



State of Open: The UK in 2024 Phase Four

AI Openness: End of Year Update 2024



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1. Overview

1.1 Executive Summary

This report sets out a year end update on the progress made across AI in 2024.

Thought Leadership pieces consider the current market place in AI and the recent push from Generative AI to Agentic AI, from AutoGPT founder and CEO, Toran Bruce Richards whose AutoGPT repository with 169,000 GitHub Stars remains the fastest growing open source repository in the world. There is also a case study of the AutoGPT Agentic AI platform released in September 2024.

As Toran explains “Agents help people do their best work by removing the time consuming barriers that hold them back. By handling routine tasks, Agents enable individuals to focus on creativity and innovation. Keeping Agents open and accessible means empowering everyone to achieve more, no matter their resources.”

In its attempt to summarise an incredibly fast-paced year of innovation this report offers an overview of the activities of that year from a technical progress and policy perspective and summarises the status of policy on AI, covering key developments it explores policy and law in depth and an analysis of data.

The EU AI Act will come into force in 2025 and the challenge of its being implimented in Northern Ireland is explored, the UK’s new consultation on copyright and AI has recently been launched and the UK’s AI Bill is expected early in the new year, along with the House of Commons Committee LLM Inquiry Report.

2024 saw the Open Source Initiative deliver its proposed ‘Open Source AI Defintion’ but only 20 or so companies and 100 individuals have registered their support for it. The Free Software Foundation is creating a second defintion. An accepted defintion or some form of assessing what makes AI open is necessary for the clarificaition of what open source AI means and to avoid allegations of ‘open washing’. Other approaches from Stamford, Linux Foundation and notably Radboud University disaggregate and assess components. The importance of this is seen most clearly in the context of legislaition such as the AI Act where exemptions from legal requirements are made for open source and so what that means must be clear. New terms such as open access AI are also being used to avoid confusion.

Breaking down the data from GitHub it demonstrates dramatic growth in AI and in particular significant growth in open source AI development, with GitHub reporting a 59% increase in generative AI projects and a tripling of GitHub stars for AI-related repositories in 2023.

The UK ranks fourth globally in AI capability and is emerging as a leader in open source AI innovation, despite facing challenges from global competitors like the US and China.

France has demonstrated fast paced growth in both open source software and AI that is open and has pushed ahead of the UK to the number one position in Europe. It will be hosting the next global AI Summit, the AI Action Governance on 10th February.

1.2 Introduction: AI Openness - The next steps

Amanda Brock,
CEO, OpenUK



In reporting on AI, we must question our focus. With the pace of growth in Generative AI (Gen AI) and Large Language Models (LLMs) since March 2023, most reporting, policy discussion and legislative work is purely focused on LLMs, yet the Agentic AI (Agentic) market has begun to grow.

In this report we are privileged to hear from Scotland-based Toran Bruce Richards, the founder of AutoGPT, the open source leader in the Agentic AI space. We share both a case study on the AutoGPT platform released in September and his Thought Leadership. LLMs are the present and we continue to grapple with them. But the perpetual challenge for those in the policy space is to seek to keep pace with innovation. Today we are seeing the start of a shift in focus, a shift to 'Agentic AI' and a need to build understanding of this space and the place of open technology in it. Whether Agentic is to be the short-term or the long-term future of AI, we cannot say. Only time will tell. But what is clear today is that we must begin to broaden the focus of what we are considering and researching in AI. This will require agility.

This report is not the only report we have done in 2024, with an interesting case study. The UK's AI Safety Institute is not only a leader as a Safety Institute but open sourced its AI Safety Evaluation/ Testing Platform 'Inspect' and you can read about that in Phase 3 which explored how open source disrupts markets and how market factors disrupt open source.¹

Toran's thought leadership sits in this report with thinking that the Future is here, from OpenUK's Entrepreneur in Residence Matt Barker, and a focus on the volatility of current policy thinking from OpenUK AI Advisory Board Member and Harvard Research Fellow, Ben Brooks, who now builds on his policy work from Stability AI in his work at Harvard. We share not only an AutoGPT case study but also one from Macrococosmos.

Bringing together a year-end round up of AI, such as this report, is no mean feat. It's clear to all that a year in AI is like a 'doggy year' in other fast-paced markets due to the unprecedented pace of acceleration in AI innovation. Frankly, we struggle to keep up. There is an inevitable need for pace, ability to adapt and agility in research just as there is in policy, to match the innovation we seek to write about. We must continuously learn and share that learning, but do so in the awareness that all too soon it will be out of date.

OpenUK has held back on sharing this report due to a plethora of activity across the AI research industry and policy world in December. This report is updated as of 19 December and I am extremely grateful to Dr Jennifer Barth and her team for their patience in my requests to continuously add the latest research into our thinking.

I believe that this enables OpenUK to have the last word on AI and openness in 2024, and to set a footing on which we and others may build in 2025...

The AI year has ended this week for the western world at least as it starts its vacation. The French Government has shared its press release on the third global AI Summit to take place on 10 February 2025 (following those in the UK at Bletchley Park and Seoul) saying - as only the French can - that 'it is our responsibility how to shape this [AI] revolution'.

They recognise the need for a global approach to AI. If we cannot succeed in a global approach it feels like it is unlikely that we can succeed in shaping a healthy AI future and the Summit's goal of contributing to 'shaping a global governance framework for AI'.²

¹ <https://openuk.uk/stateofopen/stateofopentheukin2024-phase3/>

² Translation from the invitation to the AI Action Summit from the French Government.

France has become Europe's leader in 'AI that is open' over the last few months. The UK has slipped into second place in Europe and fifth globally. Many attribute France's success to President Macron's pro-open-source policies. OpenUK has previously reported a significant growth in France's open source software contributions too. Meta's Yann Le Cunn and his beliefs in openness (if his use of the term open source has led to accusations of open washing) are given a great deal of credit for influencing this growth in France. Inevitably there will be a greater focus on open source, open access and open innovation in AI - however these are defined - at France's summit.

Meantime, as the year comes to a close, the new UK Government takes on two significant challenges. Firstly copyright and AI, with a 10 week consultation³ that looks to balance the needs of two sectors that are key to the UK Government's industrial strategy - the Creative Industries and the AI innovation sector. This is never going to be easy and the consultation is dense⁴. After two years of delay in a resolution of this conundrum, the outputs are much needed and finally some action, even if it will take a little more time, feels like progress.

Grappling with the second challenge, the potential application of the EU's AI Act to Northern Ireland will be no simpler a task. Whilst concessions were made around the UK's Brexit from the EU few had considered the implications of the EU's complex digital legislation applying to a part of the UK. How this works out is going to be important to government but also important to those dealing with AI across the rest of the UK, as well as the thriving tech sector in Northern Ireland.

On a more positive note, OpenUK shares in this report the first output of its AI Advisory Board, a Glossary of AI terms in this report. The Board has produced this under the leadership of Professor Neil Lawrence who served as its first Chair and I am grateful to the Board and him for the work that they have done to date.

That work will continue in 2025 as we see OpenUK's third annual State of Open Con taking place in London on 4 and 5th of February, with its AI Day only days before the Paris Summit. The Speakers will include Dr Laura Gilbert of Number 10 Digital, who have demonstrated leadership in open source and Guy Pordjany whose AI start upTessl recently secured £125, of funding into the UK.

2024 will inevitably be remembered in the annals of history as one of the most significant years of innovation and technology shift of our time, and perhaps of any time. We end this year with hope that 2025 will be no less interesting.

³ <https://www.gov.uk/government/news/uk-consults-on-proposals-to-give-creative-industries-and-ai-developers-clarity-over-copyright-laws>
⁴ <https://www.gov.uk/government/news/uk-consults-on-proposals-to-give-creative-industries-and-ai-developers-clarity-over-copyright-laws>

1.3 Thought Leadership: Agents

Toran Bruce Richards,
Founder, AutoGPT



In 1955, the American mathematician John McCarthy envisioned computers that could do anything a human can do. But over six decades later, the majority of employees are burdened with boring, repetitive tasks that could be automated. A staggering 85% say they're not engaged at work⁵, an unsurprising figure given that workers spend approximately 60% of their workplace time on "work about work" activities, while only dedicating 27% of their time to the tasks they were actually hired to do⁶.

As we close out 2024 however, 'AI Agents' promise to bring us closer to realising McCarthy's dream - but perhaps not in the way he might have imagined. These Agents, designed to take initiative, collaborate with other systems, and adapt autonomously, represent a seismic shift in how we approach software and automation.

Unlike traditional software, which operates within narrowly defined parameters, AI Agents blur the lines between tool and partner. Beyond just the execution of commands, Agents interpret goals, navigate ambiguity, and, in some cases, generate solutions that their creators may not have anticipated. This is both their promise and their peril.

When given too much freedom, Agents often end up being a 'jack of all trades, master of none', struggling to perform tasks with the efficiency and reliability that a human would. In many cases, a human already knows the best process, and it's more effective to guide the Agent rather than letting it figure things out entirely on its own.

This insight points to the true power of Agents: they excel not as replacements for human expertise, but as collaborators who can amplify and truly unlock human capabilities. By combining human judgment with an Agent's ability to execute repetitive yet necessary tasks tirelessly and consistently, we create a partnership that's far more powerful than either working alone. This is where Agents represent a fundamental shift in how we approach work and productivity.

Rather than getting stuck with dull monotonous tasks, well-designed Agents help people focus on what truly matters. They bring intelligent decision-making to task automation while operating within the guardrails of human guidance, allowing individuals to move beyond the bottleneck of carrying out a single task at once.

There's a lot of misunderstanding about what Agents will mean for the world. Many people assume they'll only benefit large corporations, taking over jobs and leaving individuals behind. In reality, Agents can make individuals far more effective by taking on repetitive and tedious tasks. Marketing managers don't want to spend hours copying numbers into spreadsheets, and trust me when I say their bosses don't want this either, but even though they have great passion and skill in their true craft, they often have no choice but to spend a disproportionate amount of their time on these mind-numbing activities. By taking on these repetitive tasks, agents free up time and mental energy, allowing people to focus on strategy, creativity, and solving complex problems.

What excites me most about Agents is how they're creating a new kind of open and collaborative software ecosystem. Historically, software has existed in isolation. Each tool was built for a specific purpose and didn't interact much with others. Agents are changing that. One might generate a report, another might analyse it, and a third might create a presentation from the data. Instead of isolated tools and constant re-invention of the wheel, Agents Creators can collaborate and build on each other's work.

Once an agent solves a problem, it doesn't need to be rebuilt. It becomes a resource for others to use,

⁵ Gallup, State of the Global Workplace, 2017

⁶ Asana, Anatomy of Work Index: How people spend their time at work

reuse, and improve. This kind of collaboration is already starting to happen within the AutoGPT community, where Agents are being created not just for individual needs but for others to benefit from as well. Solving a problem once can create a lasting solution for everyone.

The UK's vibrant tech ecosystem is perfectly positioned to lead this revolution in how we work. Our deep heritage in open-source is already making waves in AI - the original AI Agent project AutoGPT, which became the world's most popular AI repository and fastest growing GitHub project of all time, emerged from the UK's entrepreneurial community. Similarly, Stability AI's significant open source contributions have helped democratize AI development globally. The success of these projects shows how the UK is uniquely positioned to lead the way when it comes to open source AI. We as a Nation currently have the opportunity to build on this momentum to openly create widely available tools that let people truly focus on what they do best.

There is however a real risk if this technology is locked behind corporate walls, leaving access to Agents only available to those with the biggest budgets. A future like that would leave individuals and small businesses struggling to compete, while creativity and innovation would be stifled. Without access to Agents, individuals and small businesses would be left at a significant disadvantage, unable to compete effectively with those who have the resources to leverage this technology.

