

The Unseen **Environmental Impacts** of the Unprecedented Growth and Integration of ***Artificial Intelligence (AI)*** in the Digital World

Research Dossier

Researcher: Fatima Llamzon

INFO 4620: Systems Thinking & Changemaking

This document includes: Positionality, Literature Review,
Subject Matter Expert Interviews, and Fieldwork

Table of Contents

3

Positionality

Positionality Statement 4

5

Literature Review

Literature Review 6

Summary of Themes 16

Master Reference List 18

19

Subject Matter Expert Interviews

Crystal Chokshi 20

Nilushi Kumarasinghe 24

Interview Insights 27

29

Fieldwork

Data Collection 30

Reflective Journals 34

Positionality

The exploration, interpretation, and communication of my research has been shaped by the intersections of my identity and experiences.

Researcher Positionality

As a researcher, I acknowledge the intersections of my identity that shape my perspective and impact how I engage with this research. As an undergraduate student in Information Design, I also acknowledge my privileged access to resources and strive to be aware of my own biases and recognize how they may shape my approaches in exploring the topic.

I am a 22-year-old Filipino Canadian woman living in Canada. The other intersections of my identity include: Canadian citizen, Filipino cultural background, CIS-gendered woman, visibly non-white, lower-middle class upbringing, post-secondary education, and my exposure to and education in technology—more specifically the technological advancements and education that I have had access to that have helped me make meaningful connections within my research.

Literature Review

Exploration of existing scholarship and literature including 14 peer reviewed articles, 2 reports, 1 non-scholarly article, and 1 policy document surrounding AI's environmental impact.

Trends in AI inference energy consumption: Beyond the performance-vs-parameter laws of deep learning

Desislavov, R., Martínez-Plumed, F., & Hernández-Orallo, J. (2023). Trends in AI inference energy consumption: Beyond the performance-vs-parameter laws of deep learning. *Sustainable Computing: Informatics and Systems*, 38. <https://doi.org/10.1016/j.suscom.2023.100857>

This article helped shape my understanding of the internal processing of Artificial Intelligence (AI) and how the energy costs of running internal processing models are connected to the rising trends in AI's energy consumption. It provides context to the causes and scale of current AI development and energy usage. They focus on the inference costs which count for most of the computing effort of running an AI model. Inference is the process of running data through AI to create or make a prediction for the user. Since inference processing is being constantly repeated, it accounts for up to 90% of the machine learning costs. The authors concluded that

energy consumption coming from inference is not growing exponentially fast because it's being somewhat compensated by factors that make the process more efficient, such as algorithmic improvements, hardware specialization, and hardware consumption efficiency. However, there is a steady rise in AI's energy consumption, but it could also be due to the increase of devices and users that use AI (external factors that are not focused on in this article).

Aligning artificial intelligence with climate change mitigation

Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, 12(6), 518–527. <https://doi.org/10.1038/s41558-022-01377-7>

Since this topic is relatively new and there is a lot more information and data that needs to be gathered and analyzed, these impact categories the authors came up with help organize the environmental impact of AI. For the computer-related impacts, they speak of the energy consumed by cloud and hyperscale data centers which accounts for 0.1-0.2% of global GHG emissions. Energy usage by these large scale data centers has increased 20% annually and is expected to continue, but energy efficiency improvements and renewable electricity procurement has played a role in limiting data center energy demand growth for large operations

like Facebook. For immediate impacts, the authors acknowledge the lack of data but talk about how different Machine Learning (ML) activities lower and increase GHG emissions at the same time. For system-level impacts, the article touches on rebound effects such as the influences of AI on consumer behaviour that incentivize actions that have their own carbon footprint. With the growth of AI, computed related environmental costs seem like they can be minimized, but with the immediate and system-level impacts are more detrimental for the environment. This article frames the breadth of impact AI has on the environment.

The carbon emissions of writing and illustrating are lower for AI than for humans

Tomlinson, B., Black, R. W., Patterson, D. J., & Torrance, A. W. (2024). The carbon emissions of writing and illustrating are lower for AI than for humans. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-54271-x>

This article touches on the efficiency increases resulting from AI usage and the future of AI integration in consideration of a sustainable future. The authors make an interesting comparison between the energy needed for AI to complete a task compared to a person, which illustrates that AI can be more efficient and touches on how many tasks may be automated in the future. To illustrate, AI generating a page of text or illustration compared to human writers or illustrators produces significantly less emissions. However, this does not include social impacts and rebound effects which could lead to further resource use and pollution. With the anticipation of the increased use of AI, the authors

speak about the disclosure of energy consumption across AI use cases and AI being able to perform well with lower emissions. This article makes me consider the need for more policies, data, and communication to users necessary for future practices regarding AI especially with its current and seemingly unregulated growth. However, I also see the possibility of how AI could be developed positively and make a minimal impact on the environment.

