



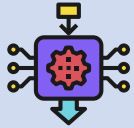
colart

ARTIFICIAL INTELLIGENCE

WHAT DOES IT MEAN FOR COLART AND OURSELVES?

What is Artificial Intelligence?

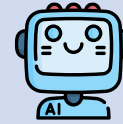
AI is a broad term for a wide range of technologies and techniques



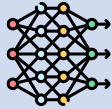
Machine learning



Process automation



Robotics



Deep learning



Expert systems



Reasoning and analysis



Natural language processing



Speech recognition



Computer vision



Planning, forecasting and scheduling

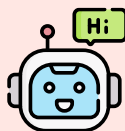
AI is already here, we experience it every day



Search engines



Voice assistant's



Chatbots



Fraud detection



Medical diagnostics



Precision Agriculture



Vehicle automation



Product recommendation



Price optimisation

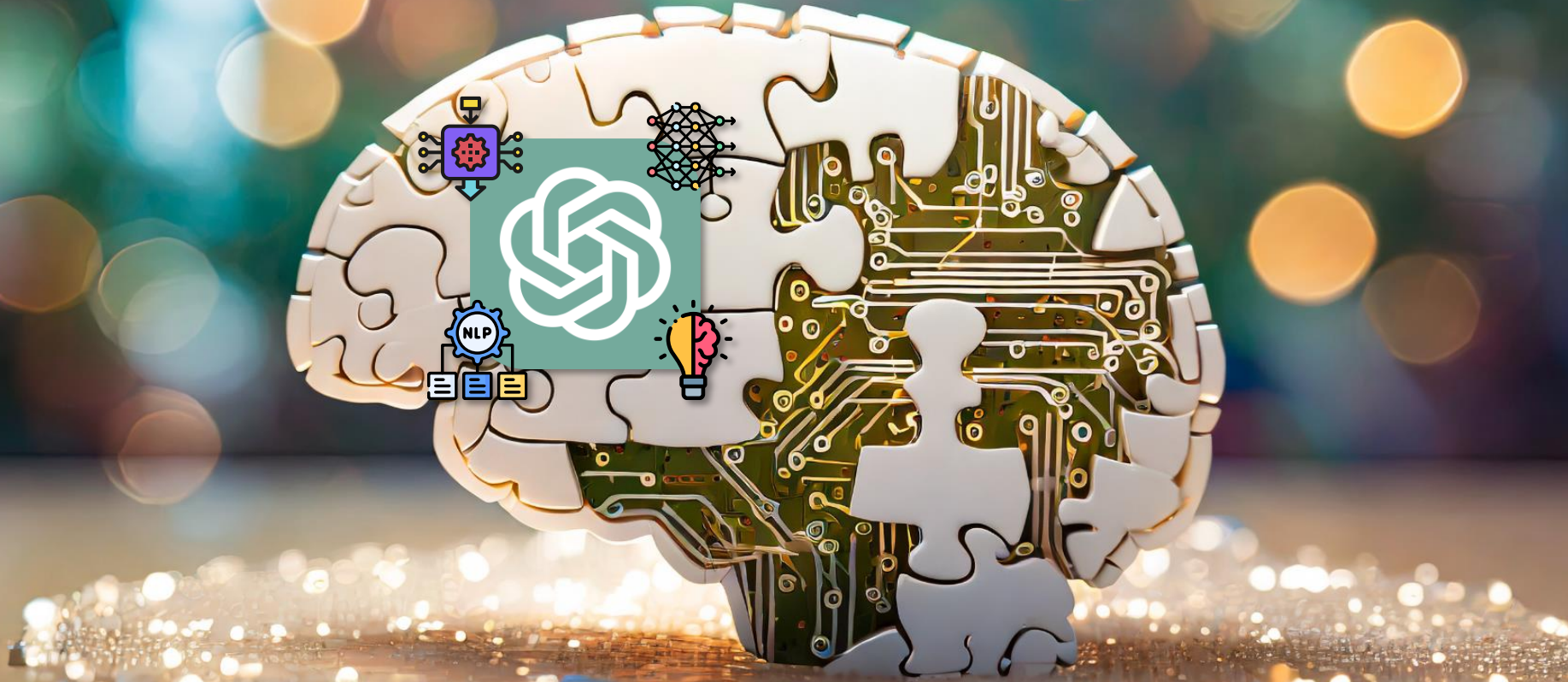


Predictive maintenance



Public security

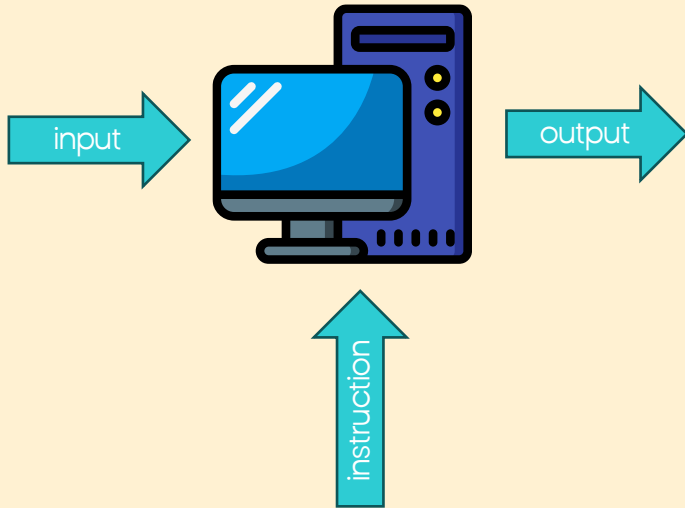
Why is AI suddenly such a big thing?



This is largely driven by the rise of the Large Language Model

What makes AI so different?

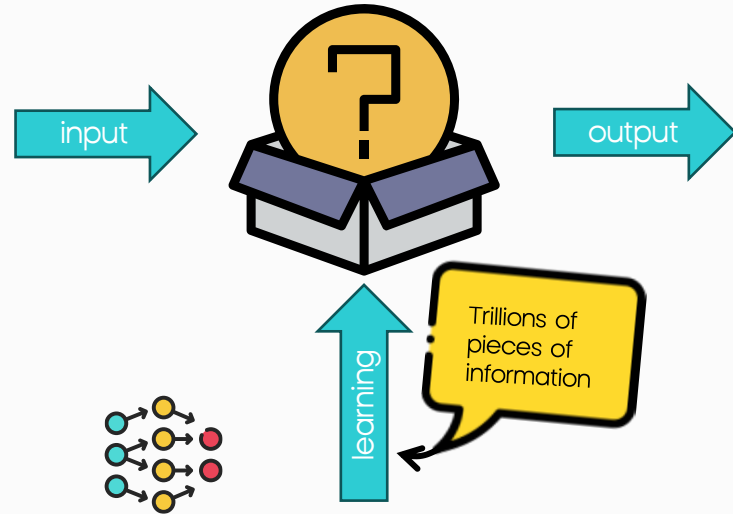
Regular computer



Entirely
predictable

Entirely
understandable

Artificial Intelligence

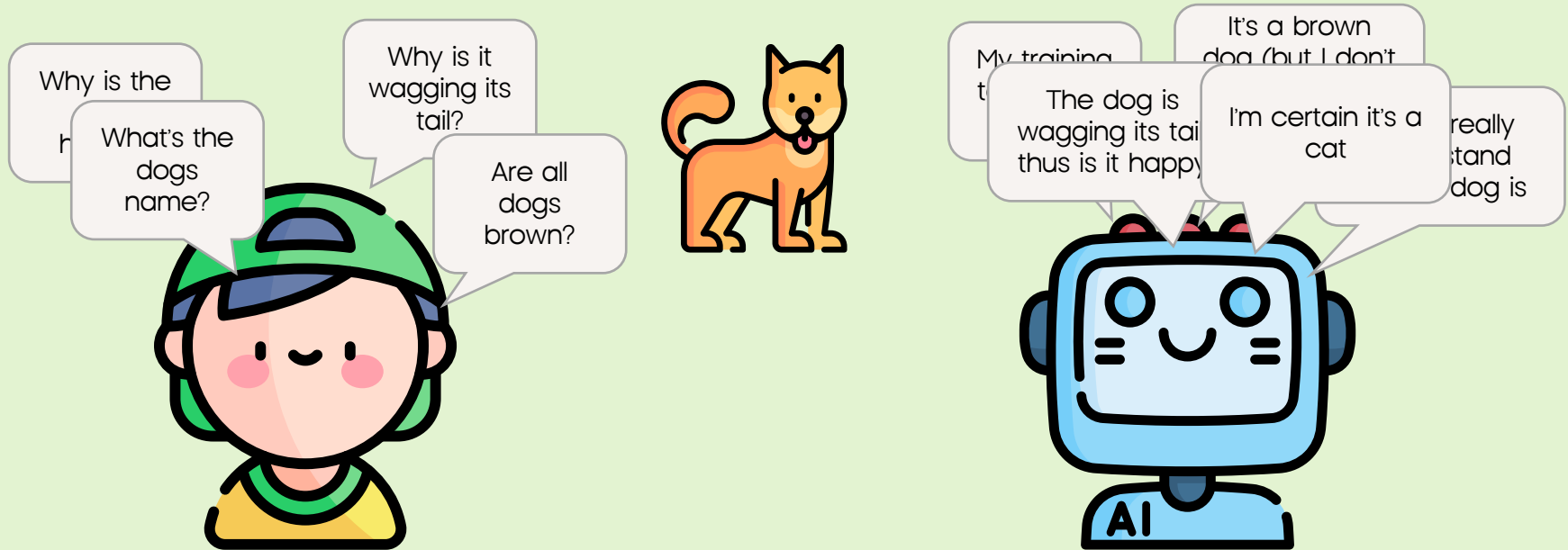


Whilst the
science of how
AI works is simple

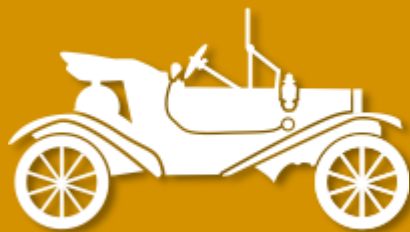
The complexity means
inner workings are
unfathomable

And how intelligent is AI?

