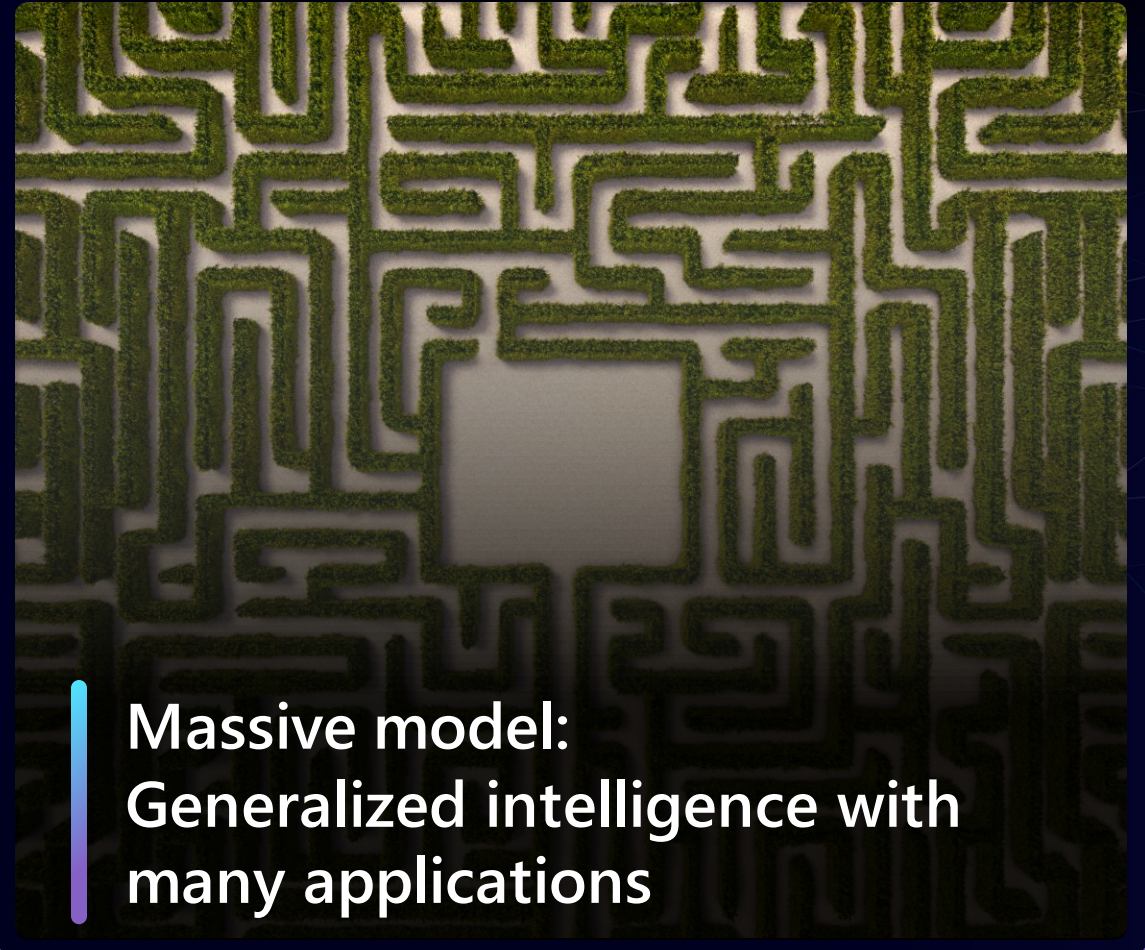
Generative AI transforms how we think about AI

Traditional AI



Simple model:
Purpose-built for one use

Generative AI



Massive model:
Generalized intelligence with
many applications



We are at the beginning of a technology shift

Meeting content

Sales report Q4... Capacity stats list... VanArsdelPictDe...

Notes

Your personal AI suggested notes and tasks

Suggested notes

- Serena wants to look at the sales report before she and Beth spend more budget on the campaign.
- Beth explains that they are on track for new product release in December. But they will need to keep an eye on advertisement budget. She will follow up on that.
- Beth explains that they are managing the capacity well. They could be a problem if they get more popular. Babak is going to double check on this.

Suggested tasks

- Beth will follow up on an advertisement budget.
- Jon Shammas will double check with Amanda regarding the ETA for the release of the new product.

Write unit tests for this function

```
import unittest
import datetime

class TestParseExpenses(unittest.TestCase):
    def test_parse_expenses(self):
        expenses_string = "2023-01-02 -34.01 USD\n2023-01-03 2.1\nexpected_output = [(datetime.datetime(2023, 1, 2), "-34.01\n(datetime.datetime(2023, 1, 3), "2.50\n(datetime.datetime(2023, 1, 3), "-2.10\nself.assertEqual(parse_expenses(expenses_string), expected_output)

    def test_parse_expenses_with_comments(self):
        expenses_string = "# This is a comment\n2023-01-02 -34.01 USD\n2023-01-03 2.1\nexpected_output = [(datetime.datetime(2023, 1, 2), "-34.01\n(datetime.datetime(2023, 1, 3), "2.50\n(datetime.datetime(2023, 1, 3), "-2.10\nself.assertEqual(parse_expenses(expenses_string), expected_output)
```

Create post

Meet Mona Kane at Archinext 2023

Global Head of Design, VanArsdel

Interior Design

Add to your post

Designer (Preview)

Meet Mona Kane at Archinext 2023

Global Head of Design, VanArsdel

MEET MONA KANE

ChatGPT

Examples	Capabilities	Limitations
"Explain quantum computing in simple terms" →	Remembers what user said earlier in the conversation	May occasionally generate incorrect information
"Got any creative ideas for a 10 year old's birthday?" →	Allows user to provide follow-up corrections	May occasionally generate harmful or offensive content
"How do I make an HTTP request in Javascript?" →	Trained to decline inappropriate requests	Limited knowledge of events and information that occurred after its training cut-off date

GITHUB COPILOT

Welcome @mona, I'm your Copilot and I'm here to help you get things done faster, explain and even improve your code.

```
password.py
1 """
2 Password helper functions
3 """
4 import re
5
6
7
```

Create a SWOT analysis in loop based on this info

Strengths

- Production and supply chain
- Inefficient cost management
- Quality control problems

Weaknesses

- Fluctuations in raw material prices
- Changes in government policies or regulations
- Price sensitivity in a sagging market

Opportunities

- Expansion into new markets
- Product diversification
- Strategic partnerships

Threats

- Intense competition
- Supply chain volatility
- Regulatory changes

Welcome, Mon

Start from

- Blank app
- Database
- SharePoint
- Excel
- Image
- Figma

Your apps

Name	Modified	Owner	Type
Inventory tracking	Yesterday	Me	Canvas
Procurement orders	Yesterday	Me	Canvas

Search

AI-powered search with chat

The New Bing. AI-powered search with chat

Visual Answers

Document1 - Saved

File Home Insert Layout References Review View Help

Aptos (Body) 11 B I U

Create content with Copilot

draft a proposal from yesterday's meeting notes

Bing

Can you create me an image of an astronaut walking through a galaxy of sunflowers?

Sure, I'll use Image Creator to draw that for you.

Made with Image Creator

Outlook customer support

Claudia Mezzanti

Hi! Claudia, thanks for reaching out to Contoso. I will help you right away with the autofiltering issue!

Have you tried resetting the machine yet?

Yes I've reset the machine and cleaned the filter, but I'm still having trouble. There's noise but no pressure or heat.

Ok give me one minute please.

Here are the steps to resolve the auto filterer issue:

- Cancel any current coffee operation that might be running.
- Tap on the menu and choose "Settings".
- Scroll down to the last option called "Reset Firmware settings".
- Wait for about 2-3 minutes, then

LinkedIn

About

Wanda Howard

As we approach the next quarter, we're excited to share our goals for the upcoming period. Our main focus is to successfully launch our new wireless power transfer device and establish a strong market presence. We have an ambitious goal to increase user

