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Part 1: An introduction to AI

Understanding the foundations of Artificial Intelligence.

01

An introduction to AI for Nonprofits

What is this?

Artificial Intelligence (AI) can be complex and a little overwhelming to get to grips with.

This resource is designed to provide Nonprofit organisations with the foundational information on what Artificial Intelligence is, why it's important and the impact is is having on our social, ecological and economic systems.

It's not exhaustive, it's a primer. We're on hand to answer any questions you have or if you would like to delve deeper into any of the areas covered.

Artificial Intelligence

No widely accepted, universal definition.

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It's a tapestry of different technologies.

Natural Language Processing

Causal AI

Knowledge Grap[h]

Computer Vision

Automatic Principle[s]

Generative AI

Edge AI

Smart Robotics

Foundation models

Autonomous Vehicles

Data labelli[ng]

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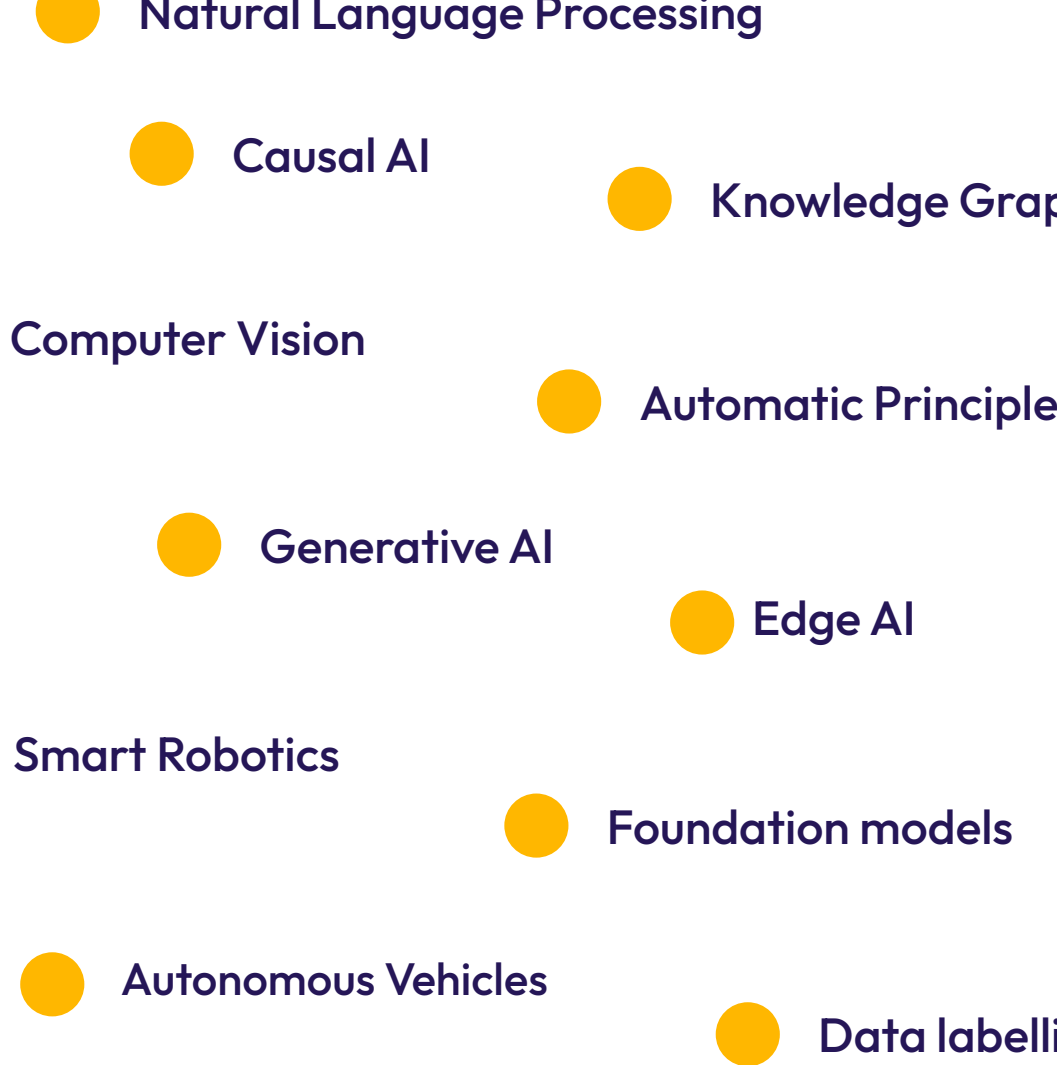
Resulting in machines that can...