The answer is a lot less intelligent that we might think



We are some distance from matching human level intelligence
but for specific jobs AI can out perform us.



AI is advancing exponentially

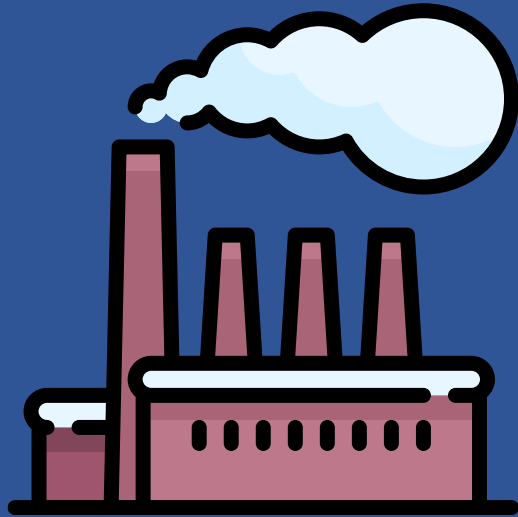
...but we are still only at the beginning of revolution

Historically, many of the most pivotal societal changes have been driven by groundbreaking technical innovations.

All indicators are that we are at the start of a the next technology revolution which will profoundly change our lives and the ways we work

Lessons from history

The Industrial Revolution



Duration: ~80 years from 1760-1840



Advances in food production



Abundance of coal



Stable financial, governmental and legal institutions



Population growth



Improved methods of iron production



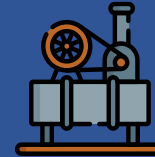
Capital accumulation feeding investment



Urbanisation



Global commerce



Steam engines to drive industry



Disruptive innovation industrialising production



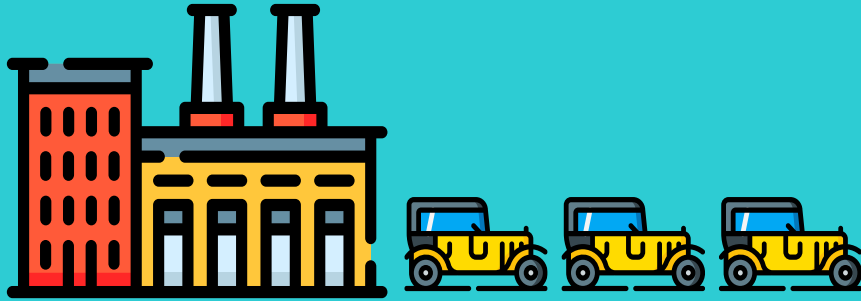
Access to global raw materials



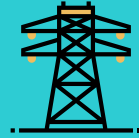
Rail transportation of people and goods

Lessons from history

The Technological Revolution



Duration: ~50 years from 1870-1920



Electricity



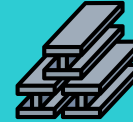
Advances in chemistry



Further urbanisation



Communication



Steel production



Mass production



Oil/Petroleum extraction



Internal combustion engine

Lessons from history

The Digital Revolution

0 1 1 0 0
1 0 1 1 0
1 1 1 1 0

Duration: ~40 years from 1960-2000



Miniaturisation of electronics



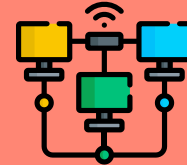
Computers



Robotics and automation



Computer operating systems



Networking



Mass storage



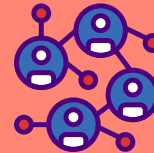
Open-source movement



The Internet



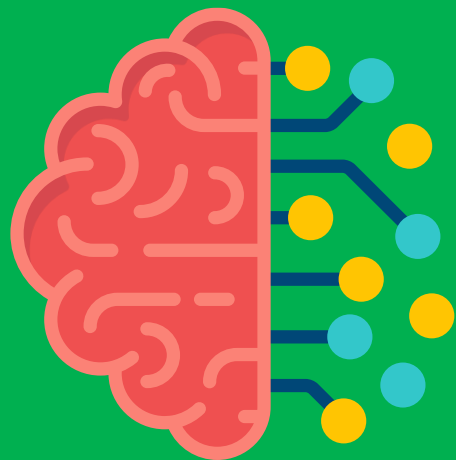
Analogue to digital migration



Social media

Today: *Industry 4.0* Synthetic Revolution

Fusion of the physical, biological and digital spheres.



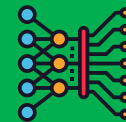
Ongoing and exponentially accelerating



BIG data



Cloud and edge computing



Deep learning / AI



Analytics and future forecasting



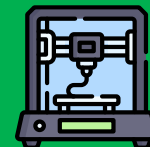
Internet of things



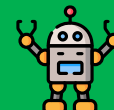
Augmentation



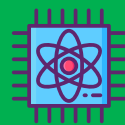
Copiloting & 'Cobots'



Digital manufacturing



Role automation and displacement



Quantum computing



Energy transformation



Biological Engineering

What will be the impacts of AI?



**We don't yet understand
the long-term implications**

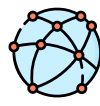
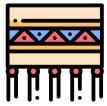
**...but AI Genie is
out of the bottle.**



Containment

An urgent challenge that will inevitably fail

History tells us that humankind has consistently failed to contain revolutionary change



So why is this?

- At its heart is our nature for wanting to outcompete our rival tribes.
- Governments are too dysfunctional and wrapped in their short-term interests to deal with difficult and potentially existential issues.
- Once a revolution has gained pace its exponential growth makes it almost impossible to control or stop.



Economic Impacts

- **Economic growth**
As with previous industrial revolutions, AI will drive economic growth as it unlocks new levels of efficiency.
- **New business models**
The ability to both do existing activities more efficiently and the new opportunities AI will bring will cause shifts in our business models, potentially with new entrants to markets disrupting and becoming significant players.
- **Global competition**
Economies that successfully adopt and adapt to changes will gain competitive advantages on the world stage and grow their markets whilst creating new opportunities.
- **Productivity and efficiency gains**
Productivity will increase as AI is able to more quickly handle both routine and complex tasks at a greater level of cost efficiency.
- **Wealth inequality**
Unless governments and societies plan and adapt in an equitable and fair manner, inequality will inevitably increase. History is not a source of hope here!



Potential impacts on labour markets

- **Job displacement**
AI's will make many roles obsolete with people needing to learn new skills
- **Job creation**
New opportunities will be created as transformation drives economic growth.
- **Changes in skill demands**
The skills demanded in the workplace will fundamentally change and continue to change as the revolution plays out.
- **Wage impacts**
AI skilled workers will be able to demand higher salaries. Conversely some roles will be less in demand and see stagnation or falls in salaries.
- **Productivity**
Increases due to efficiencies and new opportunities that AI delivers.
- **Potential for increased social inequality and erosion of employee protection**
As AI's displace roles, poverty and inequality could increase unless we make the right decisions as a society.