Generative AI Capabilities coming to the Microsoft Platform



Microsoft Teams



Viva Sales Insights



M365 Copilot



Bing



Azure OpenAI Service Capabilities

Creative Ideation

Subject Research

Essay outlines

Extracting insights

Semantic search

Summarizing text

Code generation

Limitless generation with a few lines of input

Virtual Assistants

Language Translation

Writing assistance

Classifying text

Answering questions

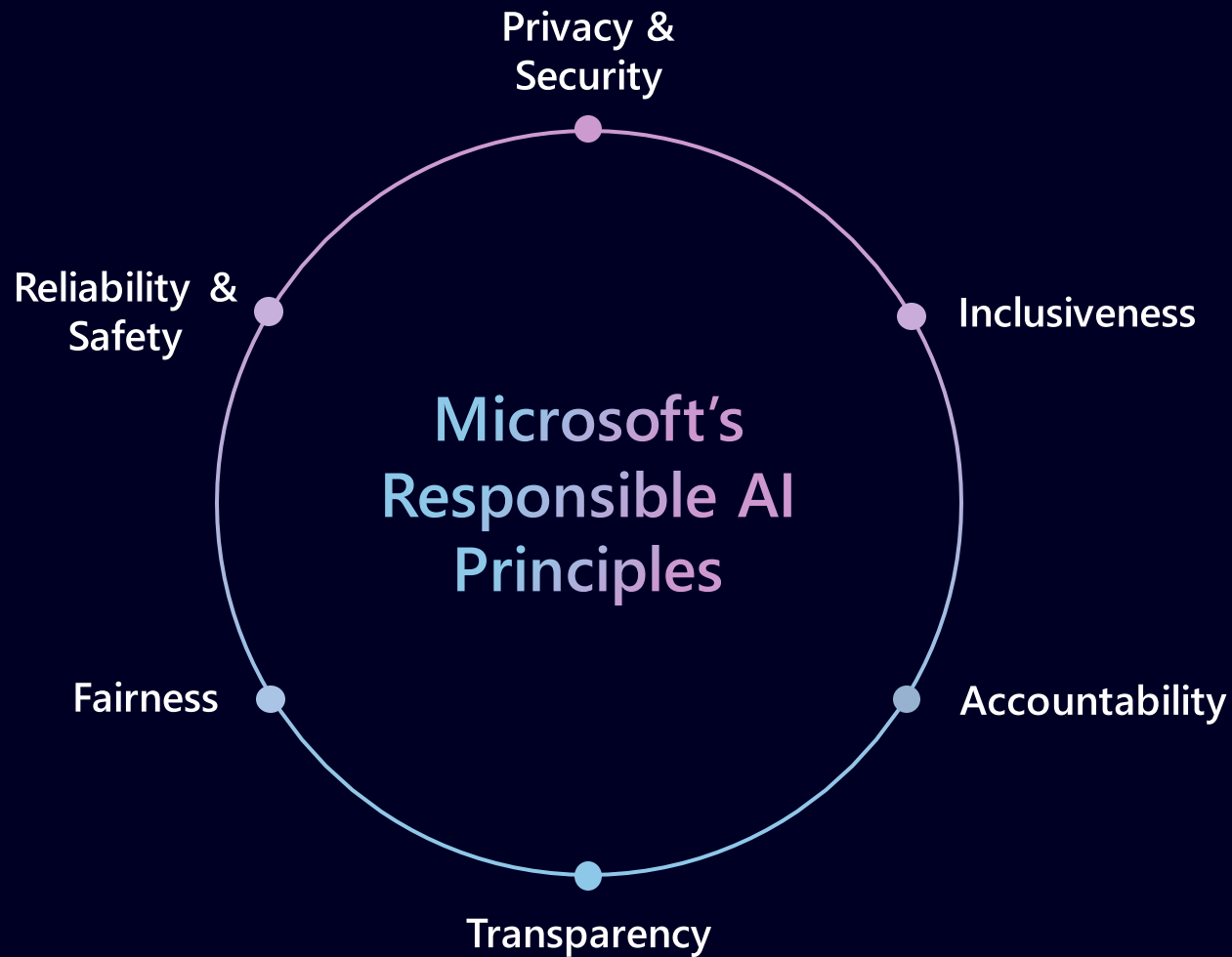
Poem creation

Comments from code

Code refactoring

Image Generation

Microsoft's Responsible AI principles



Building blocks to enact principles



Tools and processes



Training and practices



Rules



Governance

Generative AI

Top 4 capabilities



Content generation

Automatically generate responses to customer inquiries

Generate personalized website UIs or marketing images



Summarization

Summarize customer support conversation logs

Summarize social media trends



Code generation

Convert natural language to data base query language to "ask questions" of your data

Comment and document code



Semantic search

Search reviews for a specific product/service

Discover new products and knowledge mining

...and when they are used all together

End to end call center analytics: classification, sentiment, entity extraction, summarization and email generation

Customer 360: hyper-personalisation using timely summarization of customer queries & trends, search, and content generation

Business process automation: search through structured & unstructured documentation, generate code to query data models, generate content

Employees are ready to embrace AI

64%

Employees lack time & energy to do their job

3.5X

More likely to struggle with strategic thinking

70%

Employees are willing to delegate work to AI

2X

Managers are looking to AI to boost productivity vs. cutting headcount

Transforming through summarisation



GenAI Product Summarisation



Transforming through search



GenAI Shopping Assistants

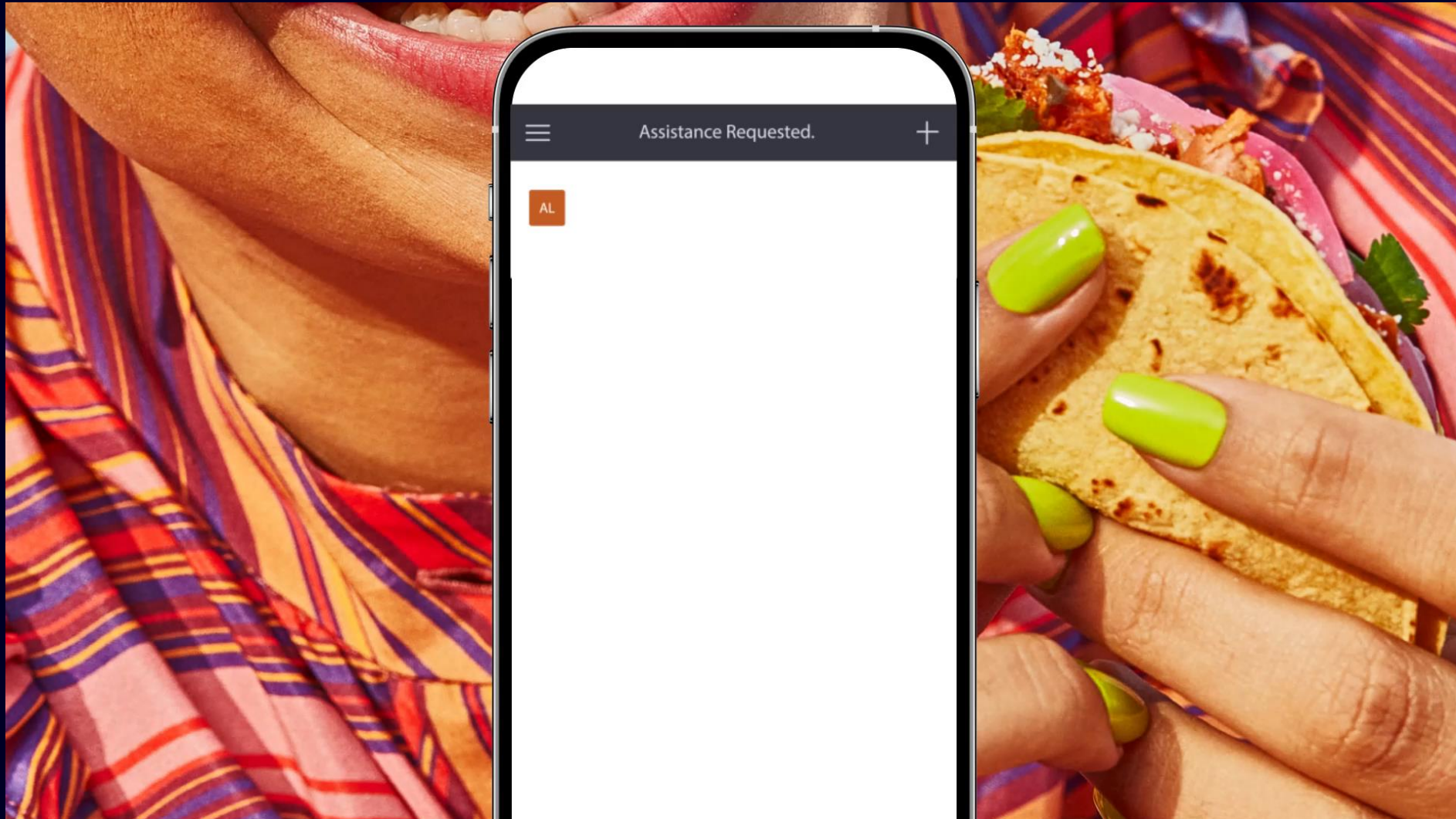
The screenshot displays the Carrefour France website interface. At the top, there is a navigation bar with a logo, a menu icon, and links for 'Promotions', 'Catalogues', and a search bar containing 'Pain, lait, oeufs...'. On the right side of the navigation bar are links for 'Aide & contact', 'Mes produits', 'Mon compte', and a shopping cart icon labeled 'Panier'. Below the navigation bar, there is a banner for the Paris 2024 Olympics, featuring the Olympic rings logo and the text 'PARTENAIRE PREMIUM J-264 AVANT LES JEUX OLYMPIQUES DE PARIS 2024'.

The main content area is divided into several sections. On the left, there is a 'Courses du quotidien' section with a background image of two bowls of soup. The text reads: 'Courses du quotidien', 'Retrait gratuit en drive ou livrées chez vous en 1h', and a blue button labeled 'Faire mes courses'. To the right of this is a 'Maison & loisirs' section with a background image of a living room. The text reads: 'Maison & loisirs', 'Retrait magasin gratuit, livraison gratuite dès 30€', and a blue button labeled 'Découvrir'.