- Learn & adapt
- Understand language
- Speak, hear & see
- Plan & schedule
- Automate tasks
- Emulate deep expertise

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Torchbox define AI as...

a discipline, like history or physics, that focuses on creating machines which can do tasks that typically require human intelligence.
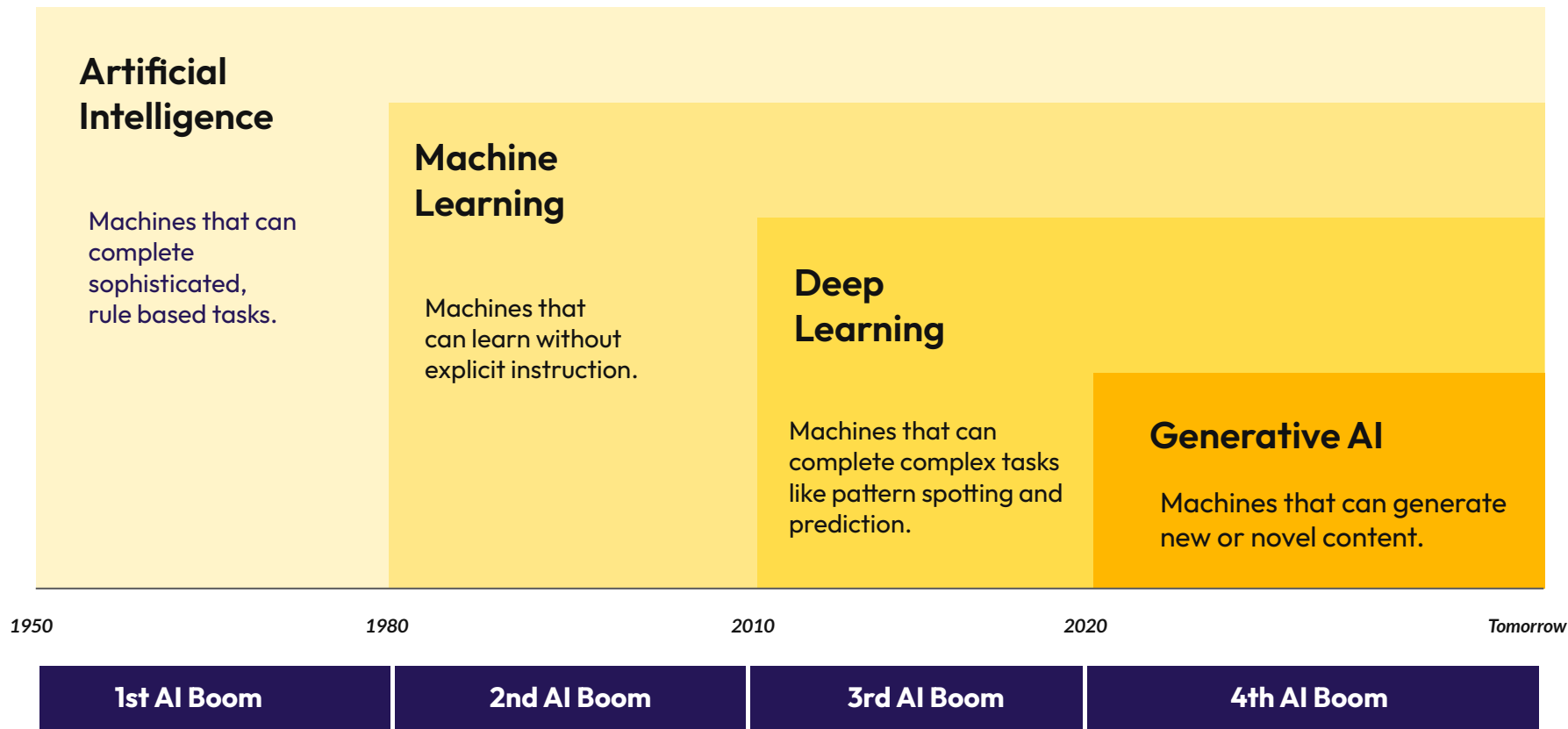
Tasks like...