Openness is critical. By making Agents accessible to everyone, individuals, entrepreneurs, and small organisations will be able to punch far above their weight, taking on challenges and competitors that were previously out of reach. Personally I also believe that the best ideas often come from people without access to huge resources, and openness ensures those ideas can flourish.

The internet has already shown what happens when barriers are lowered. Individuals with nothing but a smartphone and Social Media have built audiences that dwarf those of giant corporations. Agents will take this even further. A solo founder could run a business that looks like a team of 20, with Agents handling logistics, marketing, and customer support. Researchers could speed up breakthroughs by delegating repetitive data analysis to Agents. Tasks that once required teams and budgets only available to the ultra-elite will now be within reach for anyone.

Agents help people do their best work by removing the time consuming barriers that hold them back. By handling routine tasks, Agents enable individuals to focus on creativity and innovation. Keeping Agents open and accessible means empowering everyone to achieve more, no matter their resources.

This time it's different than just having better tools. How we work and the things we must spend time on as humans is changing. Let's make sure the future of Agents is one that works for everyone.

1.4 Thought Leadership: A Reflection on AI

Matthew Barker
VP Workload Identity, CyberArk



I'm no engineer, but in all the time I spent running Jetstack, one of the hardest things to figure out was whether something was worth the engineering investment.

We had a very strong team but were bootstrapped and primarily making money for our time. So when you must take someone off 'billable hours' you need to be sure you will get your investment back, and you certainly don't take these decisions lightly.

I distinctly remember making the decision to commit resources to building a system for managing and delivering our Kubernetes workshops. We figured we could improve participant satisfaction, save prep time, and deliver more for less. Decision made.

So, when it came to scoping out the architecture, implementation and testing effort, we figured we could do a pretty good job in a couple of months with a couple of engineers. If we ran a few trial workshops to iron out any teething problems, we thought we'd achieve what we were looking for - and you know what, we did! Nice job team.

End of story?

Well, I thought so, but something recently changed my entire perspective on this process in a ground shaking way.

One of the companies I advise recently had the same predicament. Having filled a workshop with 50 people who wanted to learn about on-prem AI, they needed to figure out how to deliver their stack and help get their participants productive.

Cue discussion about which cloud service, how to build the control plane, cost of clusters, engineering time, terraform etc etc. There was no real resolution to the question, and they decided to punt the decision to the week after.

In the meantime, one enterprising member of the team took it upon themselves to view it as a personal challenge, and their weekend became dedicated to the task. Within about 5 hours, he had built something using prompts only. The output from the AI was as follows:

This implementation:

1. Maintains a pool of prewarmed instances
2. Uses database transactions with SKIP LOCKED to handle concurrent claims safely
3. Waits up to 60 seconds for an instance to become available
4. Creates new prewarmed instances in the background
5. Uses the same server creation logic for prewarmed instances

Would you like me to explain any part in more detail?

Ok, but try productionizing it! I said. I bet it's insecure! I said. Good luck when you're actually running the workshop!

I said. Ha. Ha. Ha.

And with a bit of AI testing and a few optimizations the next day, they bravely (or stupidly I thought) ran the workshop on it.

The system worked FLAWLESSLY.

And not only that, in many ways the features of it outshone the system we built a few years ago. What?

For someone who hears the stories of AI being revolutionary in business, to see this for myself, with the context of having felt the pain of delivery, I was genuinely blown away. This small example shows a productivity gain of roughly 7900%, and a cost saving of 1233%.

Wow.

Once I got over the shock, I sat down to write this. I then started to recalibrate what it means for the future of our industry.

The Future is Here

For all the talk of the pre-training models' performance slowing down, the tools already exist to make your team dozens of times more productive. You just need to know how to implement the tech properly. I think the next 5 years will be businesses catching up to the progress we've already made and figuring out how to make use of this technology in crazy impressive ways.

You can do it in Open Source

The big proprietary foundation models clearly have their place, but I'm seeing much more evidence for the ability to get the results you need from open source models. The flexibility you get, combined with the cost benefits, and an ability to optimize for specific use cases makes them an obvious choice for local deployment. It also helps to mitigate the IP concerns.

The makeup of startups is going to change

The sheer disruption of this technology means you're going to have a number of startups that can do a hell of a lot of good work with very few people. Arguably where you previously needed 100 people and \$10m, you may only need 10 people and \$1m. In engineering, AI will take away a lot of the 'code development' requirements. In go to market, it will take away a lot of the 'top of funnel' requirements. You're left needing some experienced engineers, sales & marketing people and prompt engineers. Incumbent software companies need to get their skates on and start taking advantage of this technology or risk being disrupted.

Problems remain

A recent report from DORA⁷ suggests that although individual productivity is getting better thanks to AI, delivery stability and code throughput are getting worse. Research⁸ at Cornell University has also suggested that software engineers using AI introduce more security holes than they would otherwise and overestimate their confidence in the code they write.

Anecdotally, whilst we power forward with some amazing breakthroughs, testing also remains a big problem, as do evals. I'm seeing huge acceleration when the codebase doesn't exist, but it slows down as the codebase grows, and the AI gets less good at dealing with larger amounts of context.

But these are all well-known problems and are being actively worked on. It does suggest however, that you need to deploy this technology with a measure of caution and security awareness. Blindly jumping in would be a mistake.

It's a cliché these days to utter the words 'what a time to be alive'. But for me, at least in the context of what I'm seeing AI do to obliterate many of the things I had to consider earlier in my career, for once I can say it with a straight face!

⁷ DORA, DORA 2024: AI and Platform Engineering Fall Short, 2024 <https://thenewstack.io/dora-2024-ai-and-platform-engineering-fall-short/>
⁸ Perry, N., Srivastava, M., Kumar D., Boneh, D., Do Users Write More Insecure Code with AI Assistants? <https://arxiv.org/pdf/2211.03622>

1.5 Thought Leadership: Global AI Policy Update

Ben Brooks
Fellow Berkman Klein Center, Harvard



Looking Forward: How AI Policy Could Affect Open Innovation

The end of 2024 caps off a frenzied period of AI policymaking. The UK celebrated the first anniversary of its AI Safety Institute, and navigated a change in government. In the US, legislators closed out over 1,000 bills on AI this session, while the Trump Administration's new AI "czar" prepares to hit the ground running. The EU finalised its landmark AI Act, and began work to define how model developers might comply. Yet for all this activity, it's uncertain how future policy will impact open innovation in AI. Here's what we might expect in 2025.

Uncertainty in the UK

On the eve of the general election, Prime Minister Rishi Sunak gave a ringing endorsement of open models, declaring "we are pro-open source... There must be a very high bar for any restrictions on open source". The Government had declined to introduce new legislation for model developers, instead preferring to regulate AI through existing agencies. But upon taking office, the new Labour Government signalled that it might reverse course, contemplating new rules for frontier models, copyright, and online safety.

These proposals could affect open models in several ways. First, any framework that requires pre-release approval of models could prevent, limit, or slow the release of capable open models, such as those developed by Mistral, Google, or Meta. That would have implications for research, development, and deployment by downstream actors. Similarly, one amendment tabled in Parliament would impose criminal liability on developers of models that can "enable" or "facilitate" unlawful content. That kind of liability reform could make it difficult or impossible to release open language, image, video, or audio models.

Second, copyright reforms that limit access to data could disproportionately affect small developers. The Secretary of State for Culture, Media and Sport has indicated that EU-style text and data mining reforms—which require data miners to respect "machine-readable" opt-outs from rightsholders—might be insufficient to protect creators. If future UK reforms adopt a more restrictive approach to data access, that could make it difficult to train, deploy, or invest in model development in the UK. For example, if copyright reforms required model developers to negotiate or license data, that would be especially challenging for small firms, independent developers, or nonprofit researchers who do not have the bargaining power of a Big Tech firm.

Volatility in the US

Open models like Llama continue to generate criticism from policymakers across the political spectrum. Senators have tabled bipartisan proposals for pre-release model licensing, and representatives have urged export controls to prevent the unrestricted or unsupervised release of model weights.

Yet the response to open innovation has been mixed, and unpredictable. When California's legislature tabled SB1047—a bill imposing liability on AI model developers for downstream misuse or mishaps—an unlikely chorus of federal Democrats spoke out about the potential impact on open innovation. The Senate's bipartisan AI task force and the federal telecommunications agency declined to endorse further limitations, with the latter writing that "the government should not restrict the wide availability of model weights for dual-use foundation models at this time".

It's unclear how these tensions will play out over the coming months. The Biden Administration is doubling down on catastrophic AI risk, tasking agencies to develop a suite of "classified" model evaluations to be performed by the US AI Safety Institute, National Security Agency, and Department of Energy.

In time, these evaluation frameworks may form part of a more intensive control regime for model weights, moving from the transparency obligations laid out in the US Executive Order on AI towards pre-release evaluation and approval.

Following inauguration, the Trump Administration may take an alternative approach, pledging to revoke the Executive Order on day one. The incoming Administration will likely deprioritise online safety and societal risks as part of a reaction to so-called “woke” AI policy, and may resist international efforts to regulate US models or developers. The future of the AI Safety Institute will be uncertain. However, the Administration could take an interest in chemical, biological, radiological, nuclear, and cyber risks. It might entertain further controls on the open release of models as part of a wider response to China.

Federal volatility means that states will play an outsized role in future AI reform. While a majority of state bills to date have focused on AI systems, deployers, and users—not models—there will be continued interest in model regulation. Overbroad rules could affect the open release of capable models, and deserve close scrutiny in the next legislative session.

Clarity in the EU

In early 2024, the EU passed its AI Act after three years of negotiation and thousands of amendments. At one point totalling more than 600 pages, the Act imposes a raft of obligations on the deployers of AI systems and the developers of AI models. Initially, the Act subjected all models to the same rules, regardless of whether they are open or closed, large or small, and fine-tuned or pre-trained. That “one size fits all” framework would have held European researchers, developers, and small businesses to the same standard as OpenAI or Meta. This was especially problematic for downstream researchers and developers who fine-tune or redistribute open models: to date, for example, developers have publicly shared over 80,000 fine-tuned variants of Llama.

Following intense criticism, the final text of the Act partially exempted “free and open-source” models—so long as they do not meet the criteria for a “systemic risk” model.

The EU’s new AI Office has begun drafting a Code of Practice that will describe how model developers can comply with the Act. While the Code is promising, and draws on input from nearly a thousand stakeholders, it could pose several challenges for open innovation in 2025. For example, the framework teases an impossibly broad definition of “systemic risk” that includes concerns such as “persuasion”, “loss of trust in media” or “oversimplification of knowledge”. These risks aren’t amenable to robust evaluation, and there are few effective mitigations in the model alone. That nebulous definition of systemic risk could make it difficult for even the smallest open models to chart a path to compliance.

Likewise, the Code’s first draft would require certain developers to submit to “independent testing” before release by auditors and the EU regulator. However, a pre-release evaluation process could become a major bottleneck, slowing down the development and release of open models. These challenges will need to be resolved before the model provisions of the Act take effect in 2025.

It is also unclear how the EU will interpret “free and open-source” models. If the EU adopts a narrow definition, that could limit the number of models entitled to the exemption, offering fewer incentives for firms to release their models openly. For example, the Open Source AI Definition 1.0 (OSAID) requires that “open source” models include granular information about data inputs to enable a person to develop a “substantially similar system”. By comparison, the AI Act only requires a “sufficiently detailed summary” of training data to promote transparency and enable copyright holders to exercise their opt-out rights. The OSAID is a valuable standard, and can help to combat the “open washing” of models with proprietary characteristics. However, regulators may need to adopt less restrictive definitions of open models if they wish to incentivise open development.