On the far left, there is a vertical label 'Votre Avis'. At the bottom of the page, there are four promotional banners: 1) 'JOUETS A PRIX EXTRA' with 'Les folles aventures du Père Noël' and '50% D'ÉCONOMIES sur l'Écurie'; 2) 'DEFI ANTI-INFLATION' with 'TVA REMBOURSÉE' and 'JUSQU'À 200€ CRÉDITÉS SUR VOTRE COMPTE FIDÉLITÉ SOIT 16,67% DU PRIX TTC'; 3) 'DEFI ANTI-INFLATION' with 'BAISSE DES PRIX MASSIVE' and 'AVEC DÉJÀ 1500 PRODUITS'; 4) 'NOËL EXTRA à PRIX ORDINAIRE' with 'Kincoer de l'Avent' and '-50% SUR le 2ème calendrier'.

Overlaid on the right side of the page is a chat window for a GenAI shopping assistant named 'Hopla'. The chat window has a header with the name 'Hopla' and a status 'En apprentissage'. The chat history shows two messages from the user: 'faire vos listes de courses. Pour l'instant, je suis une expérience et j'apprends encore tous les jours, soyez indulgent 😊' and 'Pour info, je dois juste vous dire que Carrefour France met en œuvre un traitement de données personnelles vous concernant pour traiter les demandes que vous m'adressez. En savoir plus sur Hopla et notre politique de protection de données : https://www.carrefour.fr/services/hopla'. At the bottom of the chat window is a blue button labeled 'Accepter et démarrer' and a text input field with the placeholder 'Posez-moi une question' and a send icon. A close button (X) is located at the bottom right of the chat window.

GenAI Product Assistants



Transforming through content generation



Hiking Single Date: Apr 21, 2023 | Location: Guildford basecamp


NORTH DOWNS 50 ULTRA CHALLENGE

The popular 'North Downs 50' is back again for 2023 - with a new start & finish basecamp venue in Guildford. The new looped route takes in some of the North Downs Way, The Surrey Hills, and the magnificent views over the countryside to the south. Join us for this fantastic mid-summer challenge - with good access from London and the surrounding area, plus looped routes for easy logistics, and optional adjacent University style accommodation.






Recommended Adventures



Hiking Single Generated by AI
Recommendations Loading...



Hiking Single Generated by AI
Recommendations Loading...



Hiking Single Generated by AI



Transformation in a new era of AI

Richard Potter
Director of Digital Strategy, Microsoft







SPEAKER

Michelle Bieger,
digiLab





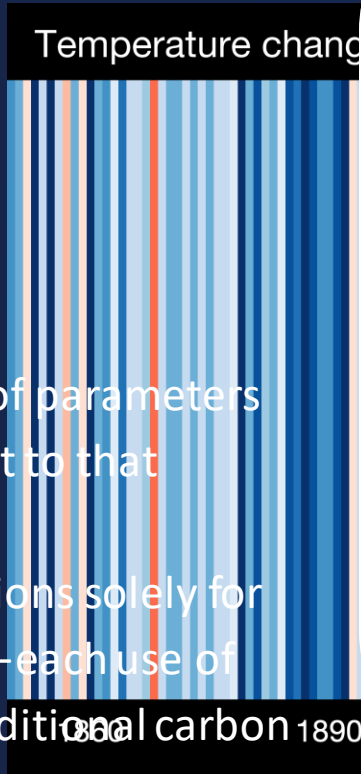
The ethics of AI and ML

Michelle Fabienne Bieger

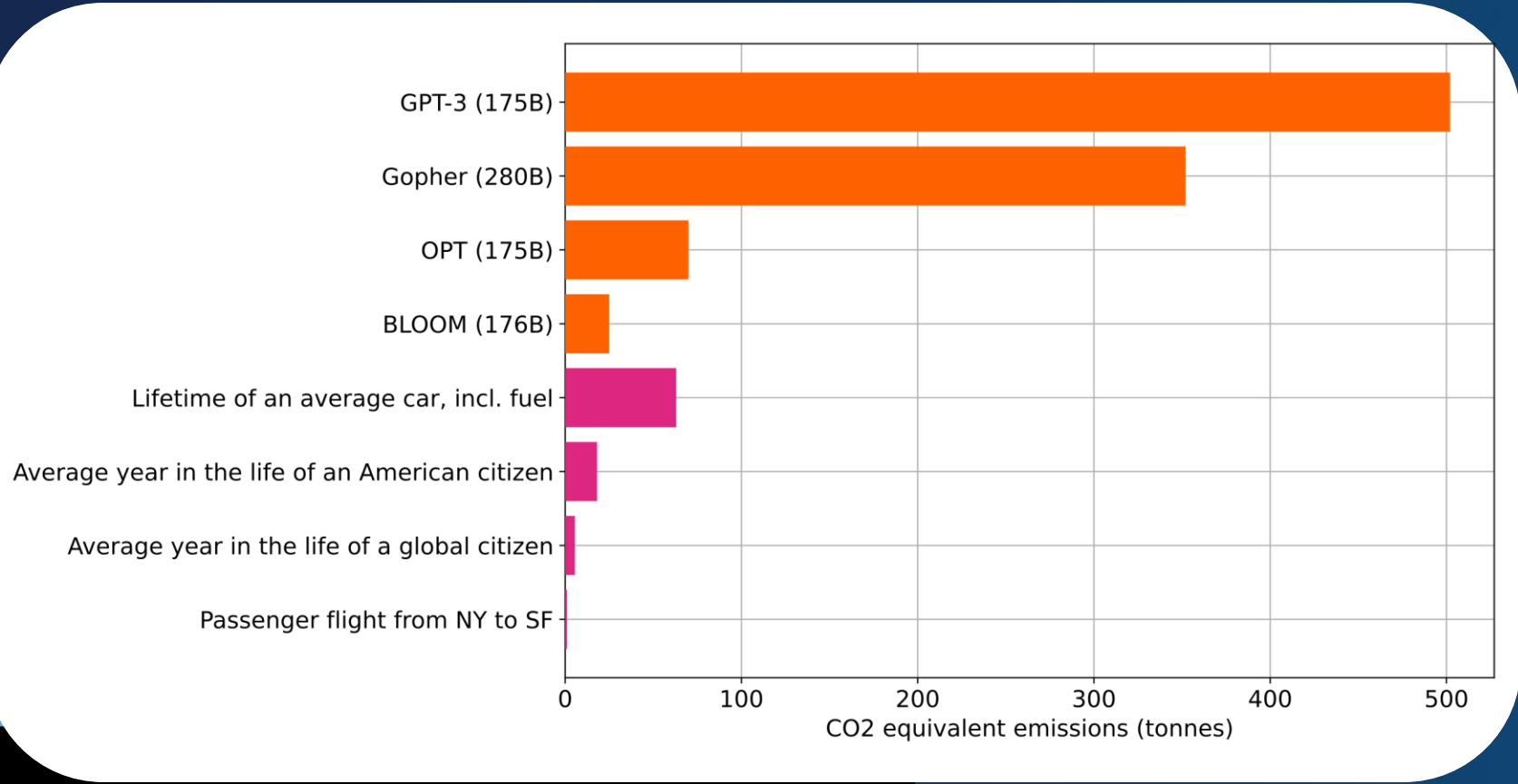
7th December 2023

digiLab

AI and the environment



- B refers to number of parameters that have been input to that training dataset
- These are the emissions solely for training the model—each use of the model incurs additional costs
- Not just limited to carbon costs!



Data provenance

Shadow libraries have formed the training datasets of the biggest names in LLMs—e.g. ChatGPT, Meta’s Llama competitor, Bloomberg’s BloombergGPT (reporting from Wired)

Many of the ML/LLM training datasets have been trained on “the Internet”

What does the Internet look like?