- Problem solving
- Decision making
- Content creation
- Prediction, analysis & synthesis
- Translation & communication
- Learning & adapting
- Material or Drug design & discovery
- Many, many more!

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There have been 4 big "booms" to date ...

Artificial Intelligence

Machines that can complete sophisticated, rule based tasks.

Machine Learning

Machines that can learn without explicit instruction.

Deep Learning

Machines that can complete complex tasks like pattern spotting and prediction.

Generative AI

Machines that can generate new or novel content.

1950   1980   2010   2020   *Tomorrow*

| 1st AI Boom | 2nd AI Boom | 3rd AI Boom | 4th AI Boom |

There are two different AI categories.

AI can be categorised into two main decision making approaches...

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Traditional AI

Deterministic

Set of rules that are defined & the outcome is based on those rules.

—

"If this, then that."

Generative AI

Probabilistic

Decision are made based on probabilities or likelihoods.

—

"The outcome can vary, even if the input is the same."

Traditional AI

Deterministic

These models are best when the outcome must be the same, everytime.

Better for tasks with clear cut rules like calculating the square root of a number or stopping a train at a red light.

Generative AI

Probabilistic

They are better at navigating complex situations or when there is a need to account for uncertainty.

Better suited for tasks like Natural language processing, image recognition or analysing and spotting patterns.

Many of these models are "Black boxes"…

In AI, a "black box" refers to a system or model whose inner workings are not visible or easily understood. Even by the experts who built them.

Meaning inputs and outputs are observable but not how the input is transformed into the output.
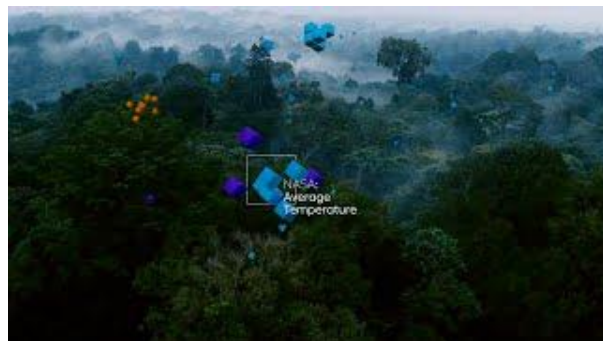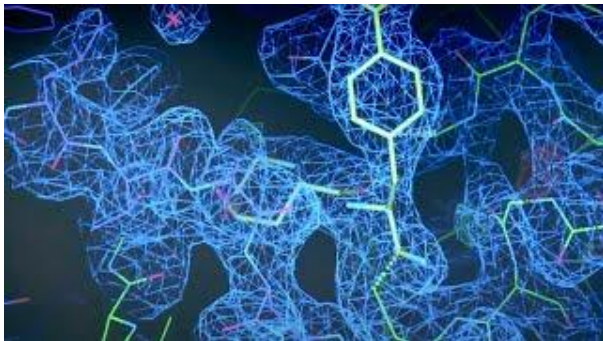
Examples of advancements over the past 12 months...

And many others...