Generative AI and Social Media May Exacerbate the Climate Crisis

Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, 12(6), 518–527. <https://doi.org/10.1038/s41558-022-01377-7>

This article discusses the need to examine the indirect effects of social media and AI on addressing climate change. I think the critical perspective on social media and AI's highlights the lack of consideration and reflection on how it will impact socio-political progression. They mention the current need for large scale economic, environmental, social, and political transformation and the need to examine if social media and AI help facilitate that change or prevent it. They note that by seeing internet-enabled technology as a part of the solution instead of the problem can lead to growing dependence on AI and prevent a timely and ambitious

response to climate change. They also mention that there is a comparative lack of research between information and computer technologies (ICT) and its environmental impact. From the research I have conducted so far, AI has led to positive changes that help reduce carbon emissions, but there is a lack of data, consideration, and communication regarding the large-scale impact AI has on working towards achieving sustainable development goals (SDGs). There is a prioritization on growth and development of technology, but not on how it can be balanced with other systematic factors and rebound effects.

Rebound Effects and ICT: A Review of the Literature

Gossart, C. (2014). Rebound effects and ICT: A review of the literature. In *Advances in Intelligent Systems and Computing*, 310, 435–448. http://dx.doi.org/10.1007/978-3-319-09228-7_26

This article explores different types of rebound effects in regard to technology and the need for more general awareness of rebound effects. With the constant and large scale changes that align with the development of AI, the most detrimental but forgotten effects will likely be rebound effects. Rebound effects are the negative effects of efficiency policies and strategies that end up countering the environmental gains they had planned for. The article touches on three different types: direct, indirect, and economy-wide. Direct rebound effects could simply be lower costs leading to increased usage meaning more energy used. Indirect effects could mean lower costs leading to people to buy other commodities that

use energy. Economy-wide effects can mean lower energy costs and price reductions causing structural changes and production patterns and consumption habits. The key takeaway from this article was that in the future, efficiency strategies should not rely so heavily on technological advancement and it should always be accompanied by a strategy that examines that larger impact. It makes me consider the critical thinking and education needed to understand the large-scale impact of AI usage.

Stanford University's Artificial Intelligence Index Report 2024

Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., & Clark, J. (2024). *Artificial Intelligence Index Report 2024*, Institute for Human-Centered AI, Stanford University. 154-157. https://aiindex.stanford.edu/wp-content/uploads/2024/04/HAI_2024_AI-Index-Report.pdf

This section of Stanford University's AI index touches on the changing landscape of transparency and awareness of AI's environmental impact. It provides insight on what information is to be disclosed and what is available currently. Model developers have not been so transparent with the carbon footprint of their AI systems and the environmental costs associated with inference which accounts for most of the energy cost. There has been more openness to disclose such information but data is still insufficient. The emission data available varies widely because of factors such as model size, data cen-

ter energy efficiency, and the carbon intensity of electrical grids. I think this reading highlights why the environmental impacts of AI are so unseen and it is because of the challenge of the transparency and having the metrics to evaluate the impact. This ties in with the future development of policies and communication needed surrounding AI systems' environmental impact.

Artificial intelligence and consumer behavior: From predictive to generative AI

Hermann, E., & Puntoni, S. (2024). Artificial intelligence and consumer behavior: From predictive to generative AI. *Journal of Business Research*, 180. <https://doi.org/10.1016/j.jbusres.2024.114720>

This article examines the impact of AI on consumer behaviour discussing predictive AI relating to media algorithms and generative AI which relates to content creation. The increased penetration and AI usage and its influence on consumer behaviour, as seen in my previous research, are a couple of the more complex and difficult to measure factors that impact the environment. I wanted to get insight on consumer behaviour to support my understanding of how AI can be used as a marketing tactic and contribute to the larger systemic problems which impact the environment such as overconsumption. Algorithmic predictions can be based on consumers' demographic, preferences, past behaviour, and different

forms of online engagement. With algorithmic predictions being ingrained in many mainstream platforms, it makes advertising, decision making, and recommendations come more frequently and has the power to greatly influence the user. However, there are instances where users have experienced poor algorithmic predictions. In consideration of sustainable practices, the waste produced, and amount of carbon emissions that come from overproduction, AI's role in influencing consumer behaviour to consume more is strongly correlated with contributing to climate change.

Is artificial intelligence greening global supply chains? Exposing the political economy of environmental costs

Dauvergne, P. (2020). Is artificial intelligence greening global supply chains? Exposing the political economy of environmental costs. *Review of International Political Economy*, 29(3), 696–718. <https://doi.org/10.1080/09692290.2020.1814381>

This article examines the benefits and environmental costs of increased AI usage in global supply chains. From a business perspective, the authors expand on how the micro-level gains of using AI are not going to compare to the macro-level solutions needed to counter the negative environmental impact of global supply chains. It can even reinforce a narrative of corporate responsibility which prevents ethical and regulatory progression. Additionally, the savings from utilizing AI would likely be reinvested and result in expanding production and consumption. The rising power of AI

could also ramp up global production, accelerate consumerism, lead to the amplification of mining in places facing human rights issues, and growing levels of electronic waste in developing countries. However, they do acknowledge that AI can positively impact having more efficient and intelligent automations which improves environmental management. This article highlights how business motivations are still a main priority when it comes to advancing technology in supply chains, and claims of green AI practices can be instances of greenwashing.

The potential of generative AI for personalized persuasion at scale

Matz, S. C., Teeny, J. D., Vaid, S. S., Peters, H., Harari, G. M., & Cerf, M. (2024). The potential of generative AI for personalized persuasion at scale. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-53755-0>

This article provides insight on what increased AI could look like on the consumer end of things and consider how “personalized persuasion” offers potential for the greater societal good as well as the threats to humans. This is relevant to the challenge because on the other end of the development of AI technology are the people who are consuming it or receiving the products of it. The article explains that messages crafted by AI are significantly more persuasive than non-personalized messages, which is significant for marketing, politics, and activism due to the consideration of the user’s psychological profile. However, this can lead to over consumption and intensify current

individual, social and environmental issues. Interestingly, they mentioned the need for new regulations and policies that talk about regulation occurring at the point of deployment instead at the level of the message reception. It makes me consider the current state of regulations in place at the platform level and the communication or transparency on the user end. It provides insights on AI’s influence consumers and the tools and strategies that can help mitigate risks to consumer behaviour.

Sustainability of Large AI Models: Balancing Environmental and Social Impact with Technology and Regulations

Szarmes, P., & Élő, G. (2023). Sustainability of Large AI Models: Balancing Environmental and Social Impact with Technology and Regulations. *Chemical Engineering Transactions*, 107, 103–108. <https://doi.org/10.3303/CET23107018>

This article provides an overview of the technological, environmental, and social impact of AI development and dives deeper into the current and future state of how sustainable data centers consume resources. Parts of AI systems that consume the most energy are the training of the model, inference costs, data center energy consumption, and data center fresh water consumption. To illustrate, training Chat GPT-3 emitted emissions comparable to the lifespan of five cars, and US data centers in 2020 consumed over 2 million households worth of water. Using fresh drinking water sources is a concern for local populations facing concerns of

drinking water availability in water-stressed regions. To face some of these concerns, the authors mention the need for a regulations framework that implements a green standard, a transition for data centers to use renewable energy, and a transition to using non-potable water to cool data centers. I think this article provides good insights on the future changes and maintenance that could be done for data centers to become more green, especially with the increasing construction of data centers and computed power needed. It also illustrates data center resource consumption.

The downside of artificial intelligence (AI) in green choices: How AI recommender systems decrease green consumption

Wang, K., Lu, L., Fang, J., Xing, Y., Tong, Z., & Wang, L. (2023). The downside of artificial intelligence (AI) in green choices: How AI recommender systems decrease green consumption. *Managerial and Decision Economics*, 44(6), 3346–3353. <https://doi.org/10.1002/mde.3882>

This article shows an interesting perspective on AI recommender systems' influence on consumers purchasing more eco-friendly products or to make greener consumer choices. Considering AI has the potential to alter consumer behaviour, it is relevant to examine how it can change their perspective on making greener choices or reinforcing non-environmentally friendly practices. This study revealed that AI recommender systems compared to human recommender systems reduced consumers' intention to buy green products. The reasoning is that when facing a human recommender system, they are more concerned about their self-im-

age showing that they care for the environment. When AI, an inhuman entity, is influencing them to make greener decisions, it is much easier to dismiss and the environmental identity they want to display disappears. It is important to examine the social context of consumer behaviour when examining the impacts of AI on their decision making. This shows an interesting perspective on the impact AI has on the individual, especially in situations where ethical considerations are involved. Social and human influences seem to lead to more positive actions rather than AI influences.

The AI gambit: leveraging artificial intelligence to combat climate change—opportunities, challenges, and recommendations

Cowls, J., Tsamados, A., Taddeo, M., & Floridi, L. (2023). The AI gambit: leveraging artificial intelligence to combat climate change—opportunities, challenges, and recommendations. *AI & Society*, 38(1), 283–307. <https://doi.org/10.1007/s00146-021-01294-x>

This article provides insights and recommendations on how AI can both be optimized for technological advancements and minimize environmental impact. These recommendations are directed to EU policymakers and AI research stakeholders who would be able to implement effective governance over AI. The authors note that the AI carbon footprint isn't avoidable but that there are many areas in which it can help it be minimized, which is difficult with the rate AI is growing at. The recommendations are designed to encourage

stakeholders to assess existing opportunities and limitations, incentivise the creation of new and balanced infrastructures, and develop new approaches to maximise the potential of AI in consideration of climate change. I think the recommendations in this article are applicable to prevent the environmental impact of AI from getting a lot worse and provide a good framework on how to approach this challenge. It also provides context for which policies, strategies, and frameworks currently exist.

Climate Change and AI: Recommendations for Government Action

Global Partnership on AI in collaboration with Climate Change AI and the Centre for AI & Climate. (2021). Climate Change and AI: Recommendations for Government Action. Global Partnership on Artificial Intelligence. 17-51. <https://www.gpai.ai/projects/climate-change-and-ai.pdf>

This document includes an overview of AI's impact on the environment and recommendations for government action in regard to climate change and AI. They mention the need for responsible AI in the future which includes avoiding green-washing, techno-solutionism, and only applying AI to areas where it's needed. Some of the obstacles they mention in the responsible use of AI are the fact that the AI sector is moving quickly and creating policies for tech can be slow, many emissions

associated with AI are under scope 3 emissions which means they will not be prioritized, there's a lack of data on life-cycle impacts of AI, and the lack of focus on the indirect environmental impacts of AI. This report provided a great overview of the current situation in regard to AI's growth, policy making, obstacles, and what responsible AI looks like.

AI human impact: toward a model for ethical investing in AI-intensive companies

Brusseau, J. (2023). AI human impact: toward a model for ethical investing in AI-intensive companies. *Journal of Sustainable Finance & Investment*, 13(2), 1030–1057. <https://doi.org/10.1080/20430795.2021.1874212>

This article provides a general overview on how AI can both support and diminish our efforts towards reaching the SDGs. The authors discuss how AI and Environmental, Social, and Governance (ESG) investing are both developing, but are also growing farther apart. This highlights how developments in AI should be more balanced in regard to not only aiming for efficiency but how any progression aligns with a sustainable future. The authors argue that ESG

frameworks do not work well with companies that rely heavily on AI, but also acknowledge that AI can help push forward for many SDG targets as well as diminish sustainability. This illustrates the idea that the gap between technological advancements and achieving the SDGs is growing because of the issues that technological competition also fuel.

S.3732 - Artificial Intelligence Environmental Impacts Act of 2024

Bill S. 3732. (2024). Artificial Intelligence Environmental Impacts Act of 2024, United States Congress. <https://www.congress.gov/bill/118th-congress/senate-bill/3732/text/~:text=To%20require%20the%20Administrator%20of,the%20Director%20to%20develop%20a>

This bill was established in 2023 by the United States Senate which shows an example of a policy effort to monitor the environmental impact of AI at a federal level. The bill includes a voluntary reporting system for the reporting of the environmental impacts of AI and for other purposes. The Bill's findings included research that I have already touched on such as data center energy consumption, model training energy consumption, the positive and negative impacts on society and the environment, lack of data and transparency, electronic

waste concerns, and uncertain estimates of the environmental impact of AI. The reporting system includes how to calculate energy and water consumption, pollution, e-waste associated with AI models and hardware, and other positive and negative impacts determined by the director. This reporting system will then solicit comments from the public. This shows some of the initial efforts to regulate AI and the case-specific approaches that need to be implemented for policies to be effective.

The role of education and social policy in the development of responsible production and consumption in the AI economy

Atabekova, N. K., Dziedzic, V. A., Troyanskaya, M. A., & Matytsin, D. E. (2022). The role of education and social policy in the development of responsible production and consumption in the AI economy. *Frontiers in Environmental Science*, 10. <https://doi.org/10.3389/fenvs.2022.929193>

This article highlights the importance of education and social policy in the responsible production and consumption in the world of AI. Again, it is mentioned that AI can contribute to green innovations in which natural resource consumption and production waste are reduced, however the digital competitiveness of AI does not ensure greener practices and consideration. There is a lack of data on the topic, but the authors talk about how increasing accessibility to education and social policy on AI production and consumption can im-

prove the effectiveness of responsible AI usage. Additionally, the authors also acknowledge the education gap between developed and developing countries that will impact how social policies and education on responsible use are implemented. This article illustrates that education and communication would give users much more control and promote responsible AI practices if it was given to them.

On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?

Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021b, March). On the dangers of stochastic parrots. Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency. <http://dx.doi.org/10.1145/3442188.3445922>

This article explores global risks and how to mitigate them in regard to the growth of Language Models (LMs). The key insights gathered touch on environmental racism, environmental and financial costs, and the social limitations of the training data. Essentially, the environmental effects of developing LMs in the Global North are being felt in the Global South where developing countries are being hit the hardest. Additionally, the people that live in the Global South do not use or benefit from LMs because the data is not in their language and they do not have access to it. Since it's a tool to serve those who have the most privilege in society, the datasets overrepresent younger users

in developed countries which make it less welcoming to marginalized populations. Additionally, even if data centers or LMs used more renewable energy sources, it would still be taking away these sources that could be used elsewhere, countering its intended purpose. This article provides insights on both the environmental and social divides AI development facilitates at a global scale. It illustrates the idea that AI puts a small population in an even more privileged and advantageous position, and the rest of the world in an increasingly socially and environmentally destructive position.

Summary of Themes

Key insights on the environmental, societal, individual, and economic themes found in the literature review.

Environmental Impact & Resource Usage

An AI model's energy consumption comes from inference processing which accounts for up to 90% of Machine Learning (ML) energy costs and the energy intensive process of training the model. To illustrate, the training of Chat GPT-3 produced carbon emissions comparable to the lifespan of 5 cars (620,000 pounds of CO2) (Desislavov et al., 2023).

Energy usage from large scale data centers increases 20% annually. They currently account for 0.1-0.2% of GHG emissions and consume large amounts of energy and fresh water. US data centers alone in 2020 used over 2 million households worth of water (626×10⁹ L of water) (Kaack et al., 2022; Tomlinson, 2024; Szarmes & Élő, 2023).

Even with the shift of AI Models using more renewable energy sources and becoming more energy efficient, the increased energy demand and taking away renewable energy sources from other infrastructures outweighs any environmental benefit (Desislavov et al., 2023; Szarmes & Élő, 2023).

The development of Language Models (LMs) in the global North fuels the environmental effects felt in the global South where we find developing countries that do not have access to or benefit from these LMs (environmental racism). Other large-scale global effects of AI growth include accelerating consumerism, increased mining in developing countries, and growing levels of electronic waste (Dauvergne, 2020; Bender et al., 2021).

AI Policy & Educating Society

There is a lack of transparency from model developers and tech companies in regard to their AI systems' environmental cost. The lack of data makes it difficult to create policies and improve communication with users (van der Ven et al., 2024; Maslej et al., 2024).

Increased social policy and AI education can improve responsible AI usage from production to consumption. There is minimal communication to users in regard to AI permissions and access, AI's environmental impact, and responsible usage of AI (van der Ven et al., 2024; Brusseau, 2023).

The need to create and implement policies that push for responsible and sustainable AI is difficult due to AI's rapid development. Sustainable AI includes only applying AI to areas where it's needed, creating more balanced AI infrastructures, and avoiding greenwashing. (Matz et al., 2024; COWLS et al., 2023; GPAI, 2021).

AI's strategies and improvements created for efficiency usually have rebound effects. Rebound effects are the negative effects of efficiency strategies that end up countering the environmental gains they planned for. For example, making production patterns more efficient can actually lead to an increase in consumption and production (Gossart, 2014).

Influence on Consumer Action

The influence of AI on consumer behaviour can **incentivize actions that have their own carbon footprint**. With AI marketing, over saturation of advertisements, and increased exposure to personalized content, this can lead to **overconsumption and reduced consideration for the larger impact of their actions** (Tomlinson, 2024; Hermann & Puntoni, 2024).

There is a **risk in seeing AI or internet related technology as the solution** as the growing dependence on AI can prevent people's actions in response to climate change and other global issues. There is a lack of collective consideration on **how AI helps facilitate or prevent the global transformation needed** (van der Ven et al., 2024).

With AI algorithms being based on a user's psychological profile, AI **personalized messages are more persuasive** than non-personalized messages which is significant for **marketing, politics, and activism**. This can reinforce current individual, social, and environmental issues (Matz et al., 2024).

AI recommender systems compared to human recommender systems **reduced consumers' intention to buy green products**. This is due to the social context and social approval that influences the consumers decision making (Wang et al., 2023).

AI and Business Practices

AI's growth is largely due to the **prioritization of profit**, digital competitiveness, and increased efficiency through technology. This is **preventing sustainable AI practices** in which AI is being developed and implemented in consideration of existing global issues such as climate change (van der Ven et al., 2024; Brusseau, 2023).

There is a large **misconception that AI advancements help make business practices greener**. Due to rebound effects, efficiency does not result in reduced resource demand. This **reinforces a narrative of corporate responsibility** as AI advancements can lead to expanding production and consumption (Dauvergne, 2020).

There is a **need to encourage new approaches** to exploring the potential of AI in consideration of climate change. This could mean encouraging stakeholders to **assess the benefits and environmental costs** of AI integration, **incentivizing the creation of balanced infrastructures** and more (Cowls, 2023).

Master Reference List

- Atabekova, N. K., Dzedik, V. A., Troyanskaya, M. A., & Matytsin, D. E. (2022). The role of education and social policy in the development of responsible production and consumption in the AI economy. *Frontiers in Environmental Science*, 10. <https://doi.org/10.3389/fenvs.2022.929193>
- Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots. *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*. <http://dx.doi.org/10.1145/3442188.3445922>
- Bill S. 3732. (2024). Artificial Intelligence Environmental Impacts Act of 2024, United States Congress. <https://www.congress.gov/bills/118th-congress/senate-bill/3732/text/~:text=To%20require%20the%20Administrator%20of,the%20Director%20to%20develop%20a>
- Brusseau, J. (2023). AI human impact: toward a model for ethical investing in AI-intensive companies. *Journal of Sustainable Finance & Investment*, 13(2), 1030–1057. <https://doi.org/10.1080/20430795.2021.1874212>
- Cowls, J., Tsamados, A., Taddeo, M., & Floridi, L. (2023). The AI gambit: leveraging artificial intelligence to combat climate change—opportunities, challenges, and recommendations. *AI & Society*, 38(1), 283–307. <https://doi.org/10.1007/s00146-021-01294-x>
- Dauvergne, P. (2020). Is artificial intelligence greening global supply chains? Exposing the political economy of environmental costs. *Review of International Political Economy*, 29(3), 696–718. <https://doi.org/10.1080/09692290.2020.1814381>
- Desislavov, R., Martínez-Plumed, F., & Hernández-Orallo, J. (2023). Trends in AI inference energy consumption: Beyond the performance-vs-parameter laws of deep learning. *Sustainable Computing: Informatics and Systems*, 38. <https://doi.org/10.1016/j.suscom.2023.100857>
- Global Partnership on AI in collaboration with Climate Change AI and the Centre for AI & Climate. (2021). *Climate Change and AI: Recommendations for Government Action*. Global Partnership on Artificial Intelligence. 17–51. <https://www.gpai.ai/projects/climate-change-and-ai.pdf>
- Gossart, C. (2014). Rebound effects and ICT: A review of the literature. In *Advances in Intelligent Systems and Computing*, 310, 435–448. http://dx.doi.org/10.1007/978-3-319-09228-7_26
- Hermann, E., & Puntoni, S. (2024). Artificial intelligence and consumer behavior: From predictive to generative AI. *Journal of Business Research*, 180. <https://doi.org/10.1016/j.jbusres.2024.114720>
- Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, 12(6), 518–527. <https://doi.org/10.1038/s41558-022-01377-7>
- Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., & Clark, J. (2024). Artificial Intelligence Index Report 2024, Institute for Human-Centered AI, Stanford University. 154–157. https://aiindex.stanford.edu/wp-content/uploads/2024/04/HAI_2024_AI-Index-Report.pdf
- Matz, S. C., Teeny, J. D., Vaid, S. S., Peters, H., Harari, G. M., & Cerf, M. (2024). The potential of generative AI for personalized persuasion at scale. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-53755-0>
- Szarmes, P., & Élő, G. (2023). Sustainability of Large AI Models: Balancing Environmental and Social Impact with Technology and Regulations. *Chemical Engineering Transactions*, 107, 103–108. <https://doi.org/10.3303/CET23107018>
- Tomlinson, B., Black, R. W., Patterson, D. J., & Torrance, A. W. (2024). The carbon emissions of writing and illustrating are lower for AI than for humans. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-54271-x>
- van der Ven, H., Corry, D., Elnur, R., Provost, V. J., & Syukron, M. (2024). Generative AI and social media may exacerbate the climate crisis. *Global Environmental Politics*, 24(2), 9–18. https://doi.org/10.1162/glep_a_00747
- Wang, K., Lu, L., Fang, J., Xing, Y., Tong, Z., & Wang, L. (2023). The downside of artificial intelligence (AI) in green choices: How AI recommender systems decrease green consumption. *Managerial and Decision Economics*, 44(6), 3346–3353. <https://doi.org/10.1002/mde.3882>

Subject Matter Expert Interviews

Crystal Chokshi and Nilushi Kumarasinghe share their knowledge on the topic of risks associated with AI growth and what this entails for the environment, society, and future policies.

NOTE: These interview notes and transcripts have been edited for clarity.

Crystal Chokshi

Assistant Professor at Mount Royal University, Public Relations

KEY THEMES

Increasing Visibility

Disinformation

Reliance on Machines

Goal for Profit

AI Interference

Dehumanizing Relationships

AI Education

Environmental Racism

To start, could you tell me about some of the work you've done in regard to AI and communication?

So my background in AI and communication, it's very academic, and it's, as I was just saying a moment ago, it's rooted in environmental media studies, so looking at the entanglement between technologies, or specifically, artificial intelligence, with environmental factors like you were just talking about clearly, and my work has been to try to make that dimension of technology more visible. So my preoccupation is, how do we bring this to people's attention because it's invisible.

How has AI changed the way we communicate on a societal level, particularly in terms of speed, accuracy, and accessibility?

So about speed—what technology companies do really well is sell us a vision of life where things always have to go faster, even today. For example, I woke up to News This Morning about a former, I think—don't quote me on this former U of T professor who just won the Nobel Prize for Physics, given his work at Google on AI. And what he was quoted as saying in the news this morning was, like, AI is certainly going to be, you know, amazing for humanity in terms of productivity. And that is the hook that technology companies keep giving us, like, faster, faster, faster. But my question is always, why and do we want to keep going faster and toward what? Like, what are we moving faster toward? And so in terms of speed, that's how we're sold. These technologies, we can do everything faster, but very few people ask, like, what's on the other side of that? I wrote an article a long time ago

when AI—generative AI was just like coming onto the scene, about the fact that if we go faster, we just have to do more work. Yeah? Interesting, like, there's no there's no stoppage, there's no benefits to us. It just keeps going faster so we can work more.

It's not meant to help us. I meant these technologies and AI especially, are not emancipatory in any way. Like AI doesn't give us, especially with regard to communication, like, the promise of eventually having more rest or more helpful communication. Like, if I'm just going to put it super bluntly, AI and communication are about dehumanizing relationships between people faster. That's my stance.

So how has AI changed communication with regard to accuracy? I mean, you probably know this already, so I'll be telling you things that you know, but what scholarship has surfaced in the first few years of especially things like chat, gpts life, yeah, is that it, quote, unquote, hallucinates, right? It invents things. It invents references. It invents events. So it's not, it doesn't make a claim always to accuracy. And I know tech companies like open AI, and you know Google are working on this, but, but when, again, we're in this context of like, let's move faster.

Yeah, we have to be cognizant of the inaccurate inaccuracies that might end up in our work or our writing or our communication or our health programs or whatever else we're using AI to generate. So there's currently a problem with accuracy. There's no sort of, like, checks and balances or stop gaps in systems right now to sort of say, oh, wait a second, this is most likely going to contain an inaccuracy, right? So I'm thinking specifically like chatgpt. So there is, I guess the headline, there is AI, there are still problems with accuracy. And I'm talking specifically about generative AI, like the chatgpt of the world, or the Lexus of the world. Perfect.

Hallucination specifically means, like, the invention of things. More importantly, though, around accuracy, like, there's been a lot of wonderful scholarship done on the data sets that generative AI is trained on, which come largely from places like Reddit, right where there's like, a cisgender, heterosexual, largely male population and baked into the training data, like a bunch of racisms, sexism, misogyny, but transphobia, things like that. And so a lot of sort of early work done with tools like chatgpt, where people were just experimenting with the kind of prompts that they could give. It's like the system generates a

lot of racist, sexist, misogynist stuff as its output. So accuracy we have to be thinking about those dimensions of it. Yeah, it's trained on web content. And web content is notoriously, notoriously racist and sexist and misogynist, and so that, because that web content was used to train the system. The system is trained to output this kind of crap.

As AI becomes more embedded in communication, do you think there's a danger of losing human agency in decision-making processes?

Are we at risk of losing agency? You know? Like, yeah, I typically, might, typically think no, but I'm going to defer to again, I forget his name, professor at U of T who won the Nobel Prize. This morning, he left Google warning of existential threats posed by AI that we might lose agency, and we do have to be cognizant of that. So people who know more than me and are smarter than me are warning of those kinds of things. I mostly worry about the fact that we seem to care so little about interacting with other humans that we're willing to defer that to machines. That is not like a loss of agency problem. It's just a loss of humanity problem, I see,

yeah for sure, like our humanness, why would we want to give over communicating with each other to machines? Yeah, I don't understand.

Well, yeah, it's like the vision that that works for so I teach in public relations, trained in School of Communication Studies and in public relations like AI Gen AI is all the rage because it can help people write faster, market faster, quote, unquote, build relationships faster. But does it? Like I'm thinking, if I am the recipient of a newsletter from a company I'm interested in, do I like, can I swear? Do I give a shit at all about what's written if it was generated by a machine like, I want to be loyal to humans, interested in humans, connected with humans? Yeah, I don't want to just, it's like selling on steroids. It's just, how much faster can we sell things? Essentially the vision pursued by generative AI.

How can educational systems or governments ensure that people are prepared to critically engage with AI-enhanced communication tools?

Universities are increasingly pursuing what's called, like the neoliberal agenda, where we have a focus on

capitalism, a focus on getting students in jobs fast, versus a sort of a different model of Education, where we're concerned with students getting an education. One of the reasons why generative AI is so seductive to our current model of post secondary education is because it helps us or helps universities achieve these neo-liberal goals faster, essentially. So the current Government of Alberta takes funding away from programs that don't show sort of a like an immediate placement of students in jobs. The current government rewards entrepreneurialism and innovation and not critical thinking, and the current government funds universities that are aligned with it in terms of those politics.

What I'm getting at here is that right now, post secondary institutions in our political climate are incentivized to adopt technologies that don't necessarily serve the public good for citizens that like welfare, but serve this a particular vision of the future. Based on fast moving technology, the acceleration of things, productivity, efficiency, like think about all the things Calgary invests in. So what do we need to answer? To answer your question is a different political climate, but we also, we also need to just do what you're doing, which is

take a step back and say, What are these tools really accomplishing? For whose benefit?

If you, as a worker, you know, go into a job next year and you're told to use AI because it's going to make life better and faster and more productive for you, you will take a step back probably, and be like, how it, how is, you know, increased productivity and increased efficiency, like, actually going to benefit me. It just means I'm going to do more work faster for an organization to make them more profitable. So doing what you're doing, what you're doing, asking these questions, is the most important thing that universities can help students do, rather than just taking on board new technologies and accepting the major argument that tech companies then give us, which is, it's here, you might as well use it. The Globe and Mail has been full of headlines for the last year and a half to that end, it's here. We might as well use it. It's here, use it or fall behind. It's here, use it or become obsolete. And it takes a big will and a lot of resistance to question that and to know that's just an illusion. It doesn't have to be that way, but that argument is very compelling to a lot of people. So essentially, that was a very long essay answer to your question. Its universities have to

equip students with opportunities to question these technologies and to question where they're coming from. Yeah, and what are the motivations? It's all spoiler alert. It's all profit for companies like they don't care about anything else. They've invested billions of dollars in developing the generative AI they want. It's about profit. End of story.

Tech development doesn't usually come from citizens' needs, right? So some products come about that way, right? There's like a citizen's need, or there's some gap in the market, yeah, okay, we developed a car, yeah, right. A lot of tech development, like generative AI, doesn't come from need, it comes from the desire for profit, and then we invent the need. And there's a lot of uses to it that I can't speak toward. Like, I know that there's some uses of AI or for AI in, like, the health sector that I can't speak to in journalism, right? Or, or there's crime, like, prosecution of crime. Like, maybe there are some interesting, productive uses that it can be put to there. But again, when I've heard people in those industries talk about it's all about doing things faster, I'm thinking of my sister who works in the prosecution of white collar crime, and she's like, we can do things so much faster now, meanwhile, she's still working

18 hour days and suffering major health impacts of her job. Oh, my God. So just, it just, like, puts you on a different wheel. It doesn't actually benefit individuals or, like, the public good.

Well, yeah, it's like the vision that that works for so I teach in public relations, trained in School of Communication Studies and in public relations like AI Gen AI is all the rage because it can help people write faster, market faster, quote, unquote, build relationships faster. But does it? Like I'm thinking, if I am the recipient of a newsletter from a company I'm interested in, do I like, can I swear? Do I give a shit at all about what's written if it was generated by a machine like, I want to be loyal to humans, interested in humans, connected with humans? Yeah, I don't want to just, it's like selling on steroids. It's just, how much faster can we sell things? Essentially the vision pursued by generative AI.

In your research, have you observed any unseen or under-discussed impacts of AI on how communication affects democracy or governance?

I'm just thinking about the work of others, really, work done by others, right? And I'm thinking about electoral interference, uh, so like in the spring, Canada finally had to investigate claims of Chinese and Indian interference in our democratic processes and elections, and some of that interference looks like posts on social media platforms that can be carried out by bots, right? And that would be an instantiate like an instance of artificial intelligence use. So again, I can't speak super specifically to this, and it's not, it's not my work, but there is all I can say, I think is there is a lot of work up that with that, if you do ask somebody who's not me, they could speak a lot more eloquently about about that...Well, I'm guessing it's quite I'm guessing there's a lot going on right now in the United States with electoral interference, given how badly Trump wants to win the presidency, and given his alliance with the Russians, for instance, and the fact that the Russians have been known to interfere in American politics in the past. So I'm sure if you Googled, like, AI, Russian interference, American politics, you probably find a lot.

On like, a, like, a sort of individual, everyday life kind of basis, you probably noticed that when you input a query now into Google, it doesn't just yield

search results, but it yields sort of this, like little header box at the top of the search page that's trying to answer maybe additional questions you might have about your topic, and often that information is wrong. So if we sort of extrapolate that and think about like, let's say I input, like, who should I vote for? And AI or Gen AI is generating answers to that question, and we know that Google is a very biased advertising tool. Like, yeah, we can see how, even at that level, we can imagine, really quite easily, how AI could interfere on an everyday basis. What, like a stunt, will be a benign basis, right into our thoughts about what we should do in life and in democracy.

What long-term societal impacts do you foresee as AI continues to become integrated into everyday communication?

So given what we talked about earlier, AI's sort of baked in inaccuracies, given also that some people think about our conversation around democratic electoral interference, some people wield AI to spread misinformation. Well, disinformation, in that case, disinformation. In that case, disinformation, these two things taken together so people deploying it to

be disinformative, if that's a word and already it's having inaccuracies built into it, we are likely to encounter, at a societal level, more misinformation and disinformation than we even have been in the last few years, and that's quite scary for a few reasons. One is like, it's just going to continue to contribute to a breakdown in trust between people and institutions, for example, people in governments or or fellow citizens, right? So if you're reading your newspaper that says one disinformed thing, and I'm reading my other paper, this is another disinformed thing, like we are here, living in polarized political times, this, this could have an effect on that.

The other thing is, it's just sort of an exhaustion, yeah, because it's hard to figure out what is real and what isn't and what is true and what isn't, yeah, and that is hard. So there could be sort of just like a tuning out of a lot of news media or content. And I sort of, I sort of feel like I'm exaggerating a little bit here, but I guess my point is that it's going to make it even harder to figure out what's real and what isn't. And people who don't have a critical training like you're developing right now are most susceptible to that and least likely to have access or privilege to an education that would help. That's one societal problem. It's

like the further erosion of truth.

Another major problem, given where you started, like, the topic you began here is the environment and climate. So actually, I was just editing, I'm editing a book right now, and the chapter I was just editing today is on chatgpt and environments, the environmental impacts of it. So I'm sure you've heard these stats, but for instance, researchers have recently estimated that to train chat GPT would have required roughly 700,000 liters of fresh water, and would have required, like, roughly the same amount of or it would have output roughly the same amount of carbon as approximately 150 cars over one year, something like that, exact stats, If you need them. And that's just in training the thing then in running it called inference, like when you or I go to chatgpt and enter a prompt, and it does its thing that requires even more water and more electricity, and therefore more has more carbon output, and companies just want to keep growing these models, like growing and growing and growing these models.

So there's the water impact, there's carbon emissions, and there's actual landscapes. Because you mentioned data centers, yeah, when you came in

and all of this infrastructure requires data centers on land, often these data centers, as I'm sure you already know, are placed in places that are already resource scarce and divert fresh water, for instance, from communities, right? Yeah. So as we try to work to make society faster and more productive, we are deteriorating the planet more quickly and more efficiently, and in a group like an amazing article written by, I think they were mostly Americans, 2019, 2020, it's called on the danger of stochastic parrots. Can language models get too big?

They talk about the fact that the people in the Global North and really rich, privileged countries developing these technologies are doing so on the backs of people in the Global South, because that's where climate crisis, climate crisis is, impacts hit first. So we develop a whole bunch up here in Silicon Valley of