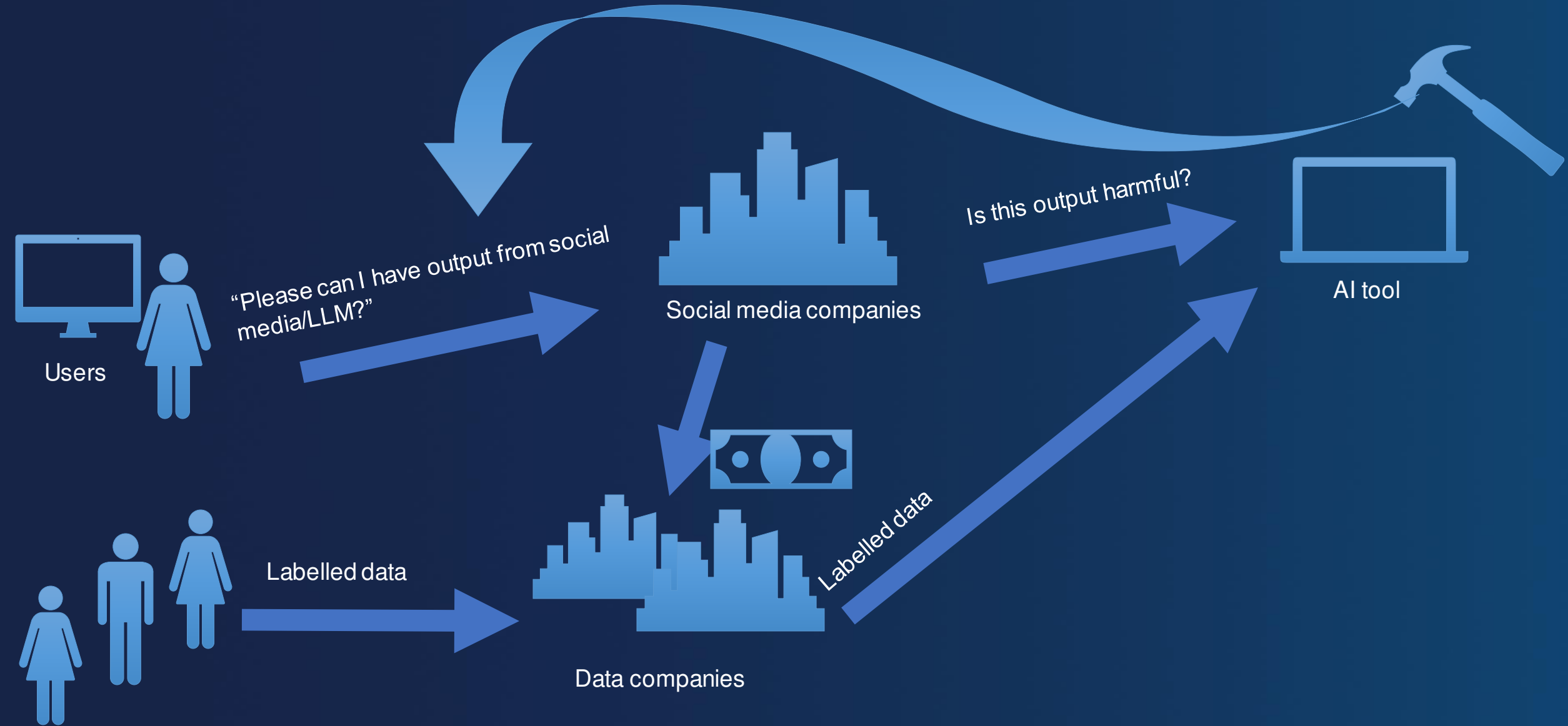
Language bias:
Predominant language on the Internet is English



Gender bias:
Less than 15% of Wikipedia contributors are women
34% of Twitter users are women
Only 33% of Reddit users are not men



Getting data training right



Case study: Karya—getting training right

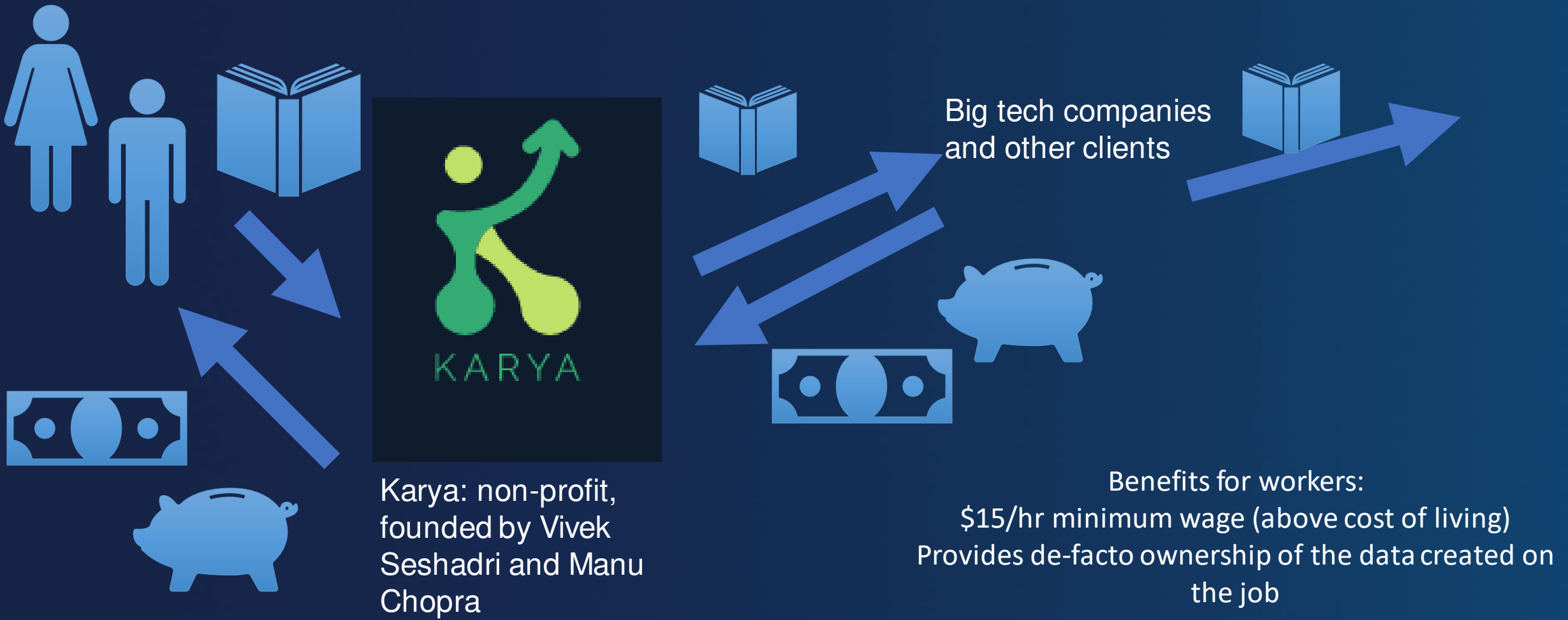


Karya: founded by Vivek Seshadri and Manu Chopra

- 1**
Living wages
Most data workers are not paid sufficiently for their labour, with many making significantly below the minimum wage. This leaves workers unable to cover their basic living expenses.
Minimum wages sustain a low-income lifestyle, data employment should give a **living wage** to encourage personal and societal growth for workers and their communities.
- 2**
No data outsourcing!
Many companies win data generation contracts through personal connections without having direct connections to data workers themselves. These companies become middle-men often taking a handsome finders fee. This creates two issues: low data quality and the potential exploitation of data workers. We must work together to shorten data value chains and bring the profits of data to its makers!
- 3**
Ensuring & investing in data worker welfare
Technology has shown the potential to be transformative and dangerous. Companies must prioritize the safety of data workers over profits, addressing both physical and psychological well-being. To bring the value of data full circle, companies should ensure that the benefits of their technologies extend to all socio-economic communities.

The Ethical Data Pledge

Case study: Karya—getting training right



Karya: non-profit,
founded by Vivek
Seshadri and Manu
Chopra

Big tech companies
and other clients

Benefits for workers:
\$15/hr minimum wage (above cost of living)
Provides de-facto ownership of the data created on
the job

Bias within the model itself



In the US health care system

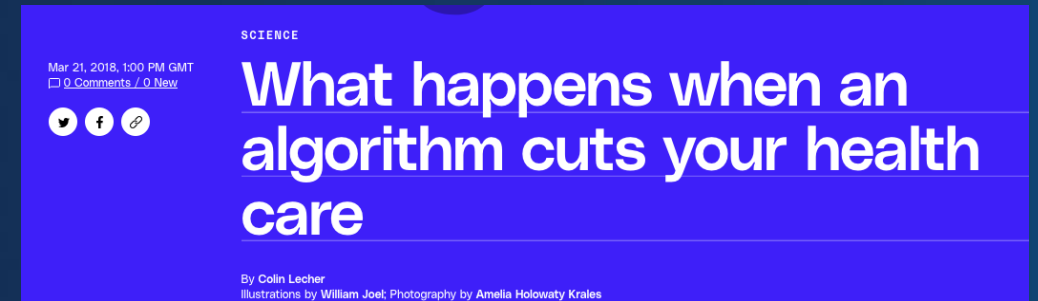
Black patients were assigned the same level of risk by the algorithm despite being more ill than white patients, **reducing the number of Black patients who identified as needing more care by more than half**

Bias introduced through use of using health care costs as a proxy for health needs—**but this reflects a bias already in-built**, as the system already spends less money on Black patients with the same healthcare needs as their white counterparts

Over-reliance on AI models

Explainability needs to come with **actionable recourse**

- Allow space in the system for human input to correct or alter AI-generated output
- Automated systems should come with means to identify and address potential errors
- Principle 3 of the Santa Clara moderation principles: companies need to provide *“meaningful opportunity for timely appeal”*



Patient Tammy Dobbs, diagnosed with cerebral palsy

Required 56 hours of care a week, but once automation came in, this was changed to 32 despite no change in her circumstance

It required legal procedures to change this despite attending nurses agreeing she required more hours

Data and privacy concerns

Data

How a company collects or uses AI/ML data for training

Marketing and advertising consumer behaviour data used to promote a company

Data outputs

How your consumer or personal data is collected, used, and bartered between companies and governments

Privacy

How you interact with a company's products or services

The visibility of your interactions with the company's products or services

~~Consent~~

~~Notice~~


Regulatory obligation

Case study: Roomba

Guo, December 2022, MIT Technology Review

Check your privacy policies—you give permission to Roomba to create a virtual layout of your house + take photos. And that's just your Roomba...

Pictures are sent to outsourced workers who can and do post them online in unsecured company and social media servers

 Consent

 Notice

 Regulatory obligation

So what?