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With leading organisations investing heavily in the space...

amazon

Microsoft

Alphabet

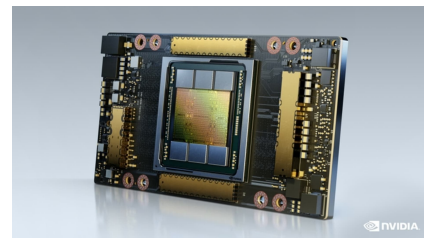ANTHROP\C

OpenAI

Google DeepMind

NVIDIA

CLAUDE 2
THE NEXT-GEN AI ASSISTANT FROM ANTHROPIC

ChatGPT 4

Gemini

Across both software and hardware

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There are many models and tools depending on the application...

Generative AI growth curve was the fastest, ever.

ChatGPT took just 3 months to get to 100m users.

100 million

50 million

16 yrs   7 yrs   4.5 yrs   7 mos.   3 mos.

"
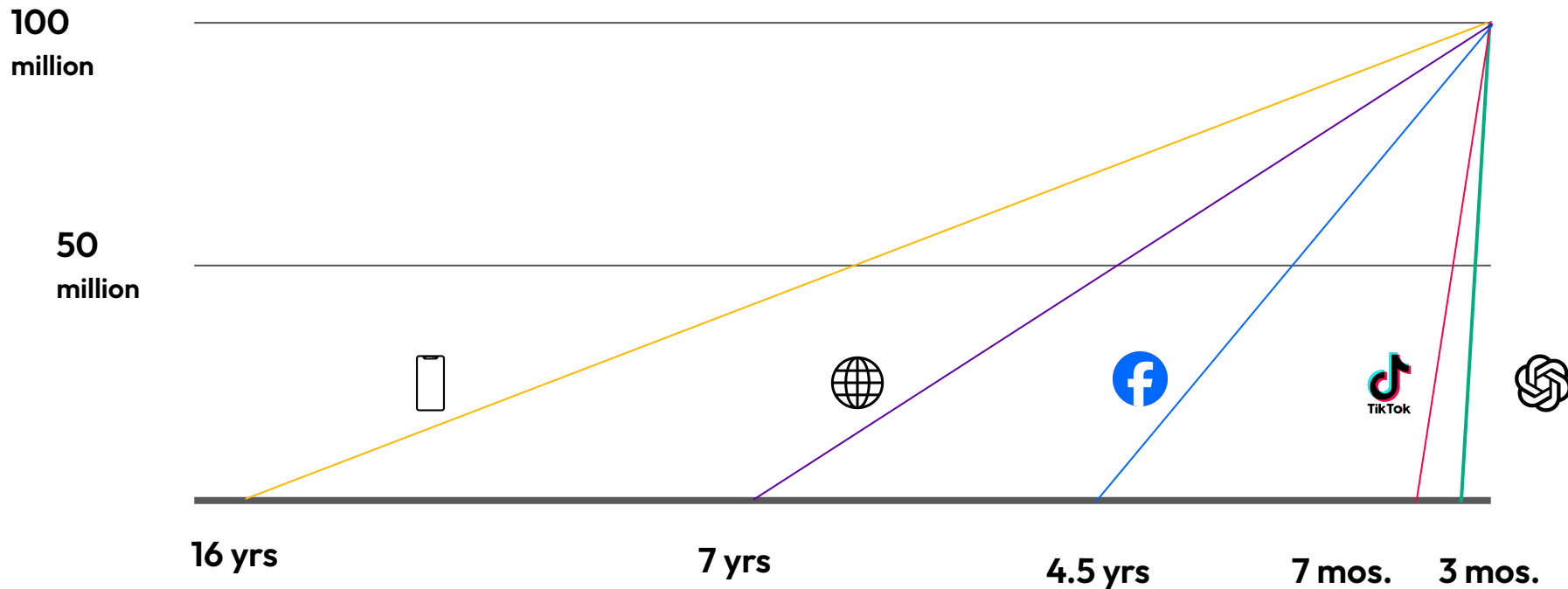
"In 1996, thirty-six million people used the internet; this year it will be well over five billion. That's the kind of trajectory we should expect for AI, only much faster."