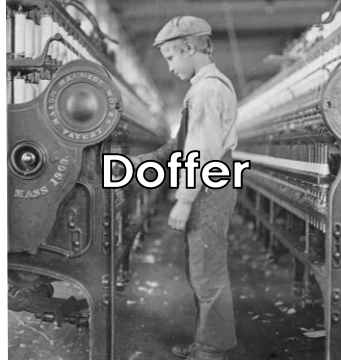




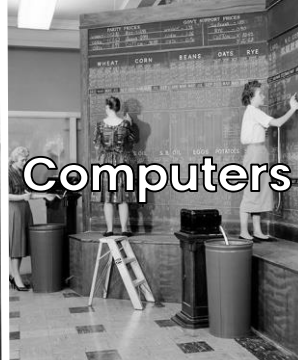
Telegram
boy



Carriage
drivers



Doffer



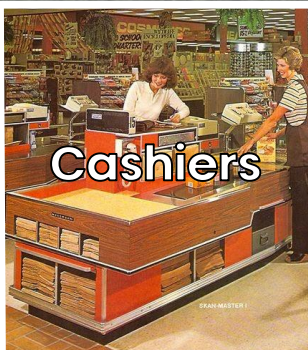
Computers



Firemen



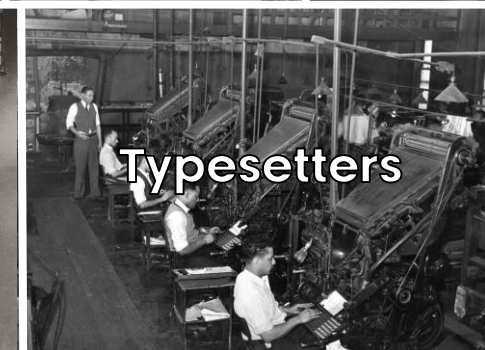
Video store
clerks



Cashiers



Telephone
operators



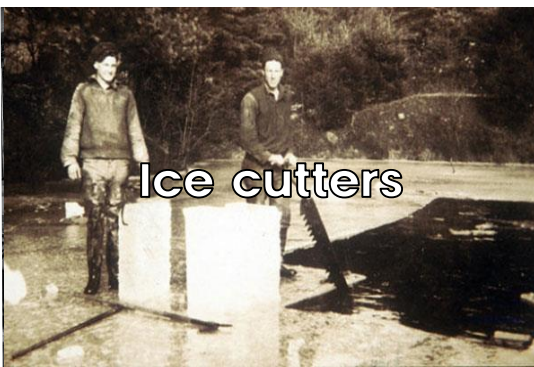
Typesetters



Spinners



Lamp
lighters



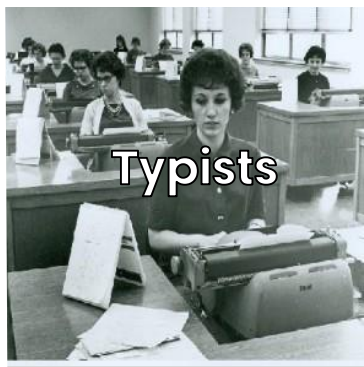
Ice cutters



Knocker
uppers



Projectionists



Typists

A tale from history

The transformation of the weaving industry

- Weaving was a skilled trade with highly paid artisan workers using hand looms often from home.
- The advent of the power looms rendered these roles obsolete
- Wages fell and child labour was used. A single child was required for the same output as 4 traditional weavers.
- The Luddite movement tried to constrain change but were forcibly put down
- At its peak there were 250,000 power looms in the UK, a vast profitable industry.



What roles will be displaced/disrupted by AI? **In the long term, the answer is all jobs**



Translators



Marketing Assistants



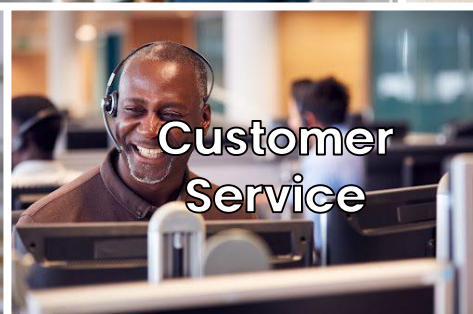
Business Analysts



Content Writers



Finance Clerks



Customer Service



Warehouse Workers



Lorry Drivers



Software Developers



Legal Assistants



Factory Workers



Graphic Designers

Ethical Considerations

- **Bias and Fairness**
How do we ensure fairness in society and avoid bias within AIs?
- **Human dignity and purpose**
As AIs replace what we do, how will we cope and adapt to our potential displacement.
- **Transparency and explainability**
AIs are immensely complex and it is easy to lose visibility on how they are making decisions and interpreting information.
- **Privacy and surveillance**
AIs pose a significant risk to our privacy allowing us to be individually profiled and tracked. This is happening currently in an uncontrolled way.
- **Accountability and responsibility**
Who is responsible for the actions and outcomes of AIs?
- **Autonomy and decision-making**
How far do we trust AIs to make decisions and run in an unsupervised way.
- **Long-term risks**
What are the implications if AIs become self-aware and/or overtake our own abilities



Environmental Impacts

- **Vast energy consumption**
Without careful consideration AI could significantly increase our energy demands.
- **Manufacturing of hardware**
Significant amounts of infrastructure are required, and they use large amounts of resource to create.
- **E-waste**
When the hardware is replaced, it becomes e-waste which needs to be processed.
- **Energy optimisation**
Whilst AI uses lots of energy it can also be used to solve energy problems by managing and optimising its use.
- **Environmental monitoring and conservation**
Its ability to analyse vast amounts of data should drive our ability to understand our environment and how to preserve it.
- **Driving behavioural change**
Through its ability to understand and study the complex environmental systems it can help drive changes in behaviour.



Innovation and Competitiveness

- **Efficiency and automation**
AI delivers efficiency gains by automating processes that are routine, time-consuming and prone to human error.
- **Product innovation**
By analysing market data, consumer behaviour and sentiment it identifies product development opportunities
- **Supply chain and inventory management**
AI enhances the ability to predict and manage inventory.
- **Risk identification and mitigation**
Analysis of business data will allow AIs to spot risks that would be hard for a human to spot and formulate mitigations and strategies to eliminate the risk.
- **Competitiveness**
Businesses will drive their competitiveness by leveraging AI to understand their markets, discover opportunities and outperform their competitors
- **Copiloting**
Employees will work in partnership with AI's to complete activities significantly increasing their performance.



Colart and AI

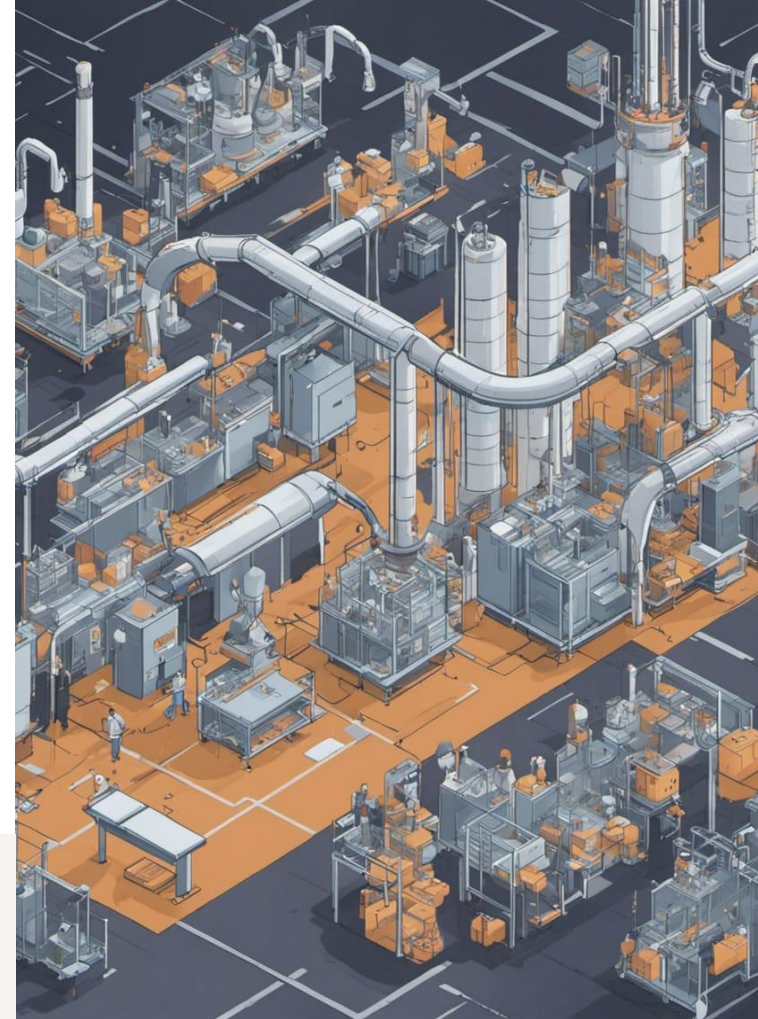
How will it impact us?

Manufacturing

- Vision systems will allow us to improve quality and reduce waste by identifying issues early and correcting them.
- Changes to the roles of our people, as increasing numbers of tasks are replaced by AI driven automation.
- Manufacturing footprints will be reduced as miniaturisation and localisation of capability becomes possible.
- Employee safety would improve as robotics are able to take over dangerous activities.
- Realtime analysis of data from our manufacturing equipment will allow constant adjustment and optimisation of our equipment and predict maintenance issues.