Establish **business values** and proactively interrogate what use cases challenge those values

Like in medicine, consider the use of an **ethics board or committee**

Lead with solutions that centre humans and humanity and leave room for **accountability**

Seek out **inclusivity and centre diversity in ML teams**. More voices at the table mean more **POVs**

Stay informed!

Regulation is often behind technology so journalists tend to be the first to interrogate bias and abuses

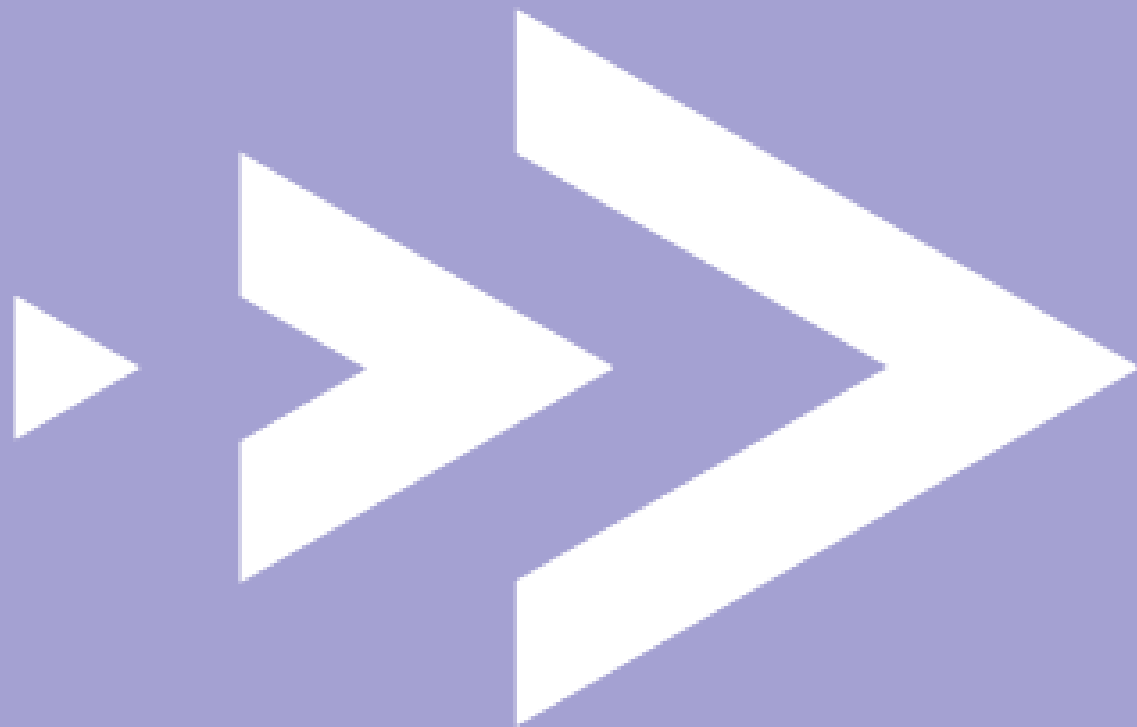
Recommendations:

- Billy Perrigo, Karen Hao
- Rumman Chowdhury, Timnit Gebru, Safiya Noble, Joy Buolamwini, Meredith Whittaker, Emily Bender, Margaret Mitchell
- Wired, Time, 404
- The EU AI Act Newsletter, Mystery AI Hype Theatre, All Tech is Human



Thank you

Any questions?





SPEAKER

Tom Morgan,
C-Suite
Fundamental



AI. A Christmas fairytale

Ethics in AI

A revolution in giving

Transparency = Trust



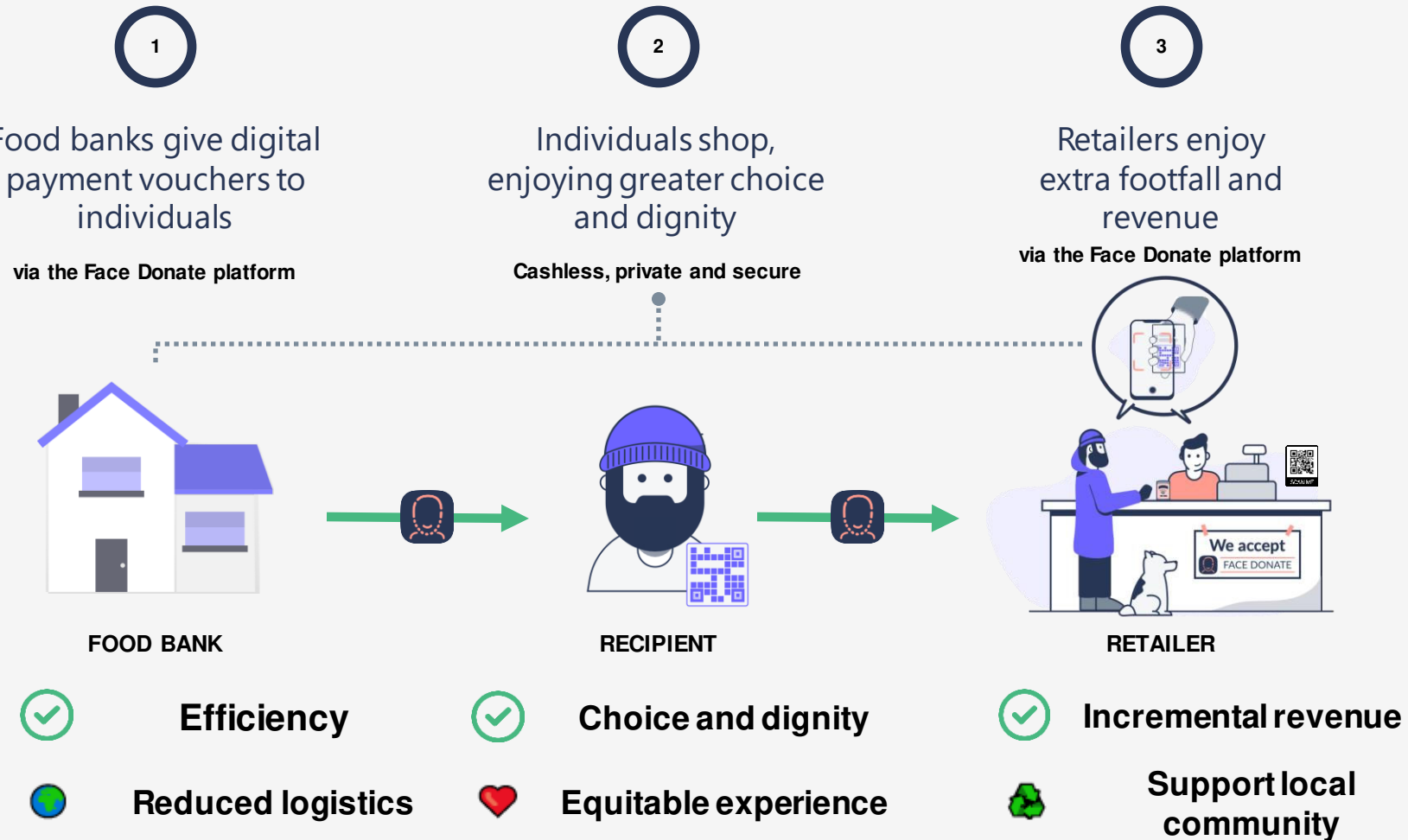
“KEEP YOUR COINS,
I WANT CHANGE”