Mustafa Suleyman, Deep-Mind co-founder

Mustafa Suleyman

Mustafa Suleyman talks about 3 waves of AI...

🌊 **Wave 1**

Classification

We have proved we can train machines to classify various types of input data.

🌊 **Wave 2**

Generation

We proved machines can take that data and produce new or novel content.

🌊 **Wave 3**

Interaction
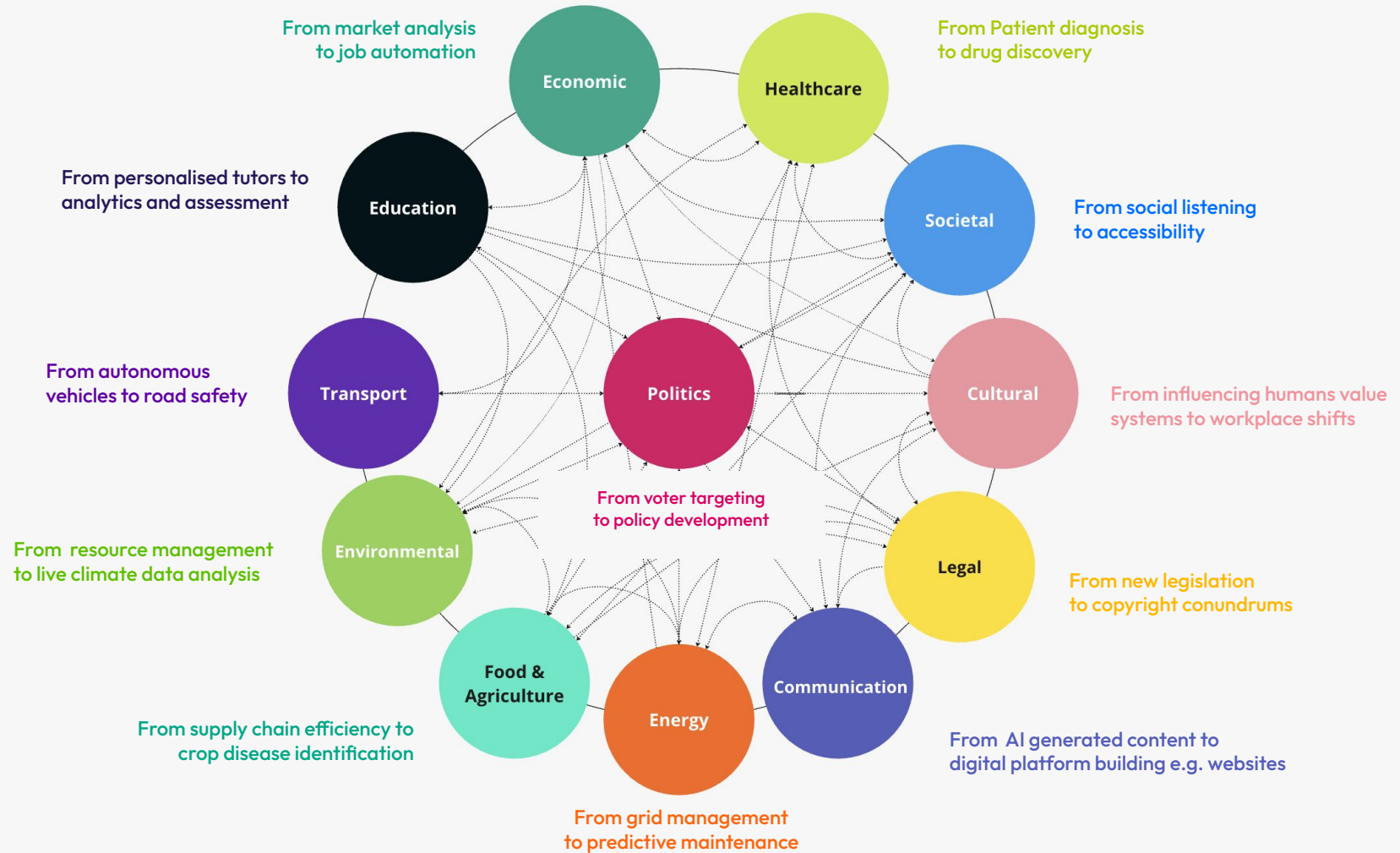
The wave we are entering now, is the future interface of AI.

