Artificial intelligence is advancing the achievement of the UN SDGs

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Abstract

Artificial intelligence (AI) has grown exponentially since the pivotal discovery of enabling technologies in the subfield of large language models in 2017. The impacts of AI are already being felt across all functions of society, economy, and business. For AI to continue to play a beneficial role at all levels in the future, it is important to align AI developments that enable the UN Sustainable Deveopment Goals (SDGs), and to encourage the acceleration of AI technology. Derived from independent research findings, this high-level paper considers key recommendations on future policy developments.

Introduction

In 2015, 193 countries agreed to the United Nations (UN) 2030 Agenda for Sustainable Development, which provides a shared blueprint for peace and prosperity for all humanity. At its heart are the Sustainable Development Goals (SDGs), a collection of 17 interlinked global goals designed as a framework of recommendations and principles to achieve a better and more sustainable future for all. The SDGs are an urgent call for action by all countries—developed and developing—in a global partnership. The SDGs are intended to be achieved by the year 2030. Achieving the SDGs is not just a moral imperative, but a universal one.

In 2022, the world is experiencing the rapid evolution of artificial intelligence (AI). The technology approach has been defined as one that allows "machines to perform human-like cognitive functions such as reasoning and learning" (Sadowski & Powell-Tuc, 2019). AI supplements and amplifies our human biological intelligence, exponentially multiplying the capacity of all human beings to understand and solve complex, dynamic, and interconnected systemic challenges like the SDGs.

The explosive progress of AI and its increasingly broad adoption is comparable to the rapid dissemination of the internet in the 1990s and smart phones in the 2000s.

Over the next few years, AI will continue to have an impact on our lives that is—according to Google/Alphabet CEO Sundar Pichai—more profound than fire, electricity, or the internet (Rajan, 2021). The latest language models are achieving unprecedented and outrageous outcomes: powering Google searches, writing up to 30% of all new computer code in 2021 (Walsh, 2021), writing articles for major media outlets including The Guardian and The New York Times (GPT-3, 2020; Metz, 2020), publishing books (Thompson, 2021a), outperforming humans in SAT questions (Thompson, 2021b), and significantly surpassing the televised performance of the 2011 version of IBM Watson (Thompson, 2021c).
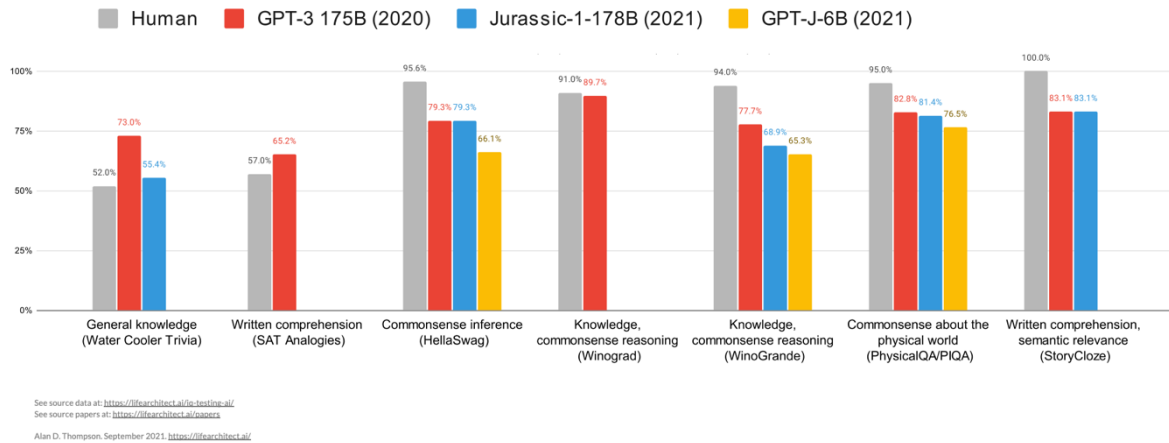
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Figure 1. Human intelligence versus AI (selected large language models) 2020–2021

AI & SDGs

The SDGs are inherently a complex, systemic challenge that require collaboration across disciplines (ethics, innovation, justice…), sectors (private, national government, multigovernmental…), and fields (education, finance, logistics…) to realize and resolve.