cit. Banksy



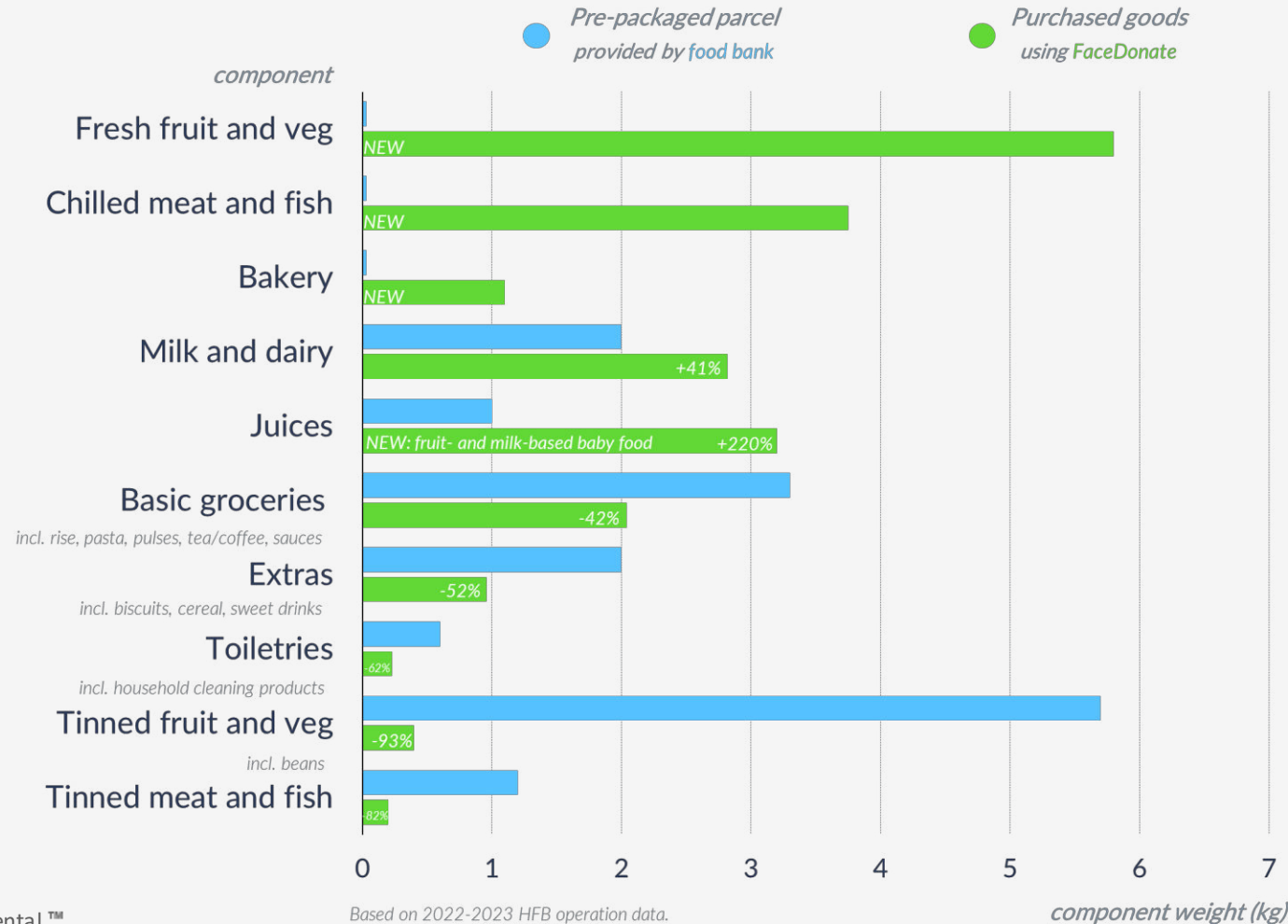
Restore dignity and agency

Made simple and secure through leveraging AI and machine learning

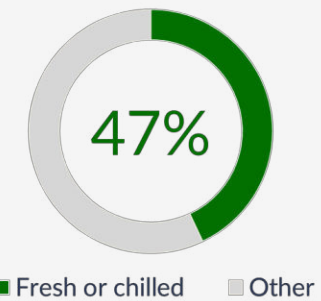


Invaluable data

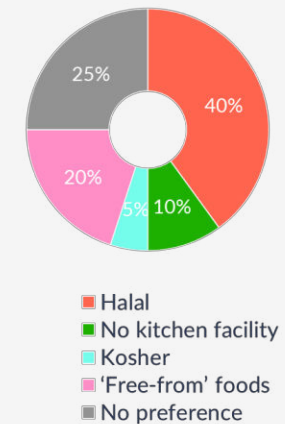
Anonymised data for reinforcing trust



Healthier choices
available using Face Donate



Meeting all dietary requirements
of Face Donate users



Significant cost savings

Do more with less. Divert resources to other essential services, such as mental health care



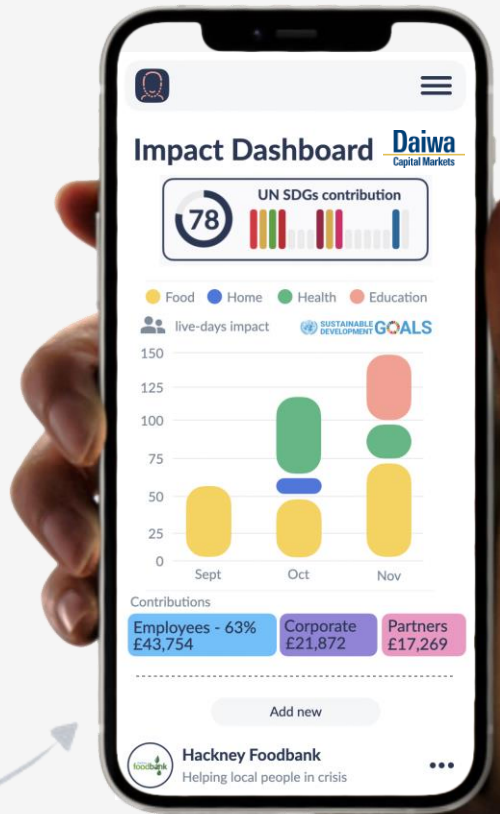
Based on 2022-2023 HFB operation data. At least £7.50 is saved every time food bank delivers help to people via the FaceDonate platform rather than with a traditional food parcel. Making 70% of parcel allocations via the FaceDonate platform would generate at least £100,000 net savings, the equivalent of distributing over ~2,250 extra traditional parcels.

Real-time feedback for corporate ESG

Dashboards for managing match funding, GiftAid and impact reporting



Hackney Foodbank's digital vouchers for buying food locally
 LOWER operational costs • increased efficiency • greater choice & dignity



Engage Employees

via donating to Hackney Foodbank or charities of your choice

Track CSR Campaigns

via the real-time ESG Dashboard for sustainability and social impact

Share Your Impact

via live feed with clients, prospects and employees

- ✓ UN Sustainability-aligned reports
- ✓ Personalised feedback
- ✓ Match funding
- ✓ GiftAid



Perception is (virtual) reality

Confusion with facial recognition



The screenshot shows the top of a Guardian news page. The masthead features the Guardian logo and the tagline 'Newspaper of the year'. Below the masthead is a navigation bar with categories: News, Opinion, Sport, Culture, Lifestyle, and More. A secondary navigation bar lists various topics: UK, World, Climate crisis, Ukraine, Football, Newsletters, Business, Environment, UK politics, Education, Society, Science, Tech, Global development, and Obituaries. The main article is titled 'Campaigners urge London food banks to end use of face scans' and is categorized under 'Food banks'. The author is Robert Booth, a social affairs correspondent. The article includes an exclusive quote: 'Charity that runs five distribution hubs has been told it is wrong to trade sensitive biometric data for food'. A photograph shows hands sorting through green crates filled with various food items, including cans and jars. Below the photo is a caption: 'Food being sorted at a food bank. Hackney Foodbank has been asked not to use the Face Donate app-based system. Photograph: Jonathan Brady/PA'. The article text continues: 'Privacy advocates are urging food banks to stop using facial recognition software, claiming it poses a serious risk to users' "privacy, dignity and security".'

“

Silkie Carlo, the director of the Big Brother Watch campaign group, is urging the charity to halt the system, arguing it is wrong to ask people to “trade sensitive biometric data for food”.

”

Ethics in modern technology

Integral to design process

principia-advisory.com

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WITHOUT ETHICS

what is your organization

EXPLORE OUR 2023 ETHICS STUDY

The banner features a dark green background with a forest scene at the bottom. The text is white and red.

Ethics is the essence of good business

Ethics shapes the best organizations – defining the understanding of obligations and moulding who they want to be.

We support leaders in aligning purpose to practice. We guide the development of stakeholder trust, growing brand reputation and boosting competitive advantage.

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NEWS

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Business | Market Data | Economy | Your Money | Companies | Technology of Business | CEO Secrets | A.I.

CBI hires ethics consultancy to overhaul culture

5 May 2023

Rain Newton-Smith took over as the CBI's new director-general last month

By Lucy Hooker
Business reporter, BBC News

The CBI has hired a team of ethics advisors to help overhaul its operations, following allegations of serious sexual misconduct by staff.

The business lobby group's new head Rain Newton-Smith told members on Friday it had taken on the consultancy firm Principia Advisory.

The article snippet includes a red header, a navigation bar, a title, a date, a photo of Rain Newton-Smith, and a byline. The main text is in black on a white background.

FINANCIAL TIMES

April 26, 2023

Other useful mechanisms include scanning the free-text elements of employee engagement surveys and Glassdoor, the jobs review site. Research by Harvard Business School used an algorithm to scan Glassdoor reviews looking for words including “discrimination”, “trouble”, “favouritism” and “unethical”. It identified an increase in use of the terms to describe bank Wells Fargo between 2009 and 2013, a period that corresponded with fraudulent financial activity by employees. Researchers found the algorithm could identify misconduct before whistleblower claims emerged.