Counter arguments

- Art materials industry is deeply conservative and so pace of change is likely to lag general manufacturing.
- Size of investments will be high and possibly unsupportable by investment realities
- Skills in manufacturing art materials may be too fringe for commercial AI solutions

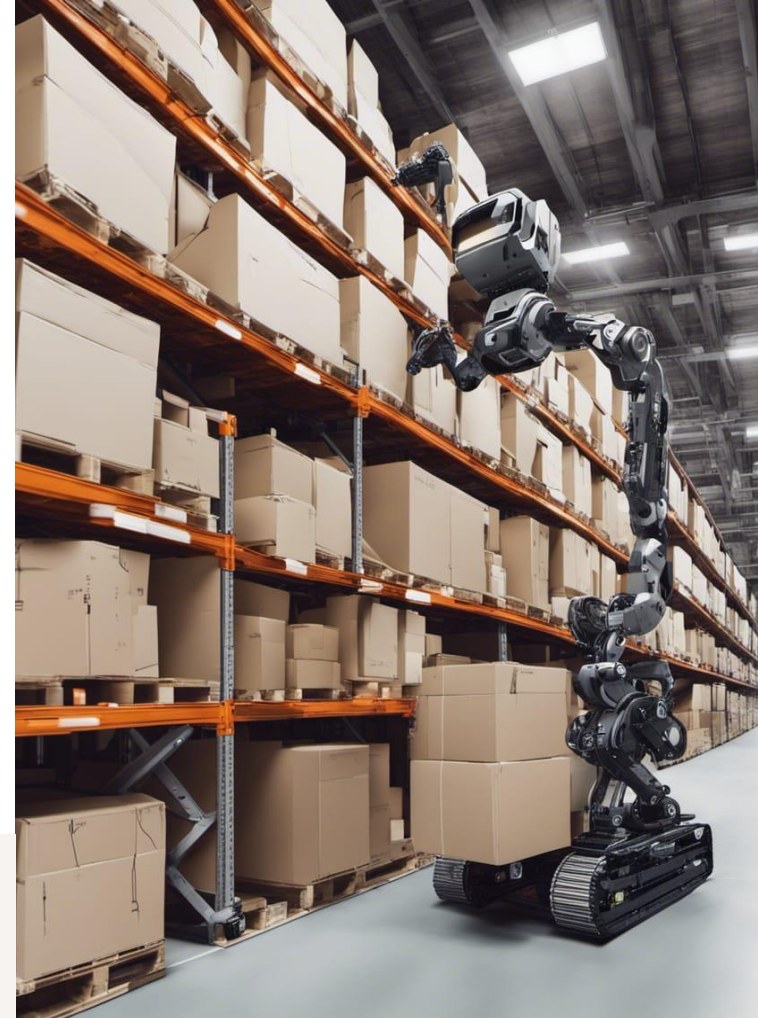


Supply Chain & Logistics

- Optimisation of our logistics operations leading to lower carrier costs, improved loading of goods, and more sustainable logistics.
- Autonomous picking and goods movements potentially facilitating 24/7 operations
- Automation of routine tasks such as item creation, inventory counts, picking/packing flow leading to greater efficiency, accuracy and reduced demand on people.
- Predictive analytics/forecasting improving our ability to anticipate distribution demands between our DCs

Counter arguments

- Elements of these change require scales of operation that potential we don't currently have meaning the cost vs benefit equation may not balance out. This may lead to us having to consider alternatives such as using third party distribution rather than investing ourselves.



Finance

- Many finance BAU tasks will become automated such as data entry, transaction processing, expense processing and invoicing allowing finance teams to focus on analysis and strategy
- As AI matures intelligent automations will allow areas like reconciliations and cost centre analysis to be automated.
- AI's will be able to combine internal and external data to provide more accurate financial forecasting and scenario simulations allowing better visualisation of financial health, risks warning and improved decision making.

Counter arguments

- Currently a significant part of our financial analysis is still excel based and we invest to put in place fit for purpose solutions to support the above. In a world of many competing company demands we may not be able to afford the required investment.



DTC

- Live analysis and profiling of our consumers will allow AIs to constantly optimise and personalise their experience increase loyalty and engagement and conversion rates.
- Chatbots and virtual assistants improve our ability to rapidly handle consumer enquiries, answer questions and support them in product decisions.
- Dynamic pricing will allow us to adjust our prices automatically to reflect demand, competitor positions, and consumer profile/behaviour.
- Automated content generation and translation providing consumers with a highly relevant and targeted experience delivered in their preferred language.
- Fraud prevention by looking at patterns of behaviour/activity.

Counter arguments

- Our consumers may not engage with chatbots preferring a more human experience. Over time this barrier will reduce as people become more trusting of and familiar with chatbots.



Brands and Marketing

- Studying consumer data will allow AI's to identify unmet needs and product opportunities.
- Content creation will allow media assets and creative content to be more easily created increasing efficiency, reducing agency costs and allowing brand/marketing teams to focus on strategy and more complex creative tasks.
- Improved segmentation and insights through analysing customer behaviours allowing us to more proactively drive our marketing strategies and target smaller niche opportunities within the market.
- Optimisation of our ad targeting, SEO, and email marketing
- Monitoring brand consistency and highlighting deviations from guidelines.

Counter arguments

- Governments may (probably should!) legislate against AI based targeting of consumers (although arguably its too late) on basis that it is controlling of the individuals behaviour.



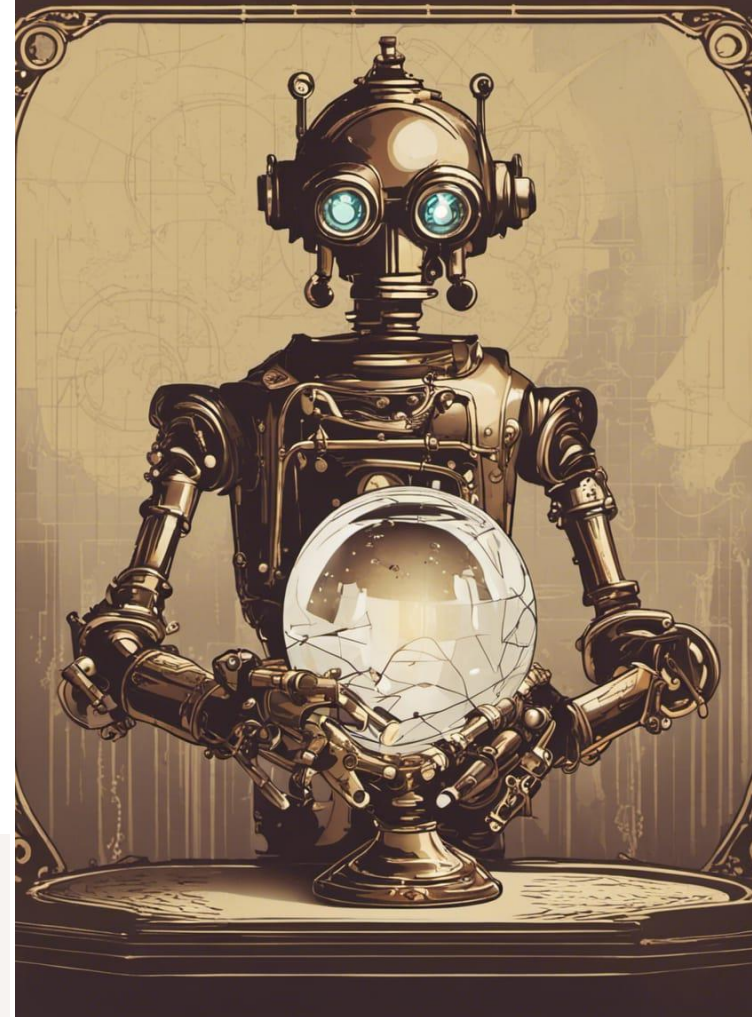
Demand Forecasting

The application of AI to our demand forecasting drives up our services levels by:

- Blending internal data with external data such as EPOS, consumer trends, economic data, market intelligence and opinions/sentiments to improve accuracy.
- Better optimizing the way we use our manufacturing and logistics capabilities to deliver the right product, in the right place at the right time and smooth out peaks and troughs to achieve optimal utilisation of our footprint.

Counter arguments

- An overreliance on AI could create an over-optimised forecasting platform that works well when things are predictable but becomes wildly inaccurate when it encounters sudden market change.



Data Analytics and Insights

- Significantly increased sensor data and automation combined with measurement of operational outcomes will allow us to deeply analyse performance and optimise our manufacturing strategies and delivery.
- Deep profiling of our customers and consumers will allow us to understand their behaviours and optimise our product offerings, pricing and communication
- Profiling and analysis of our competitors' behaviours, product portfolio and performance will allow us to identify opportunities to outcompete, drive our own brand/product strategies and grow market share.
- Image recognition will allow us to monitor and analyse our products both online and in store.

Counter arguments

- These capabilities require a transformation of our data skills and understanding which will take time and investment. This competes with many other areas where investment is needed.