As promising and beneficial as AI is, its development and release also comes with its own systemic and social challenges. All progress needs to be reconsidered in the light of the important ethical conundrums raised using AI to achieve the SDGs. Our objective is to identify, define, analyze, and disentangle the various impacts that AI's development may generate in relation to the SDGs.

■ = Significant current and short-term potential contributions by AI to the UN SDGs

Figure 2: Artificial intelligence and the UN SDGs. Significant contributions by AI highlighted

To do so, it is necessary to combine the experience of the artificial intelligence community with the expertise of multidisciplinary specialists across fields

such as neuroscience, economics, education, sociology, law, design, and many more.

The current generation of language models and multimodal models (mapping relationships between images, text, and more) up to 2022 are the latest frontier in artificial intelligence. Through training of language models with large-scale datasets and subsequent deployment of inference, this generation of AI offers a broad capacity to support the achievement of the SDGs.

Given that such models are trained on human-generated data from books, journal articles, and web content, the models can be regarded as a universal extension of human biological intelligence.
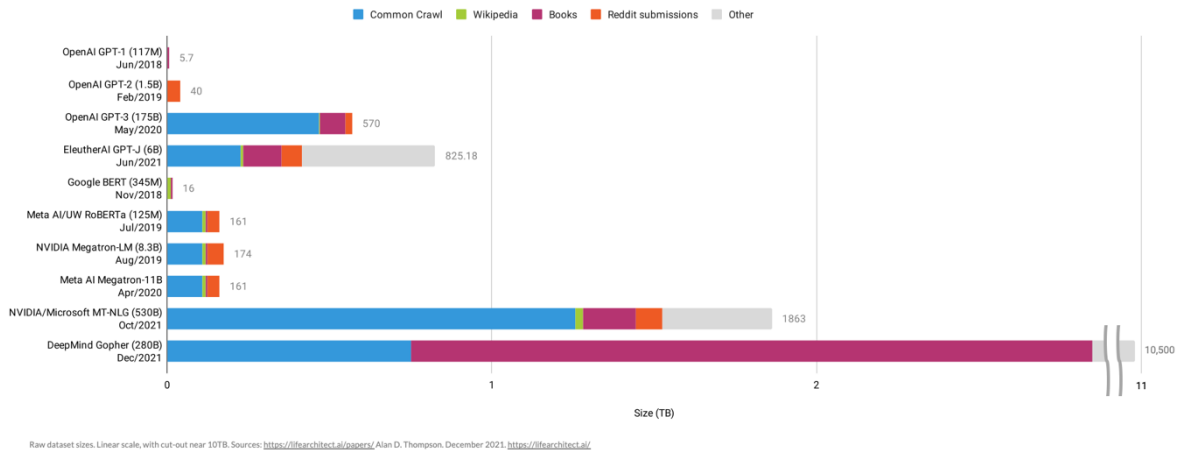

Figure 3: Increasing dataset sizes for major large language models 2018–2021

Various large organizations—including Salesforce, Duolingo, Intel, and Disney (OpenAI, 2021a)—have applied artificial intelligence to accelerate discoveries, with the added benefit of exponential increases in efficiency and productivity. Indeed, while a single 2020 language model continues to output 3.1 million words per minute (OpenAI, 2021b), 2021 saw many new models released by competing organizations internationally, leveraging the same technology (Thompson, 2021d), and paving the way for major developments across fields directly impacting the achievement of the SDGs.
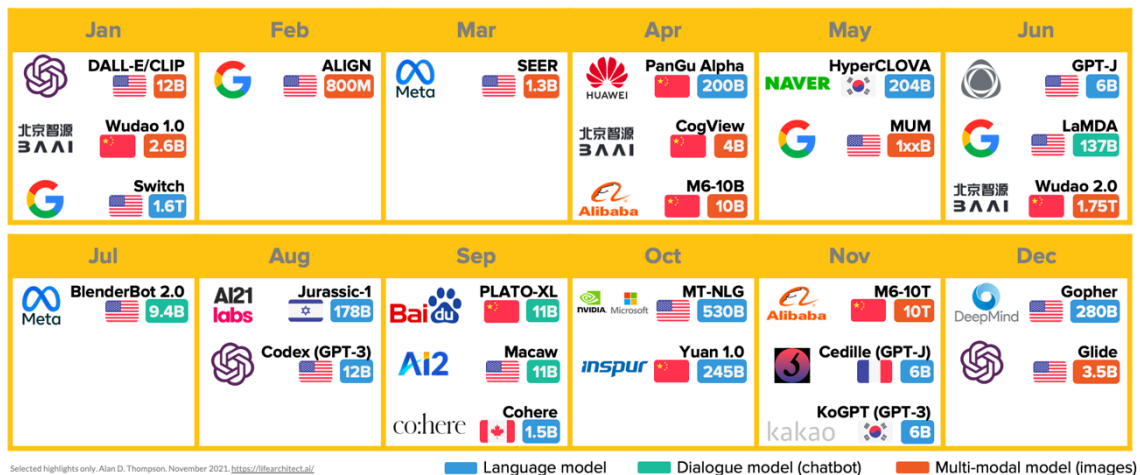