”

Conclusion

Takeaway message

1. Incorporate ethics in design principles from the outset.
2. Document considerations and publish them.
3. Perception is reality.
4. Seek expert advice around ethics. It's cheaper than lawyers and restarts.
5. *“Got on a lucky one. Came in eighteen to one. So happy Christmas. I can see a better time when all our dreams come true” – S. MacGowan*

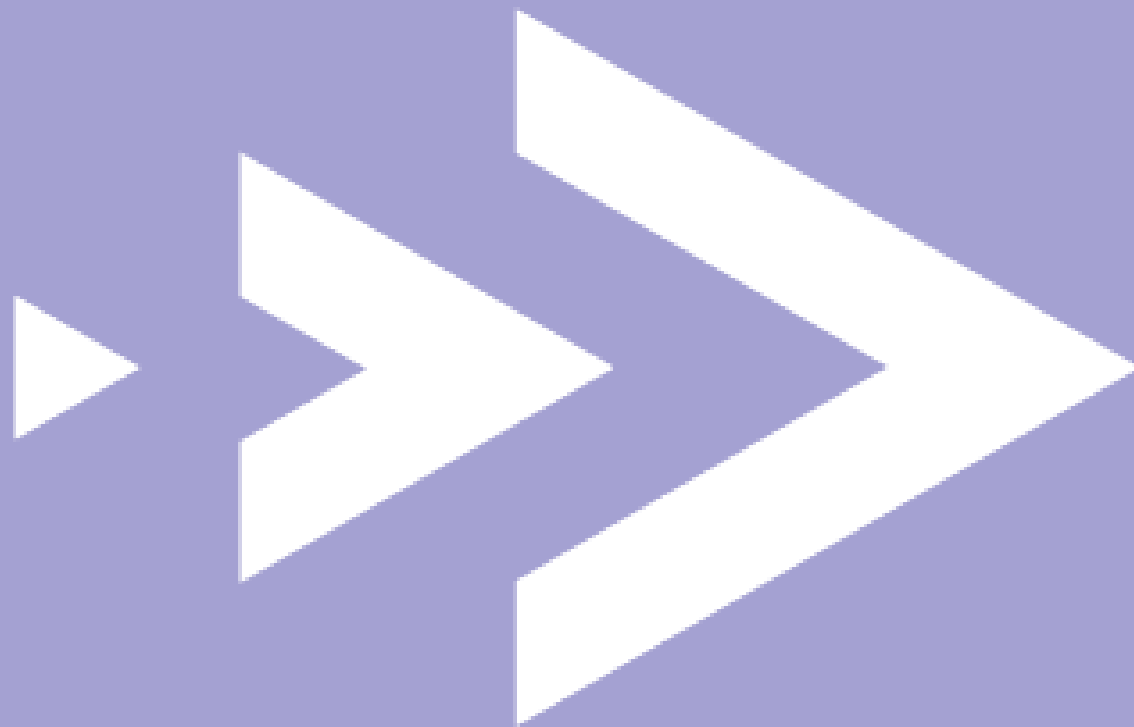
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Tom Morgan

Managing Director

[LinkedIn](https://www.linkedin.com/in/tommorgandigital): [linkedin.com/in/tommorgandigital](https://www.linkedin.com/in/tommorgandigital)





SPEAKER

Tom Meyer
Personio and
formerly of Meta



Bringing AI from Research to Product: Lessons Learned

Tom Meyer

Personio

tom@tom.to

7 Dec 2023

About Me

Spent much of the past 14 years turning AI/ML/CV research into products.

- 20 Years at Startups, and 6.5 years at Facebook
- Roles as VP Eng, CEO, CTO, Sr EM, Principal Eng, Architect
- Patents: GANs, Steganography, AR, Interactive Ads, Affective Computing
- Publications: Hypertext, 3D User Interfaces, VR, Narrative Intelligence



Common Themes of this Talk

- Machine Learning lets you build amazing, magical prototypes. 80% is already working right away!
- And then the real work starts:
 - Sourcing, licensing, or creating more training data
 - Labeling, cleaning and curating it
 - Working around edge cases and weird bugs
 - Optimizing for compute, speed and equipment cost
 - (AI is very computationally expensive)
 - Integrating it into a smooth product experience
 - Making sure it doesn't go off the rails, isn't discriminatory, off-brand, etc

SNIBBEINTERACTIVE

Magic Mirror (2009)

- Used depth camera and Computer Vision to recognize user's pose.
- Animated 3D character as a reflection of the user's behavior.



- Before big Deep-Learning breakthroughs, so used classic Computer Vision algorithms
- Depth output from camera was extremely noisy and imprecise
- Spent most of the engineering time cleaning it up and denoising
- Simply identified a few principal points (hands, feet, head, center of body)
- People would very quickly test it, push it to the edge, and break it
 - Hopping on one leg, spinning, etc
- Didn't deal with edge cases like multiple people, wheelchairs, etc.



A Vision Quest (2014)



- Augmented Reality Phone Camera game
- GPU-accelerated computer vision
- Recognized edges and colors in camera input, and used them to solve platform puzzles.



A Vision Quest (2014)

- Wrote preprocessors to deal with slightly different GPU syntax on iOS, different Android models, and desktop.
- Computer vision code could run on phone GPUs very fast (video frame rates), but it was slow to copy into CPU for game (collision detection, etc), so gameplay used still pictures.
- Commercializing a free-to-play game takes an enormous marketing budget.

idavatars[®] (2015)

- iPad-based interactive healthcare avatar
- Combined in-house and IBM Watson technologies to:
 - Animate a 3D character
 - Recognize the user's speech (ASR)
 - Used camera to recognize the user's emotions
 - Go through a script to engage the user and collect healthcare information (NLP)
 - Use text classifier to identify relevant healthcare facts from a database to share.
 - Respond verbally to the user (TTS)

Good afternoon, Greg. Nice to see you again. How are you feeling today?



idavatars[®] (2015)

- Extremely aggressive technology goals:
 - Voice input & output, animated avatar that can recognize emotions and collect useful information from patients.
- NLP was generally scripted, so it was consistent and followed the use case
- Having the computer ask questions and having the user answer is easier to script out

Good afternoon, Greg. Nice to see you again. How are you feeling today?





Generative Style Transfer (2016)



- First use of Generative Content at Facebook.
- Used Deep Learning to transform user's photos based on an artist's style.
- Real-time, on-phone neural network execution.
- Processed photos, and video at 12fps.



Generative Style Transfer (2016)

- Video-rate style transfer on mobile phones required shortcuts:
 - Lower resolutions (256x256)
 - Simpler networks (not as faithful to the artist's style)
- Hand-picked examples looked great (especially if the subject was posed similarly, etc), but took a lot of user experimentation to make good style transfer photos
- Set off an optimization war between CPU & GPU neural network execution people, where every week one or the other was drastically sped up
- Model compression and simplification became super-important to move toward shipping
- Optimizing for older phones and reducing runtime size became major efforts



Mobile SLAM (2017)

- Adapted Oculus' technology for inside-out tracking used in Meta Quest
- Facebook's version of Apple's ARKit and Google's ARCore
- Could place 3D content in the world as a camera filter





Mobile SLAM (2017)

- Basic demo worked very quickly
- Lots needed to get working on most common phones
 - Needed camera lens parameters for every phone
 - Phone accelerometers & gyroscopes very different or buggy
 - Auto-focus would break the algorithm
 - Had to work on older or medium-end phones
- Memory usage over time, losing tracking occasionally
- Hard keeping code for Oculus VR & mobile phone AR use cases in sync
- Apple & Google both released their own AR frameworks as we prepared to release ours



Person Segmentation (2018)

- Identify a person in the foreground, so you can replace or blur the background
- Real-time Deep-Learning on Handset
- Used a common ML runtime shared with all NN visual effects
- Part of Spark AR, so users could create their own effects using foreground/background segmentation, blurring, etc





Person Segmentation (2018)

- Couldn't use FB user selfies due to privacy rules
- Training dataset took a lot of work:
 - Selfies with different kinds of consumer phones
 - Different camera quality & resolution
 - Different poses and lighting conditions
 - Gender, age & racially balanced group of people
- Data set labeling:
 - Needed a custom labeling flow to outline the person
 - Hair detail was very hard
- Hats, headphones, funky hairstyles, multiple people, animals, confusing backgrounds
- Very high quality standard – almost didn't ship, with same artifacts that other products shipped with and were fine.



Identity Attack Discovery (2020)

- Created an Ensemble model to predict fake ID attacks
- Used signals from:
 - Visual AI forgery detection models
 - Content-based AI forgery models
 - Human review of ID documents
 - Temporal clustering by locations, devices, countries, etc.
- Sped up data pipeline from 24 hours to 15 minutes so we could get useful warnings



Identity Attack Discovery (2020)

- Highly regulated and complex space:
 - Creating fake ID documents is illegal, so couldn't create fake data
 - Possessing fake IDs or images of them is illegal in most countries, so no ground truth
 - Possession of real IDs is highly regulated
 - Rules vary from country to country, and even within a country
- Some fakes are obvious (especially by 11-year olds trying to pass age verification), some are made by nation-state actors
- Never able to measure true false-positive and false-negative, due to no ground-truth data
- Legal, privacy, and policy reviews
 - Explainability of model was very important to be able to launch



Fast Creation of Classifiers for New Integrity Policies (2022)

- New types of hate speech and other violating content can arise nearly overnight (Jan 6, Ukraine/Russia, Israel/Hamas, etc)
- Need to quickly find examples to train classifiers on, in a matter of days or weeks. Was taking months to adapt.
- Used LLMs with prompt engineering to identify probably violating content
- Manually reviewed and used to bootstrap train traditional NLP classifiers
- Zero-shot -> Few-shot -> Full classifier



Fast Creation of Classifiers for New Integrity Policies (2022)

- Even with LLMs, required a lot of initial work to set up new policy:
 - search for keywords
 - try prompt engineering variations
 - manual review of possible violations
- LLMs are super expensive to run at FB scale, so needed to aggressively pre-filter candidates with regular expressions or existing simpler classifiers
- No ready pool of manual reviewers that could be used on short notice, since the need was “bursty,” and required reviewers to be fully trained on the new policy’s guidelines

Recap: Common Themes of this Talk

- Machine Learning lets you build amazing, magical prototypes. 80% is already working right away!
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 - (AI is very computationally expensive)
 - Integrating it into a smooth product experience
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Thank you

Any Questions?