What is the best interface and interaction with AI systems?
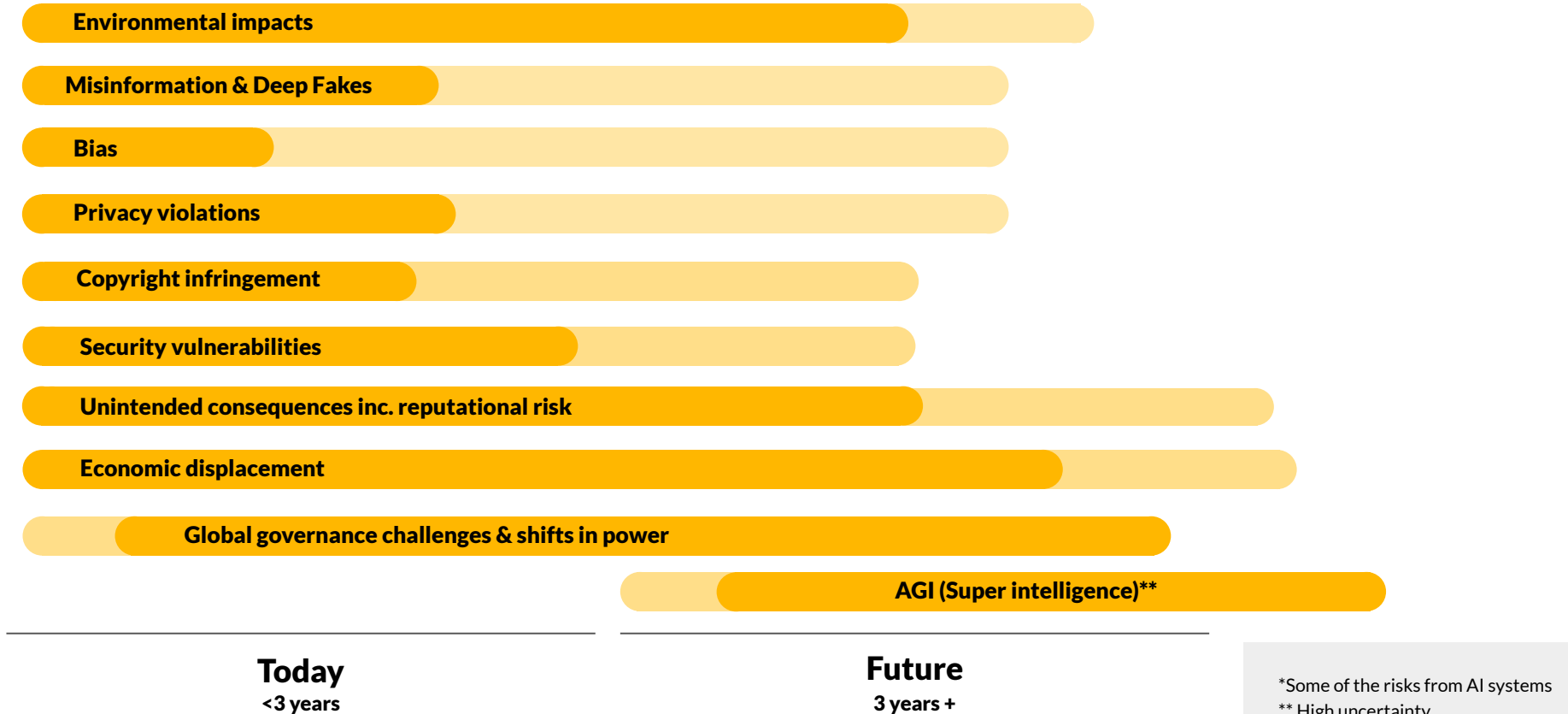
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The impact and applications are far reaching.