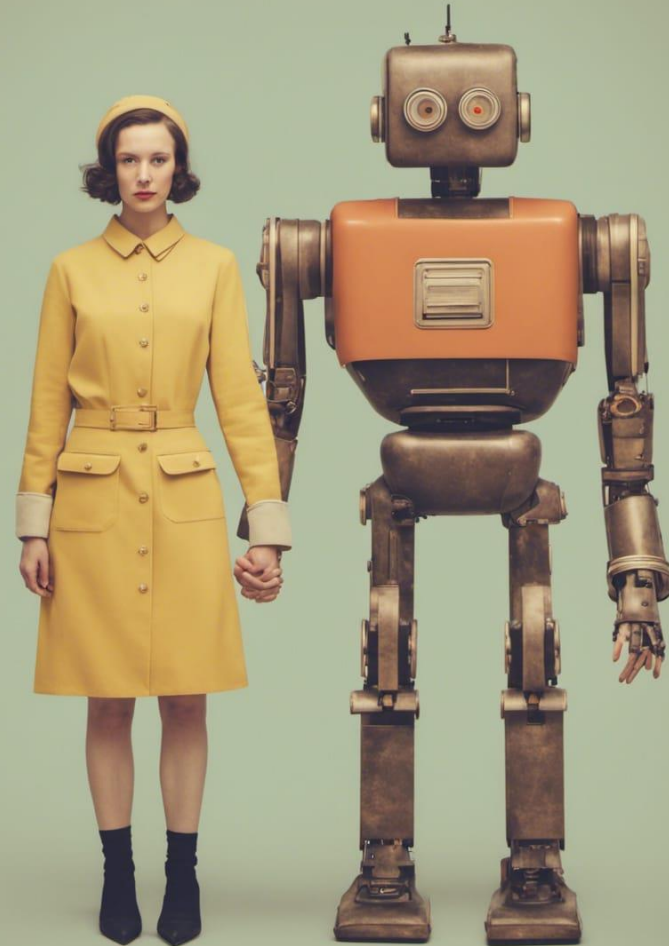


People

- AIs will enhance our abilities to measure employee performance providing data-driven insights and analysis that can identify strengths, weaknesses and development opportunities
- Many routine HR tasks such as employee onboarding, payroll, benefits administration will become automated freeing HR staff to focus on strategy and people.
- Predictive analysis of trends and patterns will allow us to identify employees who might be at risk of leaving the business.
- The reduced reliance on people for certain tasks could lead to more flexible working conditions providing a better work life balance.

Counter arguments

- AI brings with it a risk of 'big brother' style surveillance of employees. Governments will need to legislate to protect workers rights.



Sustainability

- Improvements to our energy consumption in manufacturing by optimising the way we consume energy (via smart grids, onsite energy storage) whilst reducing the need for temperate heated areas within our sites through automation of picking and packing
- Reduced waste from supply chain and process optimisation.
- Pollution monitoring, analysis, and prevention

Counter arguments

- AI uses a lot of energy. Will it actually bring benefits that offset its impact?



Governance

- Centralised collection of company data will allow AIs to rapidly audit and analyse data to identify GDPR, audit anomalies and business risk giving far greater visibility to business stakeholders.
- Automated transcribing of meetings providing an audit trail and management summarisations of activities.
- Fraud and cybersecurity detection and prevention will be enhanced as AIs are able to quickly spot anomalies and unusual patterns providing automated prevention and alerting.
- Routine legal tasks such as analysis and creation of contracts will become automated freeing legal specialists to high value work.

Counter arguments

- Due to the potential liabilities that could arise from AI 'getting it wrong' many businesses may feel uncomfortable handing over tasks to AI. For us though it may be a necessity because we are unable to resource fully our governance side of the business and 'something is better than nothing' may be a pragmatic solution.



Threats

- We fail to adapt and are out competed by more agile competitors (probably non-traditional ones).
- AI's commoditise knowledge meaning that barriers to entry fall away.
- AI becomes an arms race in which we cannot afford to play.
- AI tools are used to defraud us or penetrate out networks leading to data breaches or business harm.
- AI changes the art world with creativity shifting significantly into digital formats and we are unable to adapt.
- Security of the data we put into AI



Using AI in the real world

Copiloting

Copiloting is already transforming many jobs as people learn to partner with an AI to jointly deliver a task/outcome.

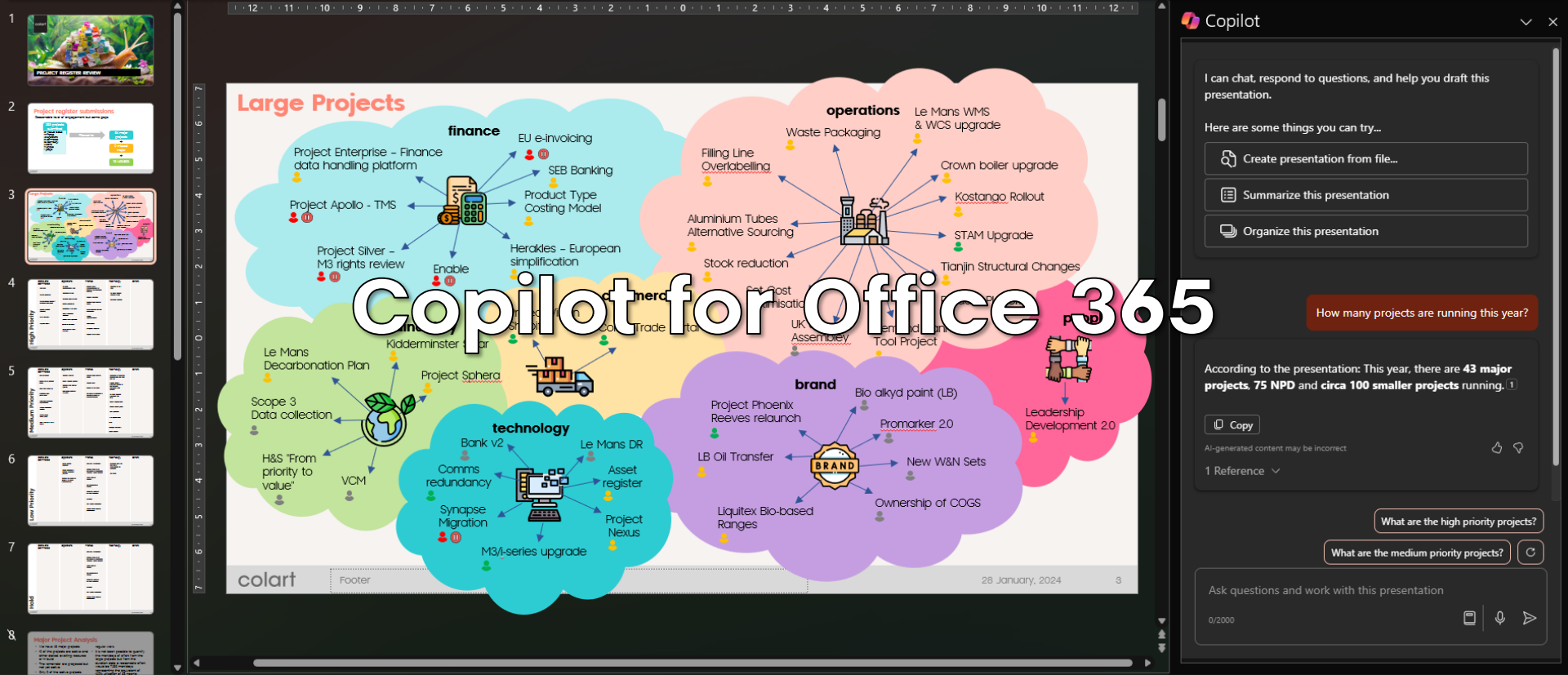
Capabilities to copilot are being built into many applications that we use day to day including Microsoft office.

Learning how to best engage with a generative language model such as ChatGPT can drastically change how much benefit it delivers.



Clipboard Slides Font Paragraph Drawing

Find Replace Select Editing Voice Sensitivity Add-ins Designer Copilot



Copilot for Office 365

Copilot

I can chat, respond to questions, and help you draft this presentation.

Here are some things you can try...

- Create presentation from file...
- Summarize this presentation
- Organize this presentation

How many projects are running this year?

According to the presentation: This year, there are **43 major projects**, **75 NPD** and **circa 100 smaller projects** running. 1

Copy

AI-generated content may be incorrect

1 Reference

What are the high priority projects?

What are the medium priority projects?

Ask questions and work with this presentation

0/2000

EXPLORER




- TEST
 - test_script.py



OUTLINE

TIMELINE

```
test_script.py
1 # This script takes a list of files and runs through them sorting each of the lines of content alphabetically into
2 # a new file.
3
```



GitHub Copilot


-  Image Copy Machine ...
-  Logo Creator
-  Explore GPTs


Today
Happy Dog Indicators  

- Yesterday
- LLM Training on A100: Estimate
 - Vue3: DefineProps Accepts Objec
 - Verbose Python Import Debugging



- Previous 7 Days
- Neuron Output Calculation
 - Neuron Operation in AI
 - Parallel Execution in GPUs

-  **Add Team workspace**
Collaborate on a Team plan
-  Toby Russell

 **You**
How do you know if a dog is happy?

 **ChatGPT**
Determining if a dog is happy involves observing a combination of their physical expressions, behaviors, and overall health. Here are some key indicators that can suggest a dog is experiencing happiness:

- Body Language:** A relaxed posture, with a wagging tail (especially if the wag is more to the right, as some studies suggest), relaxed ears, and an overall relaxed demeanor can indicate happiness. A wagging tail, in particular, is often associated with joy, but **ChatGPT** also express other emotions.
- Facial Expressions:** Happy dogs show happiness through their facial expressions. A "soft" eye, where the eyes appear normal or slightly squinted, can indicate contentment. An open mouth with a relaxed, lolling tongue can also be a sign of a happy dog.
- Engagement and Interaction:** Happy dogs usually show a keen interest in engaging with their surroundings, including people, other animals, and play objects. They may bring toys to their owners to initiate play or seek pets and cuddles.
- Good Appetite:** A healthy appetite can be a sign of well-being in dogs. If a dog is eating well and shows enthusiasm for meals and treats, it's often a good indicator of happiness.

 Message ChatGPT... 

ChatGPT can make mistakes. Consider checking important information.