Conclusion

Well-meaning regulation can affect open innovation in a variety of ways. Developers can make a difference, engaging policymakers in a thoughtful, optimistic, and proactive way to explain the benefits of open technology for grassroots innovation, and how we can mitigate emerging risks. As jurisdictions like the UK, US, and EU expand on their existing regulatory commitments, it’s more important than ever that they hear from the researchers, developers, startups, and institutes who are building out in the open.

2. OpenUK AI Advisory Board AI Glossary

AI Glossary

AI term_Meaning for the rest of us

Adversarial Attack - An attempt to manipulate the output of a model by providing deceptive input.

Agent - A software program that can act autonomously without human intervention, to perform tasks, make decisions and interact with its environment.

AGI - Artificial General Intelligence; an AI that can understand, learn, and apply knowledge broadly like a human.

AI - A machine-based system that infers from the input it receives how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment. Further defined by the OECD, <https://oecd.ai/en/work/definition>

Algorithm - A set of step-by-step instructions a computer follows to solve a problem.

Bias - When an AI system unfairly favours certain outcomes due to flawed data or design

Big Data - Extremely large sets of data analysed to reveal patterns and trends.

Chatbot - A computer program that simulates a conversation with human users.

ChatGPT - A Chatbot developed by OpenAI, built on top of one of their various LLMs (such as GPT4).

Clustering - A technique that groups similar data points together based on their characteristics.

Computational Learning Theory - The study of machine learning algorithms and their ability to learn and generalise from data.

Computer Vision - AI that enables computers to interpret and understand visual information from images or videos.

Continuous Learning System - An AI that keeps learning and improving over time as it processes more data.

Convolutional Neural Network - A type of deep learning neural network especially good at analysing visual imagery.

Co-Pilot - A tool which can assist you (but it is not autopilot - it cannot do the job for you)

Data - Facts and information collected for analysis and decision-making.

Data Mining/ Text and Data Mining - Techniques, such as AI training, which involve the analysis of data to identify patterns, trends and correlations.

Decision Tree - A tree-like model that processes data with rules to either categorise or score each data point based on its characteristics.

Explainable AI (XAI) - Systems that can provide clear explanations of their decision-making processes that are transparent and understandable to humans.

False Negative - When the Model incorrectly predicts a negative outcome for an instance that is actually positive.

False Positive - A test result that incorrectly indicates something is present when it's not.

Federated Learning - A technique that trains an algorithm across multiple decentralised devices or servers holding local data samples without centralisation of the data or sharing data between those devices.

FLOPs - Floating point operations per second: an indicative measure of the cumulative amount of computation used for training AI models - the higher the number of FLOPs, the more powerful the AI model is considered to be.

GenAI - Generative AI; AI that generates new content like text, images, or music created by consuming human content.

General AI - General Artificial Intelligence (see AGI); an AI that can understand, learn, and apply knowledge broadly like a human.

GPT - Generative Pre-trained Transformer; a type of AI model that generates text by predicting the next word.

GPU - Graphics Processing Unit; a specialized processor for handling graphics and AI computations.

Hallucination - When an AI model generates incorrect, misleading or fabricated information

AI Glossary

AI term_Meaning for the rest of us

Llama - A family of language models which have been released by Meta

LLM - Large Language Model: A type of model usually trained on massive amounts of data and can generate text, images etc

ML - Machine Learning: a field of computing that allows systems to learn and improve from data without being explicitly programmed.

Model - A program that can perform specific tasks based on the data it is trained on

Multi-modal - An AI model that can process multiple types of data including images, text, video, audio or text.

Narrow Intelligence - AI designed to perform a specific task effectively but cannot generalize beyond it.

Neural Network - A network of interconnected nodes

NL - Natural Language; the way humans communicate, like speech and text

OpenAI - Inventor of ChatGPT, an American artificial intelligence research organisation founded in December 2015, headquartered in San Francisco. Whilst initially intended to be "open source" its models are closed

Open Source AI - AI software whose code is publicly available for anyone to use or modify.

Optical Character Recognition - Technology that converts images of text into editable and searchable data.

Predictive Analytics - The use of data, statistical algorithms, and machine learning techniques to identify the likelihood of future outcomes based on historical data.

Prompt - The text you put into a model

RAG - Retrieval Augmented Generation; a technique for enhancing the accuracy and reliability of generative AI models with facts fetched from external sources.

Recurrent Neural Network - A type of artificial Neural Network designed for sequential data processing such as text, genomes, handwriting, or numerical time series data.

Regression - A statistical method for estimating the relationships between variables, often used to make predictions.

Reinforcement Learning - A method of training AI where a system improves through trial and error, receiving rewards or penalties for its actions, and gradually learning to maximize rewards over time.

Robotics - The field involving the design and use of robots.

Safety Institute - A government organisation set up to equip governments with an empirical understanding of the safety of advanced AI systems, first made popular in the UK.

Scraping - Fetching data from the internet in a programmatic way.

Singularity - A hypothetical future point when artificial intelligence can endlessly improve itself without human help, eventually approaching infinite intelligence beyond human understanding, and causing profound changes to society.

Synthetic Data - Artificial data which mimics real-world data used to train a model

Text to image generation - A way of generating images from text prompts

Tiny Model - A small, efficient model designed to run on devices with limited computational resources, such as smartphones or IoT devices, created using techniques such as knowledge distillation, network pruning, and quantization, to reduce the number of parameters built into an AI model without reducing its accuracy, often trained on synthetic data

Transfer Learning - A technique where a model developed for one task is reused as the starting point for a model on a second related task.

Training - Data that is used in a model to understand the outside world e.g. pictures of cats and dogs

Weight - Numerical values that control the connections between nodes in a neural network

3. The Global Data on Openness in AI

Artificial intelligence continues to redefine global technological landscapes, with significant implications for economic, societal, and technological progress, and the UK is emerging as one of the world's leading centres of its development. In the UK, open source is reshaping the AI landscape by democratising access to cutting-edge technologies, fostering collaboration globally, and enabling a more inclusive approach to technological advancement. Much of the focus remains on Large Language Models, but there is also a growing awareness of agentic AI.

3.1 Stanford's Approach⁹

AI GitHub Projects

Stanford describes GitHub projects as comprising a collection of files, including source code, documentation, configuration files, and images, that together make up a software project. The number of AI related GitHub projects has grown from 845 in 2011 to around 1.8 million in 2023, with a particularly sharp 59.3% rise in the total number of GitHub AI projects in the last year. This report is the first to adopt GitHub's new methodology of incorporating generative AI keywords from a recently published research paper to classify AI projects.

As of 2023, 22.9% of contributions to AI projects on GitHub were from the United States, however, the proportion of AI projects from US developers has been declining steadily since 2016. In second place is India with 19%, followed closely by the European Union and the UK at 17.9%

GitHub Stars

Similar to liking a post on social media, GitHub's "starring" feature lets people show their interest in and support of particular projects. Libraries such as TensorFlow, OpenCV, Keras, and PyTorch rank amongst the most starred repositories, signifying their widespread popularity within the AI coding community.

The total number of stars for AI GitHub projects rose dramatically in 2024, more than tripling from 4 million in 2022 to 12.2 million in 2023. This reveals the accelerating growth of open source AI software development.

While all major geographic regions sampled by Stanford, including the UK, saw a year-over-year increase in the total number of GitHub stars awarded to projects located in their countries, in 2023 the United States ranked top in receiving the highest number of stars, with 10.5 million.

⁹ Stanford University, The AI Index Report, 2024, <https://aiindex.stanford.edu/report/>

3.2 Top UK AI Repositories, September 2024

The UK’s AI repositories continue to be topped by AutoGPT, the open source software Agent from Edinburgh’s Significant Gravitas founded by Toran Bruce Richards, sitting at 167,888 stars. Agentic technology is beginning to see a significant focus in the marketplace.

Top 12 AI Repositories

In association with Runa Capital

Repo Name	Repo Description	Stars
Significant-Gravitas/AutoGPT	AutoGPT is the vision of accessible AI for everyone, to use and to build on. Our mission is to provide the tools, so that you can focus on what matters.	167888
mlabonne/llm-course	Course to get into Large Language Models (LLMs) with roadmaps and Colab notebooks.	38478
EthicalML/ awesome-production-machine-learning	A curated list of awesome open source libraries to deploy, monitor, version and scale your machine learning	17525
arc53/DocsGPT	Chatbot for documentation, that allows you to chat with your data. Privately deployable, provides AI knowledge sharing and integrates knowledge into your AI workflow	14922
ivy-llc/ivy	Convert Machine Learning Code Between Frameworks	14011
alyssaxuu/screenity	The free and privacy-friendly screen recorder with no limits 🐼	12134
owainlewis/ awesome-artificial-intelligence	A curated list of Artificial Intelligence (AI) courses, books, video lectures and papers.	10807
google-deepmind/sonnet	TensorFlow-based neural network library	9769
libvips/libvips	A fast image processing library with low memory needs.	9686
OpenMined/PySyft	Perform data science on data that remains in someone else's server	9480
sashabaranov/go-openai	OpenAI ChatGPT, GPT-3, GPT-4, DALL-E, Whisper API wrapper for Go	9149
Stability-AI/StableStudio	Community interface for generative AI	8752

Figure 1
Source: GitHub

UK AI Repositories by year created

From the end of December 2023 to September 2024, 23 AI repositories with 1,000 GitHub stars were created from the UK on GitHub. This is the most significant growth in AI repositories to date and demonstrates the growing importance of AI in this space.

UK AI Repositories by Creation Year With 1k+ Stars

In association with Runa Capital

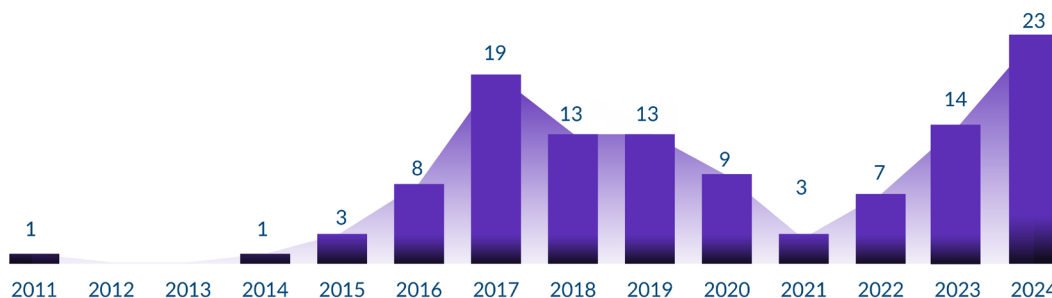


Figure 2
Source: GitHub

The Number of UK AI Repositories

The total number of AI repositories with 1,000 GitHub stars in the UK has seen a steady pace of growth.