Figure 4: AI timeline of language model releases in 2021

For example, large language models are enabling new teaching and learning methods, and providing new pathways for pedagogy to improve the quality of personalized and transdisciplinary education. This may include the integration of AI with biological intelligence, alleviating the need for traditional education in its current form. Having an educated and informed population is a key driver for multiple SDGs including innovation, economic growth, and peace.

In the health and wellbeing field, antibiotic research and discovery requires massive amounts of experiments and processes. Artificial intelligence has been used to automate repetitive and time-consuming research, identifying a powerful new drug called Halicin (Trafton, 2020). Similarly in the computing hardware field, Google applied AI to chip floorplanning for its latest generation of TPU chips (Nature, 2021).

But artificial intelligence may also impede progress towards the SDGs. First, they can be abused and involved in major ethical issues including spam and false information.

Additionally, the proliferation of artificial intelligence across industries is causing cognitive job losses. This is primarily affecting workers in lower socioeconomic areas, particularly in regions without the means to invest in such technologies or to educate a workforce able to benefit from this process.

For all 17 SDGs, the authors were able to identify potential positive and negative impacts of AI. A more comprehensive overview is intended to be published at a later date. However, it remains challenging to have a detailed perspective of the different ways AI can impact humanity. A deeper understanding of the opportunities and challenges is required, and this necessitates rapid evaluation and review of technologies on release.

Some researchers believe that AI is showing us the way towards a utopia. Consider Wise/White Mirror's vision of "WEtopia" (Gambhir, 2020), which addresses SDGs 3, 4, 9, 11, and 17, and is developing a proposal for a new SDG 18, exploring the intersection of exponential technology and spirituality. Humanity has an opportunity to begin developing a wisdom path with scenarios to evolve AI from "augmented intelligence" to an "awakened intelligence" as a roadmap to artificial general intelligence.

In parallel, OpenAI's original vision for artificial general intelligence is aimed at solving "currently intractable multi-disciplinary problems, including global challenges such as climate change, affordable and high-quality healthcare, and personalized education... [giving humanity] economic freedom to pursue what they find most fulfilling..." (Brockman, 2019).

Others have a more pessimistic view of the future. Nonetheless, it is abundantly clear that the current generation is growing up completely immersed in AI, whether they know it or not. For those of us still discovering the dawning of AI, there will be a period of challenges and struggles in accepting, adopting, and embracing this beneficial technology. To ensure a higher level of acceptance and adoption of AI in society, media visibility and ongoing education on these technologies is crucial.

Selection of opportunities and challenges

This list provides an initial and high-level selection of the current facts and issues, as identified by independent research:

- **Opportunity: supplementing.** AI is seeing an increasing role in supplementing broad sections of industry, from writing to software development (Walsh, 2021).
- **Opportunity: replacing.** Where appropriate, AI is contributing to the

optimization of complex processes across industries, replacing human activity in time-consuming tasks like legal discovery and report preparation.