“I would like to design a range of paints to sell to student level artists. Currently most products on the market come in plastic or aluminium tubes but I would like to come up with something more sustainable.

Could you suggest some alternative options for paint containers and give a commentary on what the environmental benefits and drawbacks of each option.”

“Certainly, designing a range of paints with sustainability in mind is a commendable initiative. Here are some alternative options for paint containers, along with their environmental benefits and drawbacks:

1. Glass Jars

Benefits:

- **Recyclable:** Glass is 100% recyclable and can be recycled endlessly without loss of quality.
- **Non-Toxic:** Glass is made from natural materials and doesn't contain harmful chemicals.
- **Longevity:** Glass containers are durable and can be reused multiple times.

Drawbacks:

- **Weight:** Glass is heavy, which could increase transportation costs and carbon footprint.
- **Breakability:** Glass is prone to breaking, which could result in product loss and safety concerns.

2. Cardboard Tubes

Benefits:

- **Biodegradable:** Cardboard breaks down naturally, reducing landfill waste.
- **Lightweight:** Lower transportation costs and carbon footprint.

Drawbacks:

- **Durability:** Cardboard is not as durable as plastic or glass and may not be suitable for long-term storage.
- **Water Resistance:** Cardboard is susceptible to moisture, which could compromise the quality of the paint.

3. Aluminium Tins

Benefits:

- **Recyclable:** Aluminium can be recycled and reused multiple times.
- **Lightweight:** Lower transportation costs compared to glass.

Drawbacks:

- **Energy-Intensive:** The process of recycling aluminium is energy-intensive.
- **Cost:** Aluminium is generally more expensive than plastic.

4. Plant-Based Plastics (Bioplastics)

Benefits:

- **Renewable Resources:** Made from plant-based materials like cornstarch or sugarcane.
- **Reduced Carbon Footprint:** Lower greenhouse gas emissions compared to conventional plastics.

Drawbacks:

- **Biodegradability:** Not all bioplastics are biodegradable or compostable.
- **Food Competition:** Some bioplastics are made from food sources, which could raise ethical concerns.

5. Refillable Containers

Benefits:

- **Waste Reduction:** Customers can refill the same container, reducing the need for new containers.
- **Versatility:** Could be made from various materials, including glass or aluminium.

Drawbacks:

- **Logistical Challenges:** Requires a system for refilling, which could be complex to implement.
- **Sanitation:** Containers must be thoroughly cleaned before refilling to ensure product quality.

“I was thinking of plastic pouches a bit like the ones used by Innocent for their smoothies. Would this be an option and what would the benefits/drawbacks be of these?”

“Certainly, plastic pouches similar to those used for smoothies could be an intriguing option for packaging paint. Below are the environmental benefits and drawbacks of using such pouches:

Plastic Pouches (Flexible Packaging)

Benefits:

- **Lightweight:** One of the most significant advantages is the reduced weight, which can lower transportation costs and the overall carbon footprint.
- **Material Efficiency:** Pouches often use less material than rigid containers like bottles or jars, reducing resource consumption.
- **Reduced Waste:** The flexible nature of the pouch allows for more complete extraction of the product, minimizing waste.
- **Compact:** The flexible packaging takes up less space, which is beneficial for both shipping and retail display.

Drawbacks:

- **Recyclability:** Many plastic pouches are made from multiple layers of different materials, making them difficult to recycle.
- **Durability:** While they are generally robust, they can be more susceptible to punctures or leaks than rigid containers.
- **Perception:** Consumers may associate flexible plastic pouches with single-use plastics, which could be a drawback if you're aiming for a sustainable image.
- **Resource Intensive:** While they may use less material, the production of plastic is generally resource-intensive and reliant on fossil fuels.

Given your interest in sustainability, you might consider a hybrid approach. For instance, you could use pouches made from biodegradable or compostable materials. However, it's crucial to note that even "compostable" plastics often require industrial composting facilities to break down fully, which may not be readily accessible to all consumers.

Would you like to explore this option further or discuss other aspects of sustainable packaging?”

“That’s fine, thanks. So, for my paint range I would like 36 colours and ideally they should use environmentally friendly pigments. Could you suggest some colour options and the pigments (including pigment number) that I should use?”

Certainly, creating a paint range with 36 colors that utilize environmentally friendly pigments is an ambitious and commendable project. Below are some color options along with recommended pigments that are generally considered to be more eco-friendly:

Earth Tones

- Burnt Sienna: Natural Iron Oxide (PBr7)
- Raw Umber: Natural Iron Oxide (PBr7)
- Ochre: Natural Yellow Iron Oxide (PY43)

Reds

- Cadmium-Free Red: Organic Red Pigments (PR170)
- Alizarin Crimson: Synthetic Organic Pigment (PR83)
- Rose Madder: Organic Lake Pigment (NR9)

Oranges

- Cadmium-Free Orange: Organic Orange Pigments (PO73)
- Peach: Blend of Organic Yellow and Red Pigments (PY74, PR170)
- Coral: Organic Red Pigment with White Fillers (PR254)

Yellows

- Cadmium-Free Yellow: Organic Yellow Pigments (PY74)
- Lemon Yellow: Arylide Yellow (PY3)
- Golden Yellow: Benzimidazolone Yellow (PY154)

Greens

- Phthalo Green: Phthalocyanine Green (PG7)
- Sap Green: Blend of Phthalocyanine Green and Arylide Yellow (PG7, PY3)
- Olive Green: Natural Chromium Oxide Green (PG17)

Blues

- Ultramarine Blue: Synthetic Ultramarine (PB29)
- Cobalt-Free Blue: Organic Blue Pigments (PB15)
- Cerulean Blue: Cobalt-Free Cerulean Blue (PB35)

Purples

- Violet: Dioxazine Violet (PV23)
- Lavender: Blend of Organic Blue and Red Pigments (PB15, PR122)
- Mauve: Organic Violet Pigment (PV19)

Neutrals

- Ivory Black: Carbon Black (vegetable-based) (PBk7)
- Titanium White: Titanium Dioxide (non-nano) (PW6)
- Gray: Blend of Carbon Black and Titanium White (PBk7, PW6)

Metallics

- Gold: Mica-Based Pigment (N/A)
- Silver: Mica-Based Pigment (N/A)
- Bronze: Mica-Based Pigment (N/A)

Pastels

- Pastel Pink: Organic Red with White Fillers (PR122)
- Pastel Blue: Organic Blue with White Fillers (PB15)
- Pastel Green: Organic Green with White Fillers (PG7)

Specialty Colors

- Turquoise: Phthalocyanine Blue with Green (PB15, PG7)
- Teal: Blend of Phthalocyanine Green and Blue (PG7, PB15)
- Magenta: Quinacridone Magenta (PR122)

Fluorescents

- Fluorescent Pink: Organic Fluorescent Pigment (N/A)
- Fluorescent Green: Organic Fluorescent Pigment (N/A)
- Fluorescent Yellow: Organic Fluorescent Pigment (N/A)

“What is the environmental impact of titanium oxide and are there any hazards/risks to human, animal or plant health?”

Environmental Impact of Titanium Dioxide (TiO₂)

Environmental Concerns:

- **Resource Extraction:** The extraction of titanium ore can result in habitat destruction and soil erosion.
- **Energy-Intensive Production:** The production of TiO₂ is energy-intensive, contributing to greenhouse gas emissions.
- **Water Pollution:** The production process can lead to water pollution if not managed correctly.
- **Bioaccumulation:** While TiO₂ particles are generally considered to have low bioaccumulation potential, concerns exist about nano-sized particles.

Benefits:

- **Stability:** TiO₂ is chemically stable and does not readily degrade, reducing the risk of releasing harmful substances into the environment.
- **Non-Toxic to Aquatic Life:** In its bulk form, TiO₂ is generally considered to be non-toxic to aquatic life.

Health Hazards/Risks

Human Health:

- **Inhalation Risks:** Inhalation of TiO₂ dust is a concern for workers in manufacturing facilities. It has been classified as a Group 2B carcinogen by the International Agency for Research on Cancer (IARC) when inhaled in large quantities.
- **Skin Contact:** Generally considered safe for skin contact and is widely used in cosmetics and sunscreens. However, nano-sized particles have raised some concerns.
- **Ingestion:** Generally considered non-toxic when ingested in small amounts.

Animal Health:

- **Low Toxicity:** Generally considered to have low toxicity in animals.
- **Inhalation Risks:** Similar to humans, inhalation of TiO₂ particles in high concentrations can be harmful.

Plant Health:

- **Generally Safe:** TiO₂ is generally considered to be non-toxic to plants.
- **Photocatalytic Activity:** Under certain conditions, TiO₂ can exhibit photocatalytic activity, which could potentially harm plant life, although this is generally not a concern in most applications.

Alternatives

- **Zinc Oxide (ZnO):** Considered a safer alternative but has its own set of environmental concerns.
- **Organic Whites:** Some organic pigments can be used as alternatives but may not provide the same opacity or brightness.

It's crucial to consult with environmental experts and conduct a full lifecycle analysis to understand the complete environmental impact of using Titanium Dioxide in your products. Would you like to explore this topic further?