Number of UK AI Repositories With 1k+ Stars

In association with Runa Capital

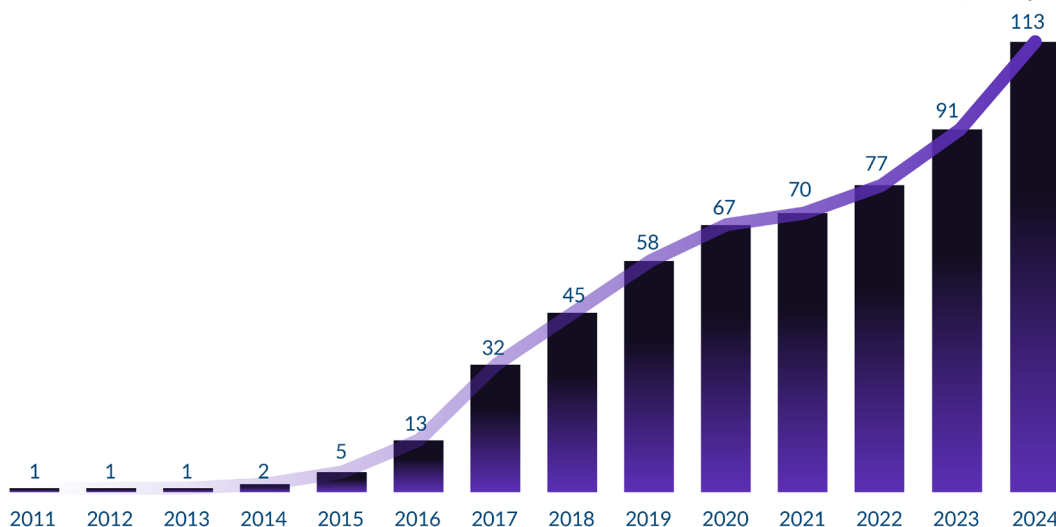


Figure 3
Source: GitHub

3.3 The UK versus the EU

A comparison of the number of AI repositories with 1,000 GitHub stars hosted from the UK and those in Europe demonstrates an uptick in both from January 2023, being 420 for Europe and 91 for the UK.

Both have a significant increase to 484 for Europe and 113 for the UK. For the UK, this is 24% growth while for Europe it is 15% growth in less than one year.

Repositories in the UK versus Europe

In association with
 Runa Capital



Figure 4
 Source: GitHub, September 2024

3.4 The UK versus the World

Globally, AI adoption is surging, with 72% of organisations now utilising AI, up from 50% in prior years¹⁰, and the UK remains a prominent player in this global arena, ranking fourth in terms of AI capability according to Tortoise’s recent report¹¹. In 2024, the UK’s AI ecosystem has seen increasing investment and an optimistic sentiment towards AI and its adoption¹². Tech Nation’s recent report indicates that UK AI startups raised \$3.4 billion in 2023, the second-highest amount on record, and AI investment grew by 10%. Furthermore, 74% of tech professionals expect AI to positively impact their roles in the next five years¹³.

Despite AI’s growing prominence, challenges persist. The global dominance of the US and China underscores the competitive pressure on the UK to maintain its position as an AI leader¹⁴. Additionally, achieving AI’s full potential will require hard work from the UK, including addressing regulatory, ethical, and trust issues, particularly as AI’s applications expand. The most prominent evolution at the moment is from reactive LLMs to proactive Agentic AI. Agentic AI combines components like reasoning, decision-making, memory, and interaction with the environment, often using LLMs or other AI models as tools to enhance their capabilities. It then enhances, or builds upon the capabilities of LLMs by incorporating autonomy, reasoning, and action-taking, creating a more dynamic system capable of achieving specific goals on its own.

10 McKinsey, State of AI in Early, 2024, <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai>
 11 Tortoise, The Global AI Index, 2024, <https://www.tortoisemedia.com/intelligence/global-ai>
 12 echNation, UK Tech in the Age of AI, 2024, <https://technation.foleon.com/research/tech-nation-report-2024/#:~:text=The%20Tech%20Nation%20Report%202024&text=Discover%20the%20investment%20data%20and,in%20the%20age%20of%20AI.&text=The%20UK%20tech%20sector%20reached,in%20our%20remarkable%20growth%20story.>
 13 TechNation, UK Tech in the Age of AI, 2024, <https://technation.foleon.com/research/tech-nation-report-2024/#:~:text=The%20Tech%20Nation%20Report%202024&text=Discover%20the%20investment%20data%20and,in%20the%20age%20of%20AI.&text=The%20UK%20tech%20sector%20reached,in%20our%20remarkable%20growth%20story.>
 14 Tortoise, The Global AI Index, 2024, <https://www.tortoisemedia.com/intelligence/global-ai>

3.4.1 The Tortoise Index¹⁵ view of the UK

Recent findings from Tortoise's 2024 report highlight significant progress in global AI development and openness, particularly within high ranking countries like the UK. Public perception of AI has notably improved over the past year, reflecting a broader societal acceptance of the technology's role in daily life and innovation.

The global legislative focus on AI is unprecedented, with mentions of the technology in legislative proceedings reaching record highs. The UK leads in this regard, demonstrating a proactive approach to governance and policy, followed closely by the US, Australia, Ireland, and Spain. This underscores the importance of transparent AI policymaking as a cornerstone of openness.

France has quickly risen to become the third global player in the development of large scale AI models. In contrast, the UK's performance in developing groundbreaking generative AI models has declined, even as it maintains an advantage in traditional AI domains.

Additionally, the UK's commercial generative AI ecosystem is facing challenges, being outfunded by France and Germany, with France currently outspending the UK by 60%.

The Development sub-pillar of the Tortoise Global AI Index 2024 focuses on the development of new AI models and datasets, mostly at the open source level, and the application of AI technology in patents across other fields¹⁶.

Number of open-source models in top 100 on OpenLLM Leaderboard, by country of origin

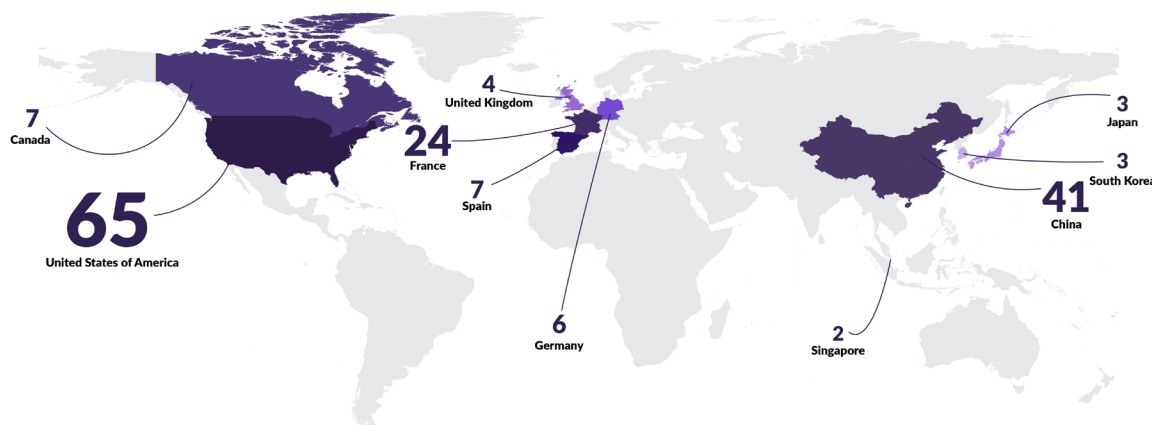


Figure 5
Source: Tortoise Global AI Index

¹⁵ Tortoise, The Global AI Index, 2024, <https://www.tortoisemedia.com/intelligence/global-ai>

¹⁶ Tortoise, The Global AI Index: Methodology, 2024, <https://www.tortoisemedia.com/wp-content/uploads/sites/3/2024/09/AI-Methodology-2409.pdf> p.3

3.4.2 Repositories in the UK versus global

This figure illustrates the AI repositories with 1,000 GitHub stars or more in each of the US, China, Germany, UK, France and IndiaUK. In Europe, Germany sits above the UK while France sits below.

Number of AI Repositories with 1000+ stars in the UK and Global

In association with
 Runa Capital



Figure 6
 Source: GitHub September 2024

3.4.3 Stanford AI Index 2024¹⁷

Stanford's recent AI Index highlights a significant acceleration in the development of large language models (LLMs), with the number of new models released worldwide doubling compared to the previous year. Notably, two thirds of the models released in 2023 were open source, a substantial increase from previous years, where open source models accounted for 44.4% in 2022 and just 33.3% in 2021. With Gemini Ultra becoming the first model to achieve human-level performance on the Massive Multitask Language Understanding (MMLU) evaluation and GPT-4 achieving a win rate score of 0.96 on the Holistic Evaluation of Language models (HELM) benchmark, it's clear that the AI landscape is advancing at an unprecedented rate.

The report reveals that the year 2023 saw the release of 149 foundation models, more than doubling the 2022 figure. This increase was accompanied by a pronounced rise in open source contributions, with 65.7%

of those newly released models being open source, reflecting a growing interest in collaborative development within the AI community.

Beyond the development of LLMs, the proliferation of AI-related projects on GitHub underscores the increasing democratisation and engagement within the AI ecosystem. Since 2011, the number of AI-related projects on GitHub has risen dramatically, from 845 in 2011 to around 1.8 million in 2023. This growth includes a remarkable 59.3% increase in 2023 alone, highlighting a surge in collaborative activity and innovation. The popularity of these projects is evident in the significant growth in GitHub stars for AI-related repositories. In 2023, the total number of stars exceeded 12.2 million, more than tripling the 4.0 million recorded in 2022. This highlights the increasing recognition and utilisation of open source in AI tools and resources, reinforcing their importance in the broader AI landscape.

¹⁷ Stanford University, AI Index Report, 2024, <https://aiindex.stanford.edu/report/>

4. Open Source & AI Overview

4.1 AI openness - a history in 2 years

Open source's history with AI runs deep, 30 years deep, but the current focus and conversation really began in 2023 and LLMs. By September 2024, 92% of Fortune 500 firms were using OpenAI's LLM products¹⁸. The name is of course a misnomer and the subject of much debate between co-founder Elon Musk, an advocate of 'open source' in AI and OpenAI CEO, Sam Altman. AI and the question of 'open source AI' really caught the public imagination in 2023, when OpenAI released ChatGPT4, a product that somehow shifted the average user's understanding of and relationship with AI.

A month or so after the release of ChatGPT4, Toran Bruce Richards created AutoGPT agentic AI, which quickly became the fastest growing open source software repository in the world.

Llama 2 and open washing

Rapidly following the release success of ChatGPT4, Meta's Llama LLM which had been freely distributed for academic research was leaked. The Llama code, which had been released for academic use only was leaked without licence and used by open and collaborative communities to develop at scale and with pace, with the consequence that the open collaborative development was seen to rapidly shift AI at a rate that would likely outpace the 'moat' of the proprietary software companies which had built the LLMs.

By July 2023, Llama 2 was distributed on the Llama Community Licence and described as open innovation, until the point of release when Mark Zuckerberg described it as 'open source'. The Llama Community Licence does not meet the Open Source Definition requirements that anyone can use the code for any purpose due to a commercial restriction on use (where a commercial licence is to be obtained from Meta by the user at 7 million users) which mean that it could not become a licence approved by the Open Source Initiative.

Whether intentional or not, the use of 'open source' to mis-describe this positive step towards opening up their LLM has led to allegations of open washing¹⁹. The importance of this stems from the fact that exceptions to legal and policy requirements on LLMs are made for example in the EU's AI Act for 'open source'. An exact understanding of when this will apply and the beneficial and detrimental impacts of this are necessary.

Disaggregating the Components

In December 2023, Stanford took an approach of looking at component parts and this approach was also one adopted by the House of Lords Digital and Communications Committee in their 'open access AI' references and recognition that the term 'open source' was contested in their Report to their Generative AI and LLM Inquiry, published in February 2024²⁰.

The Researchers at Radboud University also followed the approach of disaggregating and reviewing components in their work in summer of 2024²¹. Their research, identifying 14 possible characteristics or components of LLMs that might be opened on a partial basis or fully opened and conducting a survey of these against over 40 LLMs. The Linux Foundation, Model Openness Framework, released in May 2024²² also seeks to break down what makes up an LLM that is open.