- **Opportunity: resolving education inequality.** AI could leverage important education inequalities, for instance through the democratization of learning by providing universal access to "superintelligence" at low cost.
- **Opportunity: prioritizing innovation across urgent challenge areas.** AI is being used in creative ways to devise beneficial and impactful innovations, including in fields such as climate science, clean technology, and other urgent challenges.
- **Challenge: ethics.** Language models sometimes raises critical ethical and social issues (e.g., bias, factuality). This issue is a current focus in the field, and deserves a separate paper.
- **Challenge: documentation and contribution.** To avoid being an empty promise, AI needs to better document its own impact and challenges, while contributing to achieve SDGs.
- **Challenge: low visibility.** Despite major AI labs deploying AI at scale to the general public, AI sometimes lacks visibility.
- **Challenge: transparency.** Current AI discoveries must be made clear by researchers, the media, and related organizations. This clarity includes transparency (i.e. of datasets, training methodology, outcomes, and applications), as well as being easily explainable and understandable (i.e. articulated for the general public, not just for academic researchers).

Key policy recommendations

Derived from our findings, we want to recommend these ideas on future policy development for consideration:

- **Articulation.** SDG-related problems must be articulated and phrased so that they may be solved by AI. For example, "no poverty" can be rephrased as an opportunity to achieve equitable wealth distribution.
- **Prioritization.** It is highly likely that advanced AI can continue to be used in creative ways to devise beneficial and impactful innovations, including in fields such as climate science, clean technology, and other urgent challenges.
- **Watermarking.** Ensure that AI-generated content is clearly marked (or watermarked) in the early stages of AI development. This recommendation may become less relevant as AI is integrated with humanity more completely in the next few years.
- **Equitable distribution.** Ensure that the distribution of AI through all regions and socioeconomic groups is broadly equitable.
- **Sub-goals.** The United Nations should provide specific sub-goals for artificial intelligence to better translate the 17 SDGs in different fields of practice.
- **Alignment.** International guidelines, papers, conferences, and projects should encourage contributors to explain the alignment of their outcomes to the SDGs.
- **Stimulation.** Regarding need-driven and context-specific innovation, the United Nations and other governmental and intergovernmental organizations should consider stimulating public–private partnerships.

The opportunities and challenges (threats) presented are necessarily interlaced with peoples' hopes and fears, particularly due to the proliferation of pessimistic forecasts in media from the last few decades. But artificial intelligence is based on humanity and its documented cognitive outputs: AI is quite literally us. We now have the responsibility and power to call forth awakened intelligence, and to shape our own future.

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Acknowledgments

Appendix – Wise/White Mirror principles

1. WETOPIA IS FOR US, FOR ALL THINGS. PEOPLE, PLANET AND BEYOND.

WEtopia is in our being, so dance with it.

2. WE VALUE TIME FOR ALL & KNOW THE STORIES WRITTEN TODAY ARE THE POETRY FOR ETERNITY.

WE are immortalized by our stories we write today, poetically transcending eternity.

3. WE HAVE GRATITUDE FOR ALL.

aWEsome gratitude, appreciation & humility in our service.

4. WE POSSESS UNCONDITIONAL LOVE FOR ALL.

Compassionate love is your gift to those whose hearts you touch, make it your centre.

5. WE INCLUDE ALL.

You am I , I am You. A mantra of the ages.

6. WE LISTEN WITH EMPATHY TO ALL.

Let empathy be your wisdom.

7. WE LIVE & BREATHE IMAGINATION FOR ALL.

Deep breaths are invigorating. Stop now and breathe.

8. WE BELIEVE THERE IS ABUNDANCE FOR ALL.

In truth we discover abundance.

9. WE KNOW IT'S POSSIBLE FOR ALL.

Claim your mindset so as to make anything happen.

10. WE BRING ENERGY & SPIRITUALITY FOR ALL.

Unlimited is the universes' energy embodied within you, learn to recognize this, and retransmit as a beacon of light. This will elevate you.

11. WE SEE THE CULTURE BEING FOR ALL.

Diversity of culture is our saviour, as in White are all the colours combined.

12. WE ARE UNITED FOR ALL.

Unified action makes steel out of sticks.

13. WE TAKE ACTION FOR ALL.

This one is to give very special thanks to you, in loving embrace together, on your heart side, until you can feel our hearts beat as one.

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Source: https://wisemirror.org/