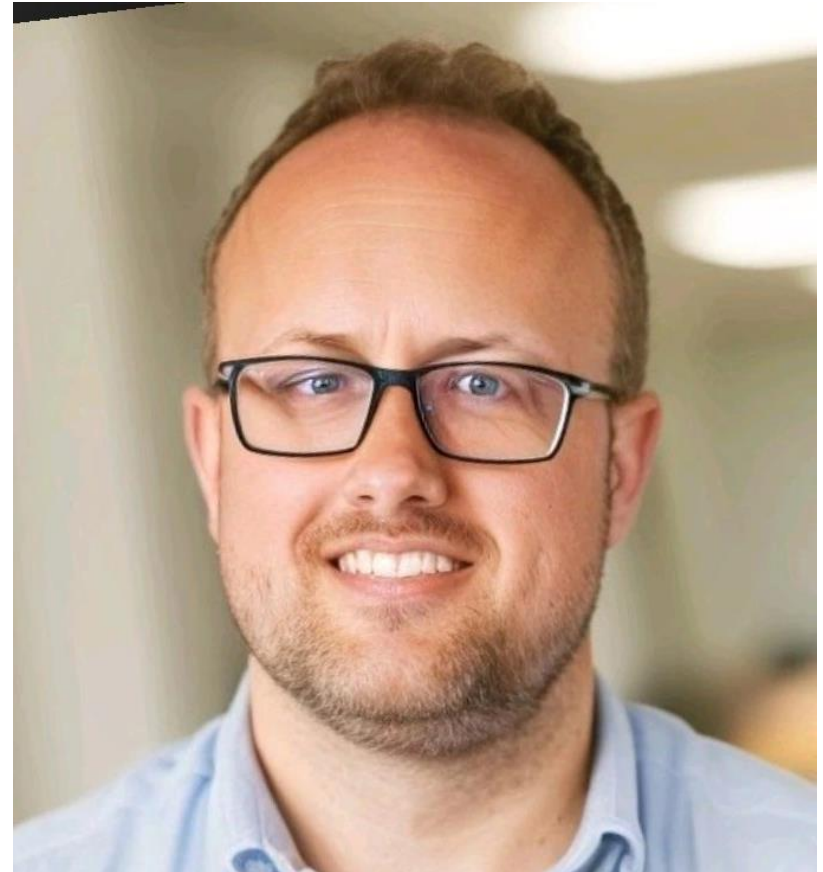
Feel free to reach out to me: tom@tom.to





SPEAKER

JAMES MOFFAT
New Future
Ventures





New Future Ventures

AI PROMPT HACKATHON



SCAN ME

AI Prompt Hackathon

Applications now open

Date: 1st February 2024

Location: Winslade Manor

newfuture.ventures/ai-hackathon-feb24-form



PUTTING YOUR IDEAS INTO ACTION

Create new product or service for your customers

Create tools for your team

Chatbots / Assistants

Document creation or analysis

Analysis, visualisation and utilisation of data sets

Tool to generate or optimise revenue streams



From ideas
to action

WHAT YOU NEED

A team of up to 4 people

No technical skills necessary

An idea you want to develop

A data set you want to utilise in the form of a spreadsheet, database or web based data source

Be available on 1st February

What you
need



Thought Experiment: Cognitive Automation

What business process, problem, idea or opportunity that you might like to automate, but traditionally would not, because a good outcome is dependant on a human applying knowledge, understanding or context to the task?

Problem: I want to show off new or empty property at its best


Virtual Staging AI

Home About Gallery Prices [Login](#)

Virtual staging with one click

Upload a picture and our AI will add furniture within seconds.





Upload image of an **empty room**

0+1 + 01

Problem: I want to pre-qualify my sales leads

SiteGPT Features Integrations Pricing Live Demo Blog [Sign In](#) [Start a free trial](#)

PRODUCT HUNT
#1 Product of the Day

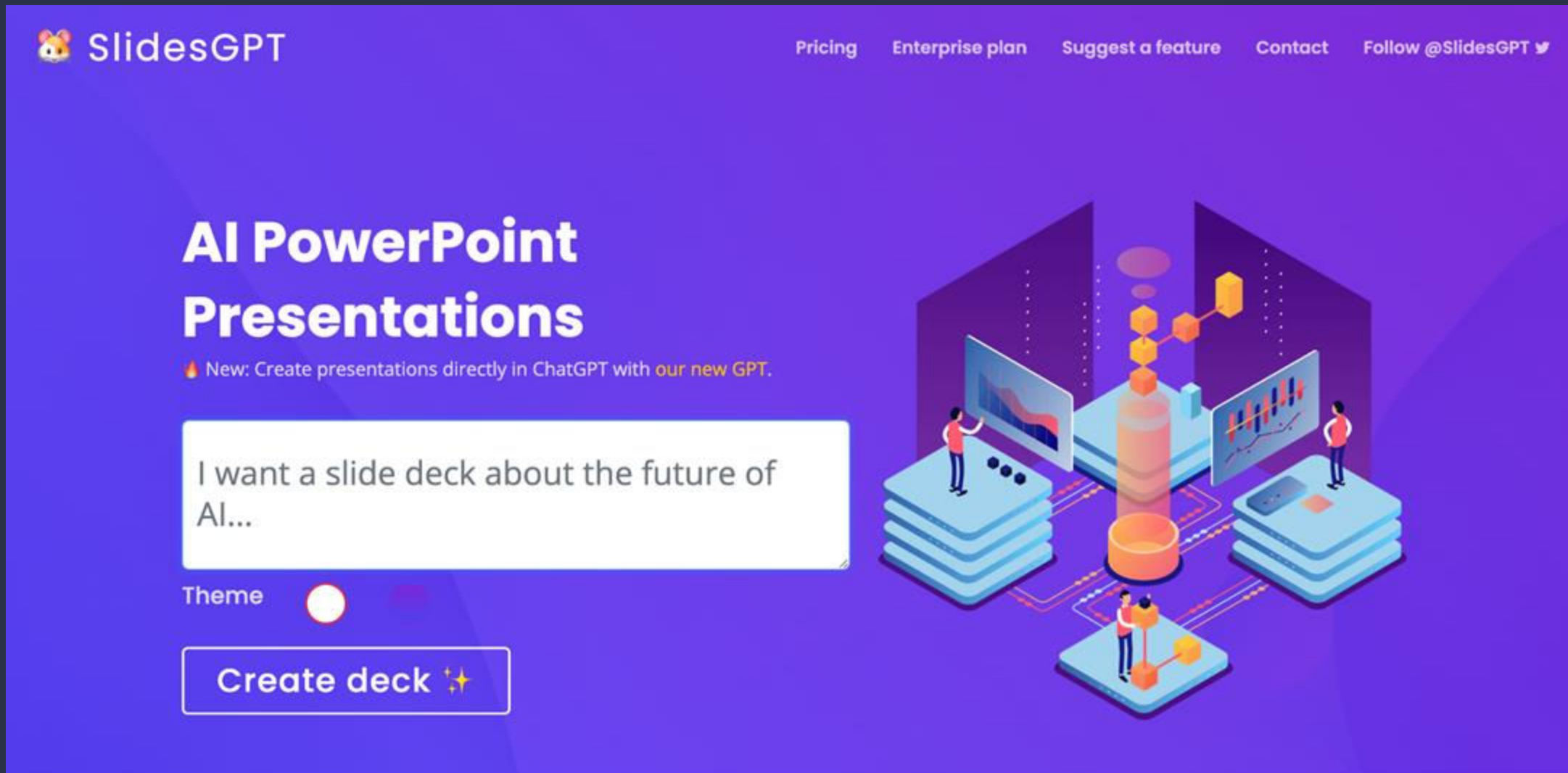
Make AI your expert customer support agent


It's like having ChatGPT specifically for your products. Instantly answer your visitors' questions with a personalized chatbot trained on your website content.

- ✔ Personalized onboarding help
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Support Chat


Problem: I need to create lots of powerpoint presentations




 SlidesGPT

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AI PowerPoint Presentations

 New: Create presentations directly in ChatGPT with our new GPT.

I want a slide deck about the future of AI...

Theme 

[Create deck ✨](#)





ON THE DAY

MORNING:

Refine and validate your idea

Learn how to write a good prompt

AFTERNOON

Build and create your own proof of concept

Demo the proof of concept to your peers

Prizes for the winners

On the Day



SCAN ME

**AI Prompt Hackathon
1st February 2024
Applications now open
Winslade Manor**

newfuture.ventures/ai-hackathon-feb24-form

THANKS TO OUR EVENT CONTRIBUOTRS



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TECH
SURVEY

EXIST  DRIVING STEMM SUCCESS

EXETER CHAMBER 



THANK YOU FOR ATTENDING



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ON YOUTUBE >>

<https://www.youtube.com/watch?v=g6jJVKnLEGo>





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