In September 2024, AutoGPT released its Agentic AI platform. Elon Musk initially funded OpenAI on the basis that it was to be an 'open source AI' foundation creating AI for the greater good and continued to show his support for the concept of opening AI by open sourcing his Grok LLM in March 2024 when the weights and architecture were released under an Apache 2.0 open source software licence. Musk's influence may be significant as the newly elected US Trump administration comes into power.

¹⁸ Tech Business News, 92% of Fortune 500 Companies Use OpenAI Products, 2024, <https://www.techbusinessnews.com.au/news/92-of-fortune-500-companies-use-openai-products/>

¹⁹ New York Times, Openwashing, 2024, <https://www.nytimes.com/2024/05/17/business/what-is-openwashing-ai.html>

²⁰ <https://lordslibrary.parliament.uk/large-language-models-and-generative-ai-house-of-lords-communications-and-digital-committee-report/>

²¹ <https://www.ru.nl/en/research/research-news/open-washing-generative-ai-how-meta-google-and-others-feign-openness>

²² Linux Foundation AI & Data, Introducing the Model Openness Framework, 2024, <https://lfaidata.foundation/blog/2024/04/17/introducing-the-model-openness-framework-promoting-completeness-and-openness-for-reproducibility-transparency-and-usability-in-ai/>

On 28 October 2024, the Open Source Initiative released an ‘Open Source AI Definition’ at the All Things Open Conference, which is further explored in the next section.

Defining Openness and AI

The battle is raging over the meaning of open source in AI, as The Economist reported in November²³. ‘There are two sides to the software industry. One faces outwards, with whizzy products and services that bring in billions of dollars of revenue for trillion-dollar companies. The other faces inwards, creating, updating and sharing—often for free—the basic software infrastructure and tools that makes the digital world tick.’

The release of Llama 2 in July 2023, whilst characterised as open innovation on Meta’s web site, saw the newly openly licensed LLM shared on the Llama Community licence referred to on its Facebook launch as ‘open source’ by Mark Zuckerberg. From this point on a battle on the meaning of open source in AI has been publicly fought. Clearly the Llama Community Licence does not meet the Open Source Definition and has not been approved by the Open Source Initiative (OSI) and so cannot be characterised as open source software.

The importance of this is the risk that mis-characterising it as such would enable benefits to be given to it which it does not merit in terms of policy and law. When the Radboud researchers questioned open washing they did so on the basis of the EU’s AI Act and its exemptions for open source which might be abused by any mis-characterisation as open source.

There are also concerns that a market ought not to be defined e.g. cloud or mobile are not defined and ought not to be as these are sectors or verticals that will flex over time. Rather, the base technology such as software, weights or models would be more appropriately defined as open.

Data is essential to AI being open and its being open, the extent of what is required for this to be the case is a matter of heated debate.

Whilst there is a long established and generally accepted definition of open source software, attempts to define data openness have not been as successful leaving uncertainty.

Open Source AI Definition - The Open Source Initiative

Released²⁴ by the OSI on 28 October 2024 at the All Things Open conference, this is the first attempt by any organisation to create a definition specific to ‘open source’ as it might be considered to apply in AI. It is clarified to be an iterative process by its creators and the process of creation has involved over 50 companies and a number of individuals through various consultations. There is an accompanying Deep Dive Podcast series.

It seeks to apply four freedoms to both fully functional systems and to discrete elements of a system.

The definition has been controversial, both as to the need for it when there is already an Open Source Definition, and as to its content. The particular concerns about the definition generally focus on the lack of requirements around disclosure of data, whether the OSI risks undermining the Open Source Definition by creating a second definition and whether a second definition is necessary.

The OSI website shows that the definition has been endorsed by 20 (mainly small) companies but the statement on the site at launch that it had been endorsed by 20 companies and 100 individuals has been removed.

A further Definition? The Free Software Foundation

On 23 October 2024, The Free Software Foundation announced that they have begun work on “freedom in machine learning applications”. Or in particular, a to-be-issued “statement” on free machine learning applications for software and the associated scripts and training data.’ And we now await a potential second definition.

²³ The Economist, A Battle is Raging over the Definition of Open Source AI, 2024, <https://www.economist.com/science-and-technology/2024/11/06/a-battle-is-raging-over-the-definition-of-open-source-ai>

²⁴ Open Source Initiative, The Open Source AI Definition, <https://opensource.org/ai/open-source-ai-definition>

4.2 Legal Update

4.2.1 The EU AI Act

The EU Artificial Intelligence Act (AI Act) was released in January and came into force in August. From an openness perspective there is concern related to the handling of Artificial Intelligence (AI) systems released under so called 'free and open-source licences' unless the AI systems satisfy any one of a series of conditions.

This term 'free and open-source licences', is not a traditionally defined phrase in legislation nor the phrase historically used by the EU in legislation. It is of particular importance as the Act offers exemptions from its requirements/ lesser obligations where this applies. There has been significant concern about the ability of organisations to 'open wash' and claim to be open when their AI products may not meet the standards expected of open source in the AI context and the meaning of open source when it comes to AI is not settled, despite the meaning of open source being clear in respect of open source software which must be distributed on a licence which complies with the Open Source Definition that is stewarded by the OSI.

The Act also clarifies that 'AI components that are provided against a price or otherwise monetised, including through the provision of technical support or other services' 'should not benefit from the exceptions provided to free and open-source AI components' and it states that making of 'AI components available through open repositories should not, in itself, constitute a monetisation.'

4.2.2. The EU AI Act and Northern Ireland

Post-Brexit the applicability of EU laws in Northern Ireland creates a complex landscape.

"The United Kingdom (UK) has so far taken a light-touch regulatory approach to its strong artificial intelligence (AI) sector. While the lack of horizontal laws may create a complicated legislative patchwork, the government argues that this is conducive to innovation and agile technology. With its new broad AI Act, the EU has taken a different path, but despite diverging approaches there are some promising signs for future cooperation."²⁵

The AI Act applies to 'a high-risk AI system' released under a 'free and open-source licence' but includes an additional dependency that the AI system in question is placed on the market or put into service in the EU and Article 3(9) defines placing on the market as the 'first making available of an AI system or a general-purpose AI model on the Union market'. There is then a question as to Northern Ireland being a place on which an AI System may be put on a market.

²⁵ European Parliament, The United Kingdom and Artificial Intelligence, 2024, [https://www.europarl.europa.eu/RegData/etudes/ATAG/2024/762285/EPRS_ATA\(2024\)762285_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2024/762285/EPRS_ATA(2024)762285_EN.pdf)

4.2.3 The UK approach

A new UK government

The UK's new Secretary of State Peter Kyle announced in July that the Government had commissioned an Action Plan to identify how Artificial Intelligence in the UK might both scale and compete on the global stage and also how the UK might boost take up of AI in the UK to drive economic growth and deliver better outcomes for people across the country. The tech entrepreneur Matt Clifford was charged with leading work to explore untapped AI opportunities by forming a new "AI Opportunities Unit" at the heart of the science and tech department to pool expertise, seize the benefits of AI and implement proposals. A meeting of Global AI Safety Summits took place in San Francisco in November 2024 and the report was expected as an output of this but is still awaited.

UK Law

A proposed AI Bill was announced in the King's Speech in July 2024, as of December 2024 the Bill has not been shared. The Department of Science Innovation and Technology is expected to release that Bill for consultation imminently.

Lord Holmes' Bill

Lord Holmes of Richmond instigated a private member's Bill - The Artificial Intelligence (Regulation) Bill which began its life in the House of Lords and had reached the House of Commons before Parliament was prorogued. However, as the Bill had not passed when Parliament was dissolved, it will not progress. It is believed that Lord Holmes intends to resubmit it in the next parliamentary session.

Copyright Consultation - Fair Use and Text and Data Mining

On 17 December DSIT issued a 10 week consultation seeking views on how the government might ensure the UK's legal framework for AI and copyright supports the UK creative industries and AI sector together. This follows over two years of delays in an expected code of conduct and will specifically address text and data mining in the UK. The UK has suffered from uncertainty around this, whereas many other countries have been able to rely on the established concept of fair usage or have implemented this.

4.2.4 The US approach

The White House

The National Telecommunications and Information Administration issued a report²⁶ supporting open source and open models to promote innovation in AI, while emphasizing the need for vigilant risk monitoring.

According to the NTIA report, open AI models offer several key benefits:

1. **Broader accessibility:** "Open-weight" models allow developers to build upon and adapt previous work, making AI tools more accessible to small companies, researchers, nonprofits, and individuals.
2. **Innovation promotion:** The openness of AI systems affects competition and innovation in these revolutionary tools. By embracing openness, the report aims to provide a roadmap for responsible AI innovation and American leadership.
3. **Accelerated development:** Open models may accelerate the diffusion of AI's benefits and the pace of AI safety research.
4. **Democratization of AI:** Open models broaden the availability of AI tools, potentially democratizing access to powerful AI capabilities across various sectors and user groups.
5. **Transparency and understanding:** Open models can contribute to a broader understanding of AI systems, a crucial factor for effective and reliable development.
6. **Economic benefits:** The wide availability of US-developed open foundation models can serve the national interest by promoting innovation and competitiveness.
7. **Research advancement:** Open models facilitate academic research on the internals of AI models,

²⁶ <https://www.ntia.gov/>

- enabling deeper study and improvement of the technology.
- 8. Local deployment: Open weights allow users and organizations to run models locally on their edge devices, which can benefit certain applications and use cases.
- 9. Customization: Open models enable creative modifications to suit specific user needs and applications.

A new US Government

Following the November 2024 election the US administration will change in January 2025, to a Trump-led Republican government. This may well have an impact on AI regulation in the US.

4.3 Global AI Summits

4.3.1 UK Safety Summit, 2023

The UK AI Safety Summit took place in November 2023 and concluded with the Bletchley Declaration being signed by 28 countries and the EU. It committed governments and leading companies to test advanced AI models before their release, to develop a shared scientific and evidence-based understanding of the risks posed by frontier AI, and to create policies to address them. In May 2024, the UK AI Safety Unit shared its Inspect AI Testing Platform as open source.

Open source was not on the agenda at the summit and was believed to be discussed twice when raised at the summit by the French and Chinese representatives. The then UK Deputy Prime Minister made a statement on his exit from the summit supporting open source.²⁷

4.3.2 Korea Summit, 2024

Building on the UK Summit, the Korea Summit was co-hosted between the UK and South Korea, and took place in May. With five new agreements, pledges, or statements, the Summit signaled the international community's sustained commitment to addressing AI safety, while broadening the discourse to include innovation and inclusivity.

The Seoul Summit's Ministerial Statement emphasised the interconnected goals of safety, innovation, and inclusivity. It reaffirmed commitments to mitigating severe AI risks while introducing mechanisms to identify and manage high risk model capabilities. However, the inclusion of inclusivity and innovation highlighted a broader vision, aiming to ensure equitable access and societal acceptance of AI advancements.

A major achievement of the Summit was the creation of an international network of AI safety institutes, promoting collaboration on research, standards, and testing. This network complements existing efforts, such as the UK-US partnership on AI safety science, and strengthens state capacity to evaluate AI systems independently from industry influence. Enhanced cooperation among safety institutes is essential to align global approaches and mitigate risks effectively.²⁸

4.3.3 Paris Summit, 2025

The Paris AI Action Summit is to take place on 10 February 2025 and in a press release on 12 December 2024, it was confirmed that the focus will be on open source and AI and would focus on the 35 AI Convergence Challenges. This will address challenges in health and life sciences, the skills and professions of the future, climate adaptation and agriculture, culture, information and democracy, inclusion, and the fundamentals of AI. With France's status and push for openness in AI, the summit is likely to have a greater focus on openness than past summits.

²⁷ GOV.UK, AI Safety Summit 2023, <https://www.gov.uk/government/topical-events/ai-safety-summit-2023#:~:text=The%20AI%20Safety%20Summit%202023,November%20at%20Bletchley%20Park%2C%20Buckinghamshire.&text=The%20summit%20will%20bring%20together,groups%20and%20experts%20in%20research>. GOV.UK, AI Safety Summit 2023, <https://www.gov.uk/government/topical-events/ai-safety-summit-2023#:~:text=The%20AI%20Safety%20Summit%202023,November%20at%20Bletchley%20Park%2C%20Buckinghamshire.&text=The%20summit%20will%20bring%20together,groups%20and%20experts%20in%20research>.

²⁸ CETAS, AI Seoul Summit Stocktake, 2024, <https://cetas.turing.ac.uk/publications/ai-seoul-summit-stocktake-reflections-and-projections>

Five Main Themes stated for the Paris Summit²⁹:

1. Public interest AI - define, build and deliver critical open public infrastructure for the global AI sector to drive beneficial social, economic and environmental outcomes in the public interest
2. Future of work - provide a platform for dialogue on how AI can support the future of work agenda, by promoting AI usage that enhances productivity and wellbeing
3. Innovation and culture - support and build dynamic and sustainable innovation ecosystems that work hand-in-hand with all economic sectors, notably cultural and creative industries
4. Trust in AI - consolidate the mechanisms to build trust in AI, based on an objective scientific consensus on safety and security issues
5. Global AI governance - shape an effective and inclusive framework of international governance for AI, building on the work conducted within the UN and on existing initiatives like the Global Partnership on Artificial Intelligence

²⁹ AI Action Summit, 2024, <https://www.elysee.fr/en/sommet-pour-l-action-sur-l-ia>

5. Literature Review

5.1 GitHub's Octoverse

The 2024 Octoverse Report shows a surge in global developer engagement and a notable shift towards open source contributions. According to the report, generative AI projects on GitHub saw a 59% increase in contributions and an impressive 98% growth in the number of projects. This rise highlights the democratising potential of open source in AI, which has facilitated participation from a diverse range of geographies, including India, Germany, Singapore, and the UK. Such trends underscore the increasing accessibility of advanced AI tools and frameworks through collaborative platforms.

The report reveals that Python has overtaken JavaScript as the most popular language on GitHub and notes a 92% spike in the use of Jupyter Notebooks. These trends highlight the surge in data science and machine learning on GitHub and also correlate with large numbers of people joining the open source community from across the STEM world. This development marks a pivotal shift in the open source ecosystem, attracting contributors from beyond the traditional software development sphere and fostering interdisciplinary collaboration.

The UK has emerged as a key player in this global landscape, ranking among the top five fastest growing developer communities in Europe and the Middle East. With a 19% year-over-year growth and a developer base exceeding 4 million, the UK's contributions to the open source community are increasingly impactful. This mirrors broader global trends of rising interest, participation and innovation in open AI. As the global developer community grows – now surpassing 100 million users on GitHub – the collaborative and open source nature of AI development continues to drive progress.

5.2 Linux Foundation's Generative AI Report

Linux Foundation's December 2024 report³⁰ showcases the vital role that open source plays in shaping the adoption and trajectory of GenAI in the UK. According to the report, open source infrastructure constitutes 41% of GenAI code and 82% of organizations surveyed consider open source critical for a positive AI future. The open source nature of models and tools positively influences adoption for 71% of organisations, reflecting a broad consensus on its value.

They reveal that organisations with high GenAI adoption levels are more likely to use open source tools and infrastructure, with open source code comprising an average of 47% of their GenAI infrastructure compared to 35% among low adopters. High adopters are also three times more likely to contribute frequently to open source GenAI projects (28%) than their lower adoption counterparts (9%), signaling a deeper commitment to the open source ecosystem.

While the report states that consumption remains dominant (65%), custom model building and serving are gaining traction as businesses realise the value of tailoring models to meet specific needs. High adopters lead in these activities, with 44% building/training models, 52% serving them internally, and 69% consuming them.

According to the Linux Foundation, the future of openness in AI appears to remain strong, with 83% of respondents advocating for increasingly open AI systems. This collective commitment to open source should reinforce its role as a catalyst for transformative advancements in AI, positioning the UK as a leader in shaping an inclusive and sustainable AI future.

5.3 Demos Open Horizons: Exploring nuanced technical and policy approaches to openness in AI

Demos' recent report³¹ on technical and policy approaches to openness in AI offers an examination of issues facing policymakers, researchers, and industry stakeholders in regards to AI. They emphasise the need for a balanced approach that fosters innovation while mitigating risks.

³⁰ Linux Foundation, Shaping the Future of Generative AI, 2024, <https://www.linuxfoundation.org/blog/shaping-the-future-of-generative-ai>

³¹ Demos, Open Horizons: Exploring Nuanced Technical and Policy Approaches to Openness in AI, 2024, <https://demos.co.uk/research/open-horizons-exploring-nuanced-technical-and-policy-approaches-to-openness-in-ai/>

The report proposes a non-exhaustive menu of policy options for the UK government. These recommendations are categorised into two main areas: investments and regulatory interventions.

Investment options:

- Financial backing for open source ecosystems
- Digital public infrastructure - development of national foundation models, public compute infrastructure, and open data libraries
- Threat modelling and risk mitigation
- Economic impact research - studies on the implications of open sourcing AI models and restricting model access
- Incentive structures - initiatives like rewards programs to encourage breakthroughs in AI safety and social benefits

Regulatory options:

- Transparency standards - requirements for proprietary models to disclose critical safety and functionality information
- Exemptions for openness - regulatory relief for models meeting specified openness and transparency criteria
- Liability clarification - establishing clear liability legislation with openness standards to ensure accountability
- Safety evaluation support - defining the role of the UK AI Safety Institute (AISi) to assist startups and open source ecosystems with resources and safety standards
- Government open data policy - reforming policies to enhance data availability and support for democratic decision making around AI

5.4 State of Enterprise Open Source AI³²

Anaconda's report reveals that managing security risks is a cornerstone of successful 'open source AI' adoption. The increasing reliance on 'open source AI/ML' components necessitates robust risk management strategies to mitigate vulnerabilities and build trust. Security concerns remain prominent, with 29% of organisations identifying these risks as the most critical challenge associated with open source tools. Common issues include exposure of vulnerabilities, flawed insights due to incorrect AI outputs, and, less frequently but more severely, malicious code installation.

To navigate these risks, organisations are employing a range of strategies. Over 60% use third party software to scan for vulnerabilities, and 57% rely exclusively on trusted open source communities. These proactive measures highlight a growing recognition that robust security underpins the trust needed for broad adoption of 'open source AI' solutions.

Innovation & Collaboration

Open source remains a vital driver of innovation in AI/ML, offering unprecedented opportunities for collaboration and creativity. According to the report, open source solutions save organisations an estimated 28% in costs and 29% in time, with 42% reporting expanded capabilities. They also enhance collaboration, breaking down silos across teams and fostering shared innovation. Over 63% of organisations noted improved cross-team collaboration through open source tools, which not only supports better decision making but also helps maintain competitiveness as cutting edge algorithms are often released openly before proprietary versions.

Scaling AI Initiatives with Confidence

The report notes that scaling AI initiatives requires stability and effective dependency management. Open Source tools provide accessibility, scalable infrastructure to support these efforts. Addressing challenges like fine-tuning advanced models and ensuring compliance is critical for smooth scalability. The report states that cloud based or hybrid environments are instrumental in managing large scale AI deployments, ensuring operational resilience and performance.

³² Anaconda, The State of Enterprise Open Source AI, 2024, <https://www.anaconda.com/lp/state-of-enterprise-open-source-ai>

Realising Value & ROI through Open Source AI

Open source AI tools deliver tangible benefits, from reducing total cost of ownership to improving operational efficiency. While some organisations achieve short term gains, most expert ROI within 12 to 18 months, contingent on addressing barriers like data quality and skill gaps. Open source tools enable both immediate value and long term strategic advantages, ensuring organizations remain competitive in a rapidly evolving AI landscape.

5.5 AI Alliance³³

In the form of a blogpost in December 2024, The AI Alliance reported 140 members including OpenUK in its focus on Trust. Its membership is diverse, including startups (35%), academic organisations (30%), enterprises (19%), nonprofits (11%), and research institutions (6%). They see this variety of perspectives as a critical strength, enabling the AI Alliance to address complex challenges in AI trust and safety.

A significant focus of the AI Alliance is the development of open source tools and methodologies. Notable contributions include projects like NeMo-Guardrails, Llama Guard, and CodeShield, which help developers build safer AI applications by offering features such as content moderation, protection against malicious prompts, and secure code generation. The Alliance also supports evaluation frameworks, such as TrustyAI and MLCommons AILuminate, which assess AI systems for fairness, bias, and other safety metrics.

Insights gathered from their survey reveal key trends and concerns within the AI ecosystem. Primary use cases for AI systems include chatbots, coding assistants, and summarisation tools. Safety is rated as a high priority, with respondents attributing this to legal, regulatory, and customer satisfaction concerns. Despite this, a major gap remains in the community's trust in current benchmarks, highlighting the need for improved safety evaluations, automated red-teaming processes, and advanced guardrail technologies.

The AI Alliance continues to act as a central platform for collaboration, creating a reference stack for safety evaluations and expanding its taxonomy to include performance and alignment metrics beyond safety. It regularly hosts bi-weekly working group sessions to facilitate knowledge exchange and invites community members to participate in these discussions. These efforts reflect the AI Alliance's dedication to fostering innovation in AI safety while addressing the evolving needs of developers and stakeholders.

5.6 Insight's State of the AI Agents Ecosystem³⁴

Insight's report explores the shift towards AI Agents, based on their monitoring of agentic deployments across companies. They define Agents as a new architecture that combines core application logic and associated workflow automation in a unified flow, embedding LLMs to interweave planning and execution of complex tasks.

They note two key areas where they see opportunity going forward: infrastructure and verticalised platforms. Scaffolding and infrastructure is needed for Agents to be deployed reliably so seeing builders enabling and improving the infrastructure for agentic deployment is promising. They also see opportunity for verticalised functional Agents that can be stitched together with complex workflows targeting a specific industry or function.

Within the last year, many AI agents have moved from conceptual to practical. By surveying 105 Fortune 500 companies, Insight reveals some examples of real life use cases of this emergent technology. In terms of developing user facing use cases, they note identity access management, automated testing and provisioning, code generation and compliance.

³³ AI Alliance, The State of Open Source AI Trust and Safety, 2024, <https://thealliance.ai/blog/the-state-of-open-source-trust>

³⁴ Insight, The State of the AI Agents Ecosystem, 2024, <https://www.insightpartners.com/ideas/state-of-the-ai-agent-ecosystem-use-cases-and-learning-for-technology-builders-and-buyers/#:~:text=A%20rich%20ecosystem%20of%20AI,normalized%20workflow%20across%20a%20company.>

5.7 Opportunities in AI as seen from the Reports

The high cost of proprietary AI model development poses significant barriers for many organisations. According to the Economist Impact report, open source models mitigate these challenges by offering financially accessible alternatives, particularly for academic institutions and smaller enterprises³⁵. By standardising programming languages and frameworks, open source tools reduce training and adoption costs, enabling broader participation in AI innovation.