AI Media

Tools like Dall-e, Adobe Firefly, Midjourney are starting to evolve from interesting proof of concepts to genuinely useful (and potentially nefarious) tools that can create and adapt a wide range of media types including imagery, video, audio and other media.



Example

“A mid 60's british sportscar driving down a country road. intricate details, HDR, beautifully shot, hyperrealistic, soft focus, 64 megapixels, perfect composition, high contrast, cinematic, atmospheric, moody”





We can also train AI's on our own imagery

- The image on the right was produced by training an existing image AI with just 16 images from the bank.
- It successfully recreates some of the feel of our bank imagery and even hints at some of our brand identity.



"paint tubes on a table with a brush and some canvas"

Example 2

As we have seen in movies, AI can be used to de-age or even deep-fake people or performers.

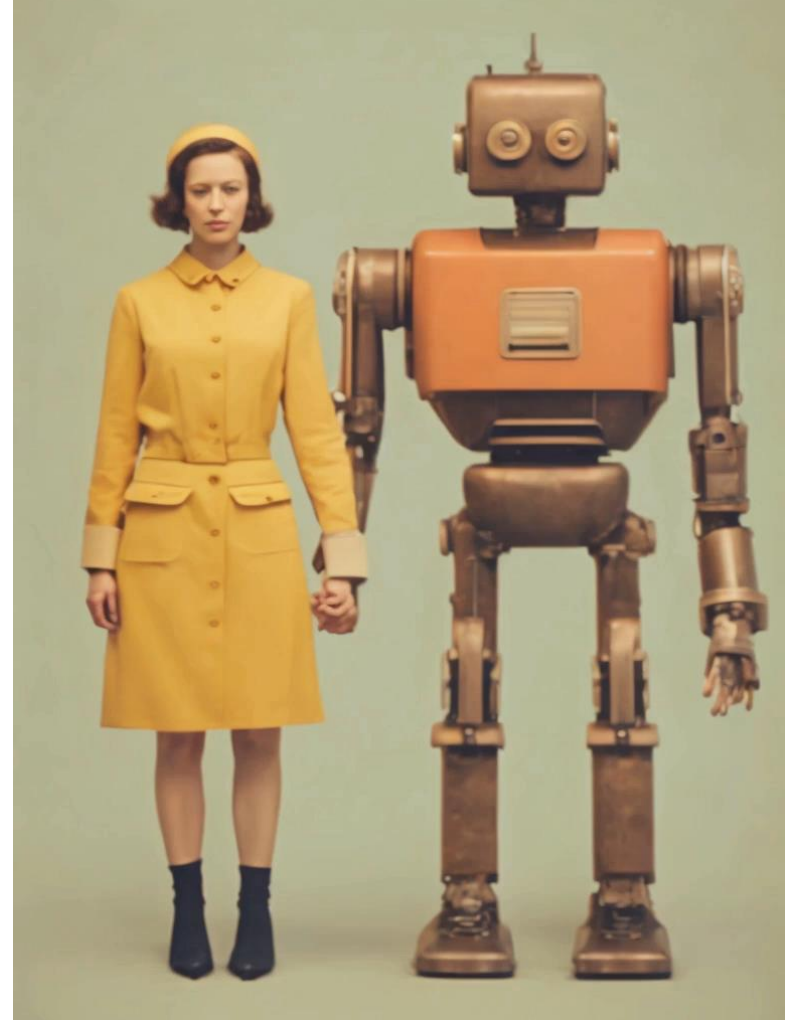
It is becoming increasingly hard to recognise the difference between a real person and an AI generated image/video



Video

Video is still in the very early stages of development but already it is showing its potential.

Actors are worried for very good reason!



Voice

- It is becoming increasingly easy to clone people's voices.
- Whilst not yet perfect, they are potentially good enough to fool people who do not know people well.
- Whilst there are legitimate uses of such technologies, there are plenty of more sinister applications!
- For example, they could be used to fool people into compromising the company or their own security.



Lip syncing is also becoming possible allowing the possibility of fully interactive video-based visualisations/impersonations.

Admittedly my rudimentary attempt above is basic, but it only took 2 minutes to create

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Image Analysis

- AI's are able to study images and describe what is happening within them.
- This is incredibly useful for a range of applications such as marketing analysis, surveillance, and automation of manufacturing.





Q: What is happening in this picture?

“There appears to be an altercation occurring on a residential street. One individual is on the ground while another stands in front of them, seemingly in a confrontational posture. There is also a dog on a leash, held by the person on the ground. This scene may suggest a potential robbery or assault in progress. It would be a matter for local law enforcement to handle.”



Q: Describe everything you see from this picture

- A 51-year-old male squatting in front of a glass wall
- A person's hands with rings on their fingers
- A man squatting in front of a shark
- Damien Hirst sitting on the floor.



Q: Describe this picture

“A collection of Liquitex brand acrylic paints in a variety of colors. These are professional-grade paints, as indicated on the labels, and come in different viscosities—both soft body and heavy body types are visible. The tubes are arranged with their labels facing forward, allowing viewers to read the color names and properties. The background of the image is slightly blurred but it seems to show some abstract paintings, which could suggest this setting is an artist's workspace or studio where the paints are utilized.”



Q: What size are the pots in the foreground?

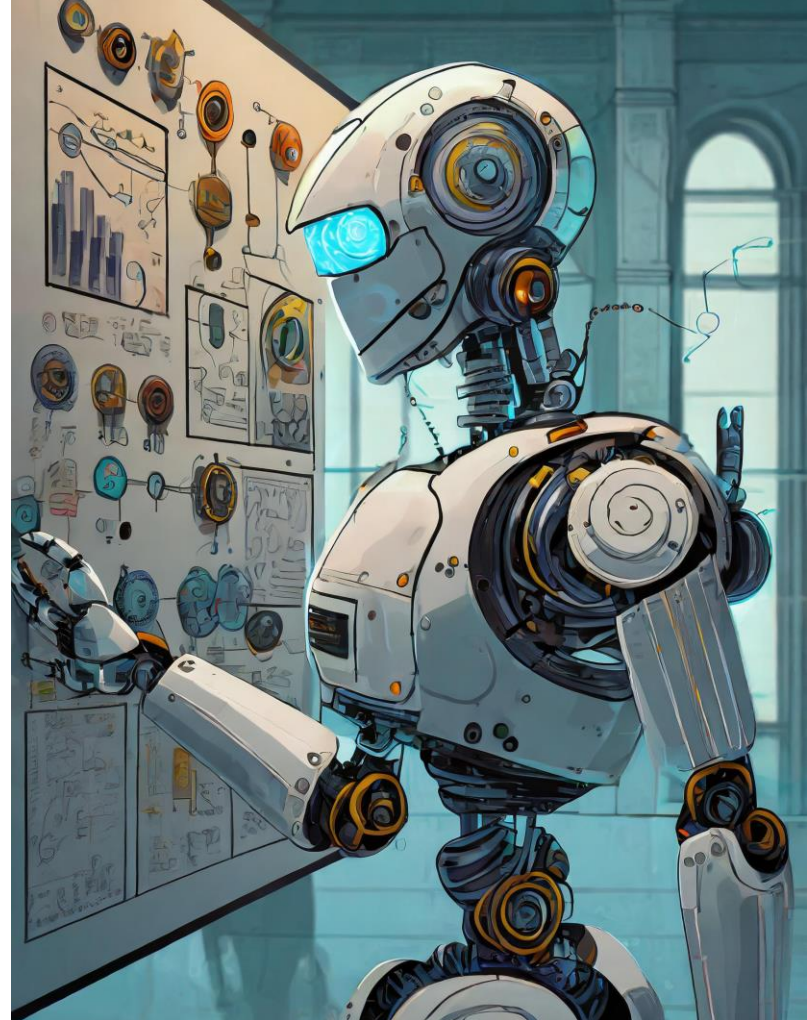
“The paint tubes in the foreground have a label that indicates they contain 59 ml (or 2 US fl oz) of paint. This is a common size for professional-grade paint, offering artists a good balance between quantity and portability.”

Planning

AI has the potential to significantly improve how we plan operations

By allowing us to better optimise our processes it can unlock efficiencies and reduce bottlenecks.

These sorts of changes ultimately drive up our profitability



Planning

AI has the potential to significantly improve how we plan operations

We manufacture tubes of paint. We have 4 filling lines that are used to fill paint into tubes and I would like to create a manufacturing plan that would optimally use the filling lines to create maximum output of my work orders.

Here are details of my filling lines:

Line 1: Fills 22ml and 37ml tubes. It can fill 500 tubes per hour and a changeover between work orders takes 2 hours

Line 2: Fills 37ml tubes. It can fill 750 tubes per hour and a changeover takes 2.5 hours

Line 3: Fills 12ml and 22ml tubes. It can only fill 250 tubes per hour and changeover takes 1 hour

Line 4: Fills 12ml, 22ml and 37ml tubes. It can fill 1000 tubes per hour and a changeover between work orders takes 2 hours.

I have the following work orders:

Order 1 : 500 tubes of 37ml with red paint

Order 2 : 1000 tubes of 22ml with green paint

Order 3 : 600 tubes of 12ml blue paint

Order 4 : 2000 tubes of 37ml orange paint. This is a high priority

Order 5 : 100 tubes of 12ml black paint

Order 6 : 800 tubes of 22ml white paint

Order 7 : 2000 tubes of 37ml brown paint. This is low priority

Order 8 : 600 tubes of 12ml gray paint.