AI is already impacting every <u>societal system</u>.

From market analysis to job automation

From Patient diagnosis to drug discovery

From personalised tutors to analytics and assessment

From social listening to accessibility

From autonomous vehicles to road safety

From influencing humans value systems to workplace shifts

From resource management to live climate data analysis

From new legislation to copyright conundrums

From supply chain efficiency to crop disease identification

From voter targeting to policy development

From AI generated content to digital platform building e.g. websites

From grid management to predictive maintenance

Economic

Healthcare

Education

Societal

Transport

Cultural

Politics

Environmental

Legal

Food & Agriculture

Energy

Communication

There are risks* that need to be carefully considered.

- Environmental impacts
- Misinformation & Deep Fakes
- Bias
- Privacy violations
- Copyright infringement
- Security vulnerabilities
- Unintended consequences inc. reputational risk
- Economic displacement
- Global governance challenges & shifts in power
- AGI (Super intelligence)**

Today
<3 years

Future
3 years +

*Some of the risks from AI systems
** High uncertainty

Growing consensus on the profound impacts

AI is increasingly being described and acknowledged as Technology that will transform our economy, environment and society.

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Joy Buolamwini

Fei-Fei Li

Klaus Schwab

Timnit Gebru

António Guterres

Some are going as far as describing AI as the next

General purpose technology (GPT).

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Mo Gawdat,
Former Google X

Bill Gates,
Former Microsoft CEO

Mira Murati,
OpenAI CTO

Sundar Pichai,
Google CEO

The GPT Definition varies.
The characteristics remain the same.

A Single recognisable technology

Pervasive
Becomes widely used

Improves
Compounding over time

Effects
Creates spillover effects

Torchbox

The GPT Definition varies.
The characteristics remain the same.

A Single recognisable technology	**Pervasive** Becomes widely used	**Improves** Compounding over time	**Effects** Creates spillover effects

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Whether a GPT or not.

It is an important driver of change.

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> "

In my lifetime, I've seen two demonstrations of technology that struck me as revolutionary... the GUI and ChatGPT.

Bill Gates, March 2023

Equip and empower your teams with the foundational knowledge to leverage AI for impact.

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AI foundations session

In this 1-hour session, we'll share:

- An introduction to AI
- How AI is impacting the sector
- Exciting examples of AI for Good
- How to get started

And we'll answer any questions your team has.

Book an AI foundation session ▶

Please get in touch with us if you have any questions.

✉️ innovation@torchbox.com

🌐 https://ai.torchbox.com/

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Other references

If you'd like to dive a little deeper we would recommend the following sources:

- [Generative AI exists because of the Transformer](#), The Financial Times
- [Economic Impacts of Artificial Intelligence](#), European Parliament
- [The economic potential of generative AI: The next productivity frontier](#), Mckinsey Digital
- [The Coming Wave](#), Book by Mustafa Suleyman
- [AI Is Dangerous, but Not for the Reasons You Think](#) , Sasha Luccioni | TED Talk
- [The transformative potential of AGI — and when it might arrive](#), Google DeepMind, Shane Legg | TED Talk
- Exploring [Anthropic](#), [OpenAI](#) , [Hugging Face](#), and [Google Gemini](#)
- [UNESCO Ethics of AI: Challenges and Governance](#)
- [The Alan Turing Institute](#)
- [UK Government AI resources](#) and the [European AI Act](#)
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And our own, Torchbox AI, resources can be found [here](#).

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