Moreover, ‘open source AI’ fosters economic benefits at both micro and macro levels. For example, Grammarly’s integration of open source LLMs into its experimental environments within a single day illustrates the efficiency gains and adaptability afforded by open source models³⁶. These benefits extend to reducing computational costs and environmental impacts, aligning with global sustainability goals.

5.8 Challenges and Risks identified in the Reports

Defining AI openness remains a dilemma, with the term still in want of a clarity. Demos’ 2024 report follows the definition set out at the Columbia Convening co-hosted by Mozilla and the Columbia Institute of Global Politics, which states that AI openness encompasses various dimensions, including model distribution, licensing, access to AI artifacts, and transparency into safety guardrails. Importantly, AI openness extends beyond ‘open source AI’, which specifically refers to models that are publicly available under open source licenses for unrestricted use, study, modification, and sharing. Openness, therefore, represents a broader ecosystem of practices and governance mechanisms aimed at fostering transparency and accessibility in AI development.³⁷

While the benefits of ‘open source AI’ are evident, there are accompanying risks and challenges. Open Horizon’s 2024 report emphasises the need for robust risk mitigation strategies throughout the AI value chain. Unclear liability rules and safety standards could stifle innovation and lead to less safe technologies. Furthermore, the report calls for alternative approaches to AI openness, including technical solutions that address risks without compromising transparency.³⁸

The PwC 2024 AI Business Predictions report highlights an imminent “moment of truth” for trust in AI. As generative AI becomes integral to business processes, ensuring trust and accountability in ‘open source AI’ models will be paramount. This brings about the need for clear threat models and evaluation standards to safeguard against misuse and vulnerabilities.³⁹

5.9 The Future

The intersection of AI and open source presents a unique opportunity for the UK to lead in inclusive and innovative AI development. According to the Linux Foundation, 83% of respondents advocate for greater openness in AI⁴⁰, reflecting a broad consensus on its importance for a positive AI future.

To capitalise on this potential, the UK must continue investing in open source initiatives, fostering collaboration, and addressing regulatory and ethical challenges. By leveraging open source, the UK can ensure that AI development remains accessible, transparent, and beneficial to all stakeholders.

The UK’s AI ecosystem is deeply intertwined with open source, which serves as a catalyst for innovation and inclusivity. By prioritising open source principles and fostering collaboration, the UK can solidify its position as a global leader in AI while promoting a future where technological advancements are equitably distributed.

³⁵ Economist Impact, Open Sourcing the AI Revolution, 2024, https://impact.economist.com/perspectives/sites/default/files/ei-meta_open_sourcing_the_ai_revolution_report_us-v8.pdf

³⁶ Economist Impact, Open Sourcing the AI Revolution, 2024, https://impact.economist.com/perspectives/sites/default/files/ei-meta_open_sourcing_the_ai_revolution_report_us-v8.pdf

³⁷ Demo, Open Horizons: Exploring Nuanced Technical and Policy Approaches to Openness in AI, 2024, <https://demos.co.uk/research/open-horizons-exploring-nuanced-technical-and-policy-approaches-to-openness-in-ai/>

³⁸ Demo, Open Horizons: Exploring Nuanced Technical and Policy Approaches to Openness in AI, 2024, <https://demos.co.uk/research/open-horizons-exploring-nuanced-technical-and-policy-approaches-to-openness-in-ai/>

³⁹ PwC, 2025 AI Business Predictions, 2024, <https://www.pwc.com/us/en/tech-effect/ai-analytics/ai-predictions.html>

⁴⁰ Linux Foundation, Shaping the Future of Generative AI, 2024, <https://www.linuxfoundation.org/research/gen-ai-2024>

6. Case Studies

6.1 AutoGPT

Toran Bruce Richards,
Founder



AutoGPT is a UK-based organisation in Edinburgh, founded by [26 year old] Toran Bruce Richards, revolutionising the artificial intelligence (AI) landscape with its focus on agentic AI. Since its creation in July 2023, the company has grown to include eight full time employees and seven part time contractors, spread across Europe, Asia, and America. As a fully remote team, AutoGPT epitomises a globally distributed, open-source-driven enterprise committed to driving innovation.

Revolutionising AI with Agentic Systems

Agentic AI, the focus of AutoGPT's work, empowers AI systems to operate independently and perform multi-step tasks without constant user input, i.e. with a degree of autonomy. While agentic AI is quickly emerging as an area of interest, few organisations have managed to translate it into practical, scalable systems.

The creation of AutoGPT in 2023 marked the debut of 'agency' in large language models (LLMs). This set the organisation apart as an industry pioneer. This has made it an indispensable tool for users worldwide.

In September 2024, AutoGPT released the AutoGPT Platform. One example of the Platform's potential is to generate content which will improve a sales process, by speeding up the process, but also by analysing complex information to convert written conversation to video and by enabling greater personalisation of sales content. It does this through a number of elements including data processing and analysis, task scheduling and management, communication and notification systems, integration between different software tools, AI-powered decision making and content generation.

The majority of the project continues to be shared under an OSI-approved open source license, the MIT license. AutoGPT's open source licensing has driven its success, evidenced by its unprecedented 169,000 plus GitHub stars and recognition as one of the top 25 global GitHub projects.

The new `autogpt_platform` folder has been released by AutoGPT, on the 'Polyform Shield license', which is a standard form proprietary licence. This licence is largely open but does not qualify as open source as the licence is not open source and contains a restriction. It allows for new works to be made by all users with a carve out from that, being the condition that no user will not compete with the underlying distribution. This enables many other activities that do not compete to be carried out freely and commercialisation of those. Effectively this new licence choice enables the company to utilise an 'open core' model to monetise the AutoGPT Platform whilst granting relatively wide rights in it and keeps the 'core' AutoGPT, truly open source.

AutoGPT's adherence to open source values of community and collaboration is one of the key differentiators for AutoGPT. By centering the needs of their community and users, they have been able to offer not only the best tools but also those tailored to individual preferences. This inclusive, user-centric approach has, and will continue to, set AutoGPT apart from larger corporate players who prioritise shareholder interests over user needs.

Open Source Philosophy

From its creation, AutoGPT's commitment to open source has been key to its founder and the organisation.

By making its innovations publicly accessible, the company ensures that advanced AI technology benefits a broad community rather than a select few thereby democratising AI. This ethos has fostered widespread interest in agentic AI, drawing the attention of major tech giants like Google, OpenAI, and Meta to this revolutionary technology.

Open source accelerates innovation as AutoGPT’s founder explains, “building in public allows us to benefit from constant instant feedback. We constantly share our work to the scrutiny of the world far before it’s finished, which means we benefit from much earlier feedback than any other working model can hope to achieve.” By publicly sharing every stage of development, AutoGPT has cultivated a dynamic ecosystem where contributors worldwide refine and expand the technology.

This transparent approach has enabled the company to iterate quickly and avoid the pitfalls of closed door development cycles. Its transparency also fosters trust in AutoGPT’s AI agents, as users can scrutinise and build upon widely shared tools, ensuring reliability and community confidence and are not reliant on the company or locked-in to it.

Navigating Challenges & Regulations

Operating in the UK, AutoGPT has faced regulatory hurdles that restrict access to certain cutting-edge AI technologies that are available in other regions like the US.

These limitations, stemming from stringent policies, pose challenges to maintaining a competitive edge against international counterparts. Despite these challenges, AutoGPT has remained committed to its UK roots and remained a UK company, leveraging international funding opportunities and building a globally distributed team to mitigate geographical constraints.

This approach underscores its resilience and adaptability in a rapidly evolving industry and sets it aside as a leading UK AI company with massive international impact despite its diminutive size.

Future Prospects and Vision

AutoGPT’s vision extends beyond individual agentic AI solutions to the development of massive multi-agent systems.

By enabling hundreds of specialised AI agents to collaborate seamlessly with each other without human intervention, the company aims to unlock unprecedented possibilities in solving complex problems.

The forthcoming agent marketplace from AutoGPT, will serve as a hub for innovation, where developers can build on others’ creations, fostering a culture of collaboration and ingenuity, in the true open source spirit.

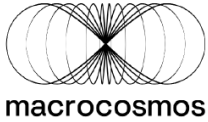
By empowering creators to monetise their agents, AutoGPT is shaping a new economic dynamic in AI, one centred on community driven task fulfilment. This approach ensures that the best tools – and the tools best suited to individual needs – are readily available, advancing not just technology but also its accessibility and usability.

Conclusion

AutoGPT’s groundbreaking work exemplifies the transformative potential of open source in the world of AI. By prioritising their community and users, and fostering trust through transparency, the company has not only advanced the capabilities of AI but also reshaped the broader landscape of AI development. As it navigates regulatory challenges and scales its ambitions, AutoGPT remains at the forefront of an open, collaborative future for AI. It is one of the best examples globally of open source meeting AI and for the UK an exemplar of the UK’s leading position in open source and ground-breaking AI innovation.

6.2 Macrocosmos

Elena Nesterova
Head of Delivery



Macrocosmos, an ‘open source AI’ research lab, stands at the forefront of democratising AI. By integrating AI and blockchain technology, Macrocosmos drives the development of distributed, decentralised AI solutions. While headquartered in the UK, Macrocosmos’ global and diverse team of 30 employees manages a vast decentralised network of over 1000 community contributors, who play a pivotal role in creating transparent, open, and collaborative innovation.

Open Source as a Catalyst for Democratisation

Open source is fundamental to Macrocosmos, not just philosophically but also to their product and service. It reduces development barriers by encouraging the reuse and improvement of existing models, leading to reduced development time and expense.

Macrocosmos leverages blockchain technology to support open source collaboration, helping to ensure data integrity and decentralisation, while also incentivising contributors to coordinate their efforts to advance AI capabilities - and be fairly rewarded for their efforts.

For example, Macrocosmos’ community is now the largest supplier of fresh media datasets on Hugging Face, the biggest open source data repository. With an average daily contribution of 350 million rows, these datasets are instrumental for AI model training and product development.

Community Driven Innovation

Macrocosmos’ decentralised approach extends to its operational structure. Despite being a small team, their innovative management frameworks allow them to efficiently oversee a large global network of contributors. The organisation incentivises contributions through a reward system that promotes quality and efficiency. Their Pre-training Network encourages contributors to produce foundational LLM models of varying sizes with state-of-the-art quality standards. This system not only attracts top tier talent into commodity production but also ensures that the community consistently delivers value to end users.

Technological Advancements & Challenges

Macrocosmos’ commitment to decentralisation drives their research into distributed AI training. Training large language models (LLMs) traditionally requires immense computational resources concentrated into centralised data centres, often controlled by a few tech giants. To counter this, Macrocosmos is exploring distributed training across multiple devices, reducing resource demands and environmental impact. Recent experiments have achieved a tenfold compression of model weights, significantly accelerating training times while maintaining model quality. However, this ambitious work is not without its challenges. Regulatory uncertainty, particularly regarding data compliance and intellectual property poses significant hurdles. To navigate risks associated with GDPR and continue innovating, Macrocosmos needs clarity on text and data mining in the UK.

Long-Term Sustainability

All tech startups face the risk of obsolescence, platform risk, and incompatibility. For Macrocosmos, these risks can be mitigated in part through product diversification of on-demand full stack AI/ML services. One of them is an innovative product ‘Gravity’, which enables users to collect large amounts of media data for sentiment analytics and insight gathering, opening new revenue streams. Macrocosmos also focuses on partnerships, collaborating with open source communities and industry bodies to expand their reach and impact.

Impact on the AI Ecosystem

Macrocosmos' work demonstrates that there is an alternative to proprietary, centralised, and closed AI. If state of the art intelligence can be convened both at a lower cost and at a global scale, startups no longer need be at the behest of Big Tech - levelling the playing field and unlocking previously unattainable use cases. Their model shows that openness and collaboration are not just ideals but practical strategies that have the potential to further drive AI innovation.

7. Conclusion

**Dr Jennifer Barth,
Founder Symmetry and
Research Director OpenUK**



As we close out 2024, the landscape of AI has undergone an extraordinary transformation, spurred by rapid advancements in both technological capabilities and the public discourse around AI. This report has touched on a range of significant developments, from the accelerating shift towards Generative AI and Agentic AI, to the growing influence of open source initiatives, and the changing regulatory environments across key global markets. The pace of innovation in AI, particularly in the UK, remains impressive, yet the challenges of keeping up with such fast-moving developments, as well as the potential risks they present, can't be overstated.

Demonstrated by projects like AutoGPT, the UK has fostered a thriving open source community that is driving forward not only technological innovation but also new economic and collaborative models. AutoGPT leverages an open source philosophy to foster rapid innovation and community-driven development. AutoGPT's success exemplifies the transformative potential of open source in AI. Open source software in AI, notably in the realm of agentic AI, has proven to be a powerful tool for democratising access to advanced technologies, enabling a broader and more inclusive ecosystem of developers, researchers, and entrepreneurs. The emergence of Agentic AI, which integrates autonomy and reasoning into AI systems, signals an evolution in AI towards systems that can act more independently and intelligently within complex environments. These developments offer great promise, particularly in how they can support small businesses and individuals. It is early yet to know the full impact, or, indeed, exactly how this technological shift will progress.

The rapid pace of AI advancements also brings with it a host of policy, regulatory, and ethical challenges. There is a growing divide between different regions on how AI should be regulated. In the UK, the government has demonstrated a commitment to open source principles, but as new regulatory frameworks are proposed, particularly concerning AI safety, copyright, and data rights, the UK's position will need to evolve to remain competitive and inclusive. The recent developments in the European Union with the passing of the AI Act represent a significant step toward creating a global framework for AI governance, but challenges remain in how 'open source AI' will be treated. The proposed frameworks in the US and the EU around AI safety and model transparency will need to strike a delicate balance to avoid overregulating and hindering progress, particularly for smaller developers and open source communities.

As we move into 2025, it is evident that the landscape of AI will continue to evolve at a rapid pace. There is a growing need for more agile and forward-thinking regulatory frameworks that do not impede progress while safeguarding public trust and ensuring ethical practices. The global discussions on AI safety, as seen in the upcoming Paris AI Summit and the ongoing efforts in the UK, France, and other countries, will play a crucial role in shaping the future of AI development. These discussions must prioritise not only the safe and responsible use of AI but also the continued expansion of open source and open access initiatives that have proven to be a catalyst for global collaboration and innovation.

The opportunities presented by AI that are open are vast. With a model that encourages collaboration, transparency, and the rapid iteration of ideas, the UK stands to benefit immensely from fostering an environment where AI that is open is seen as a cornerstone of the future tech ecosystem. By prioritising open source, the UK can ensure that AI technology remains accessible to all, enabling individuals, small businesses, and startups to leverage AI capabilities without the burden of high costs or exclusive access to proprietary tools. Furthermore, 'open source AI' empowers researchers and developers to push the boundaries of what is possible, exploring new use cases and creating novel solutions to some of the world's most pressing challenges. As seen in the efforts of organisations like Macrocosmos, the intersection of 'open source AI' and blockchain technology shows promise in mitigating some of these risks by ensuring data integrity and decentralising control. Macrocosmos demonstrates the viability of community-driven AI development and the potential for equitable access to advanced AI capabilities. Challenges remain to find robust mechanisms

for addressing safety, fairness, and accountability in AI systems. 'Open source AI' initiatives require investment, collaboration, and clear regulatory frameworks for success.

The momentum generated by AI in the past year will undoubtedly shape the course of the industry in the years to come. The UK has positioned itself as a leader in the 'open source AI' movement, and its commitment to openness must continue to drive both innovation and policy development.

8. Formalities

8.1 Contributors

Amanda Brock, CEO, OpenUK

OpenUK CEO, Amanda's built one of open source's most recognised and impactful organisations. Executive Producer of State of Open Con (2023- 2025), Amanda's a globally sought-after keynote speaker. A lawyer with 25 years' experience, 5 as GC of Canonical, she's been instrumental in shaping open source's legal frameworks, as she was internet law during the early 2000's. Regularly contributing to tech press, she edited 'Open Source: Law, Policy and Practice', (2022).

Recognition: Computer Weekly 50 Most Influential Women in UK Tech (2023, 2024); Computing IT Leaders 100 (2023, 2024); Lifetime Achievement Award WIPL (2022); Women Who Will Changemaker (2023); INvolve Heroes (2022, 2023); Novi Awards (2024) and Ambassador, Open Charge Alliance.

Advisory Appointments: UK Cabinet Office Open Standards Board; UKRI Digital Research Infrastructure; UKRI Exascale; KDE; commercial boards – Mimoto, Scarf, FerretDB and Space Aye; and is Fellow Open Forum Academy; Distinguished Fellow Rust Foundation; and European Representative, OIN.

Ben Brooks, Fellow, Berkman Klein Center, Harvard

Ben is a Fellow at the Berkman Klein Center, Harvard, where he scrutinises the regulatory and legislative response to AI models. He served most recently as Head of Public Policy for Stability AI, custodian of Stable Diffusion. Ben has testified on AI regulation before the US Congress and UK Parliament, and engaged policymakers around the world to protect open innovation in future regulation. Previously, Ben championed the safe, open, and durable regulation of emerging technologies, including for drone delivery at Alphabet, ridesharing at Uber, and digital assets at Coinbase. He has worked with authorities on the ground in over 25 countries as they navigate complex reforms in high-stakes or permission-based domains.

Dr Jennifer Barth, Founder Symmetry and Research Director OpenUK

Jenn has more than 15 years of experience leading independent research on the intersections of emerging technologies and socioeconomic change. She provides companies with independent thought leadership and media engagement opportunities on global issues impacting and shaping our current and future technical-social lives. Her work spans the digital through to social and economic change. She has looked at sustainability, workforce skills and organisational competitiveness strategies through and beyond the pandemic with Microsoft and many other big and small organisations and works as the Chief Research Office researching the role of open source software and its potential to fuel the circular economy with OpenUK. She has experience working on the human impact of artificial intelligence (AI) through fieldwork experiments with IBM Watson, Microsoft and other providers. She is skilled at blending research methods and working with people to bring to life the stories behind numbers. Dr Barth earned her DPhil in Geography from the University of Oxford.

Elena Nesterova, Head of Delivery, Macrococosmos

Elena is Head of Delivery at Macrococosmos, driving cutting edge, high quality technological products and services through Agile values. Motivated by integrating technology with the people and communities, Elena has devoted her career to managing diverse software development and infrastructure teams in start-ups and corporate environments. Drawing from both worlds, she fosters a team culture rooted in integrity, collaboration, and innovation. Her delivery framework prioritises efficient, timely product releases, while also ensuring continuous value creation for the end-users, open source community and business customers.

Matt Barker, VP Workload Identity, CyberArk

Matt was the co-founder & CEO of Jetstack, a Kubernetes company he started in 2015 and bootstrapped before being acquired by Venafi in 2020. Venafi was subsequently acquired by private equity company Thoma Bravo, and then the cybersecurity company CyberArk. Jetstack is best known for its open source-project 'cert-manager', which is downloaded millions of times a day to secure cloud native infrastructure.

Cert-manager was donated to the CNCF in 2020 and graduated in 2024. Matt has played a number of product and leadership roles since being acquired, and now leads workload identity at CyberArk. In January 2021 Matt was awarded as a top 100 Open Source Influencer by OpenUK.

Toran Bruce Richards

Toran Bruce Richards, a prominent figure in AI innovation from the UK, is chiefly known for creating Auto-GPT, an Autonomous AI System. Launched Open Source in March 2023, Auto-GPT represents a lead in the application of advanced large language models (LLMs), capable of independently managing complex, multi-step tasks without continuous human input. The scale of the project and its community impact is significant, with Auto-GPT's GitHub Repository achieving the #23 rank globally, amassing over 157k stars. Additionally, it has fostered a vibrant community of over 50k AI enthusiasts on Discord, marking its position as a prominent and influential project in the 'open source AI' landscape.

8.2 About the Creators of this Report

OpenUK

OpenUK is the unique open tech industry body for the business of open technology in the UK. It spans the opens – software, hardware, data, standards and AI and is the convening point for the UK's business, academic and contributing communities across open tech. Our work supports the UK's journey to become "The State of Open". Our organisation is run with the support of our volunteer community and their leadership in the tradition of open source delivering on three pillars: community, legal and policy and learning. Our Community is recognised through our world-leading open tech recognition programme including the OpenUK Awards (the Oscars of Open Source) now in their 5th year, New Year's Honours Lists and Ambassador Scheme.

OpenUK undertakes research and reporting both on its own account through its "State of Open Reports" and on a commissioned basis for third parties. Case studies, Thought Leadership, Surveys and desk-based research are included in our reporting which pushes the envelope and leads the way. Our Research and Reporting Show and Tell events coalesce the global open source research communities digitally to regularly update and share research practices and topics. OpenUK's new OpenUK Fellows Network for postgraduate researchers is launching in 2024 to encourage more academic research across the opens.

The community's strength is channelled to enable a cohesive voice that responds to legislative proposals and sets policy. We have set the agenda in policy matters across openness in the UK and beyond. OpenUK's Policy work leads the conversations around open source licensing and commercialisation, AI openness and cloud computing and other key topics across open source, as they emerge. Engagement with UK policy makers is supported by a volunteer Policy Advisory Board and by experts across our volunteer Advisory Boards and the open source communities. Our Advisory Boards span AI, Communications Tech, Data, Finance, Hardware, Healthcare, Security, Software, Space, Sustainability and Quantum Computing. We are able to provide industry experts across the opens for speaking engagements, consultancy and advisory boards.

OpenUK is the second organisation established anywhere in the world with open source policy as its purpose, our approach is holistic to and representative of the entire open ecosystem. OpenUK undertakes a broad range of activities in support of its policy work and is a day one member of GaiaX and UK's GaiaX Hub Coordinator, hosted one of the biggest tech events at COP26, and was the first organisation in open tech to put a Sustainability Policy and Chief Sustainability Officer in place. Skills and Learning form our third pillar and our Learning work has spanned initiatives for children including our award winning Kids Camps which teach coding, open source and sustainability in a real world context; and exploring the business of open source through our Founder training. We have shared several hundred hours of digital training. Our ambitions include a UK apprenticeship module and adding open source to the UK curriculum.

The State of Open Con has become one of the world's leading open source conferences since its inception by OpenUK in 2023. In 2025 we expect to host 1000 people across 8 tracks and plenary sessions, with at least 50 partners in our delegate experience space and over 200 speakers. Our small events team deliver to the highest standards a series of unique events through the year and our community organise UK-wide OpenUK meet-ups. Contact OpenUK admin@openuk.uk

Symmetry

Symmetry looks beyond the surface and behind the curtain of the fundamental innovations and trends shaping our society, markets, culture, and values. We are academics and researchers looking at the intersections of emerging technology and socioeconomic impact, producing independent research for thought leadership and business solutions. Symmetry's mission is to share and grow knowledge about the interaction of technology and everyday lives. We want to understand the past, present, and future of human interaction with emerging technologies and socioeconomic changes—from behaviour to context, nature to nurture, origin to experiences—helping our clients engage their clients and public imagination.

8.3 Acknowledgements

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