What is the optimal sequencing of the filling lines needed to satisfy the above orders?

Planning

AI has the potential to significantly improve how we plan operations

Line 1:

Order 4: 2000 tubes of 37ml orange paint (high priority, 4 hours to fill, 2 hours changeover)

Line 2:

Order 1: 500 tubes of 37ml red paint (0.67 hours to fill, 2.5 hours changeover)

Order 7: 2000 tubes of 37ml brown paint (low priority, 2.67 hours to fill, no additional changeover since it's the same size)

Line 3:

Order 5: 100 tubes of 12ml black paint (0.4 hours to fill, 1 hour changeover)

Order 6: 800 tubes of 22ml white paint (3.2 hours to fill, 1 hour changeover)

Line 4:

Order 3: 600 tubes of 12ml blue paint (0.6 hours to fill, 2 hours changeover)

Order 8: 600 tubes of 12ml gray paint (0.6 hours to fill, no additional changeover since it's the same size)

Order 2: 1000 tubes of 22ml green paint (1 hour to fill, 2 hours changeover)

The total time taken for each line to complete its assigned orders, including changeovers, would be as follows:

Line 1: 6 hours, Line 2: 5.83 hours, Line 3: 5.6 hours, Line 4: 6.2 hours

This plan minimizes the overall changeover times by grouping orders with the same tube sizes where possible and prioritizes the high-priority order. It's worth noting that Line 4, being the fastest, is utilized for three different sizes, maximizing its output by minimizing its idle changeover time.

Summarisation of information

Tools that can scan documents or even record and analyse meetings allow information to be compactly summarised.

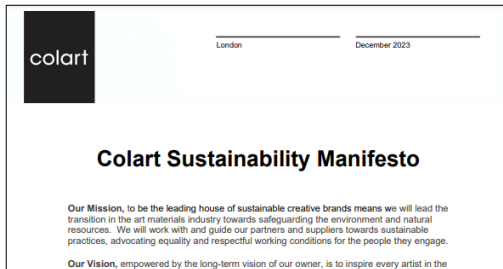


The "Colart Sustainability Manifesto" outlines the company's commitment to leading the transition towards environmental stewardship in the art materials industry. It emphasizes three main work streams: developing products that minimize environmental impact, optimizing operations for sustainability, and fostering a culture of sustainability among employees.

Key initiatives include reducing waste, promoting recyclability in packaging, implementing sustainable manufacturing processes, and engaging employees in sustainability efforts. The manifesto also highlights the importance of measuring progress towards these goals and integrating sustainability into the company's governance and decision-making processes.

Document Analysis

- As well as being able to summarise information, tools can provide interactive analysis.
- This can provide a powerful way to better understand complicated documents by providing a way of asking questions that the AI will provide analysis based on both the document and its general knowledge of a subjects



Q: What are the main improvements we aim to make to our products?

- Delivering a product portfolio that is optimized to reduce complexity and minimize environmental impact.
- Making use of standardized formulations categorized as good, better, and best.
- Implementing a low waste and energy-efficient manufacturing and supply chain.
- Developing environmentally tuned packaging, with a commitment that 100% of the plastic packaging will be reusable or widely recyclable and will include at least 50% post-consumer recycled content

Q: What are the strengths and weaknesses of this plan?

Strengths:

- **Comprehensive Approach:** The plan addresses various aspects of sustainability, including product formulation, manufacturing processes, and packaging. This holistic approach is crucial for making a significant environmental impact.
- **Clear Targets:** Setting specific goals, such as making 100% of plastic packaging reusable or widely recyclable and including 50% post-consumer recycled content, provides clear direction and measurable objectives.
- **Innovation in Product Development:** The focus on standardized formulations and reducing complexity in products can drive innovation, leading to more sustainable and efficient production methods.
- **Stakeholder Engagement:** The plan includes measures for engaging employees and other stakeholders, fostering a culture of sustainability that extends beyond the company's direct operations.
- **Alignment with Global Sustainability Goals:** Aligning with broader sustainability agendas, like the 2030 agenda for sustainable development, positions the company as a responsible global citizen.

Q: What are the strengths and weaknesses of this plan?

Weaknesses:

Implementation Challenges: Transforming existing processes and products to meet these sustainability goals can be challenging and resource-intensive. It may require significant investments and organizational change management.

Supply Chain Complexity: Ensuring sustainability across the entire supply chain, especially for global operations, can be complex and difficult to control or monitor effectively.

Market Acceptance: Customers may have varying responses to new product formulations and packaging, which could impact market acceptance and sales.

Measuring Impact: While the plan includes a Value Creation Model for measuring progress, quantifying the environmental and social impacts of these initiatives can be complex and may require sophisticated monitoring and reporting systems.

Balancing Cost and Sustainability: There may be a need to balance the cost implications of sustainable practices with business profitability, especially in a competitive market.

Next Steps in our AI Journey

AI is now an unstoppable reality, and we need to adapt and adopt to thrive.

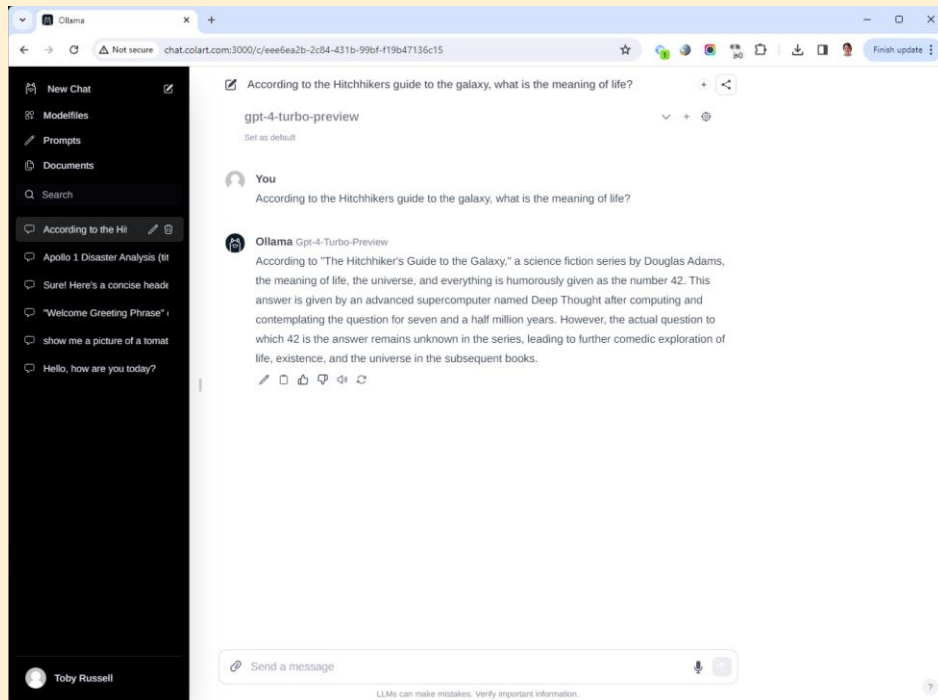
In a conservative industry like our own it is easy to dismiss as not yet an issue. However, history is littered with companies that failed to adapt to transformational change and we ignore the potential and the risks of AI at our extreme peril.

What it will take

- A clear strategy on how we approach AI's roll out with a fully joined up approach between business functions
- Constant vision of what's over the horizon so that we are prepared for when time comes to adopt.
- Support and train our people in moving into an AI, data driven and digital world.
- A willingness to invest alongside many other competing areas of the business.
- An ethical and governance framework on how we invest in AI and apply it
- A cultural readiness. This is a journey not everyone will want to go on and there will be fear of what is to come.

Have a play with GPT-4

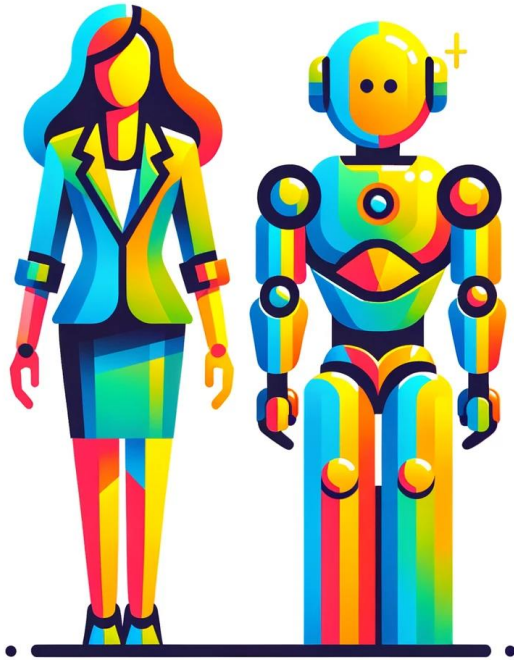
Use our Colart chat client to experiment



<https://chat.colart.com/>

Getting that best from your copilot

Book in for a Copiloting workshop to develop your skills



<https://workflows.colart.com/>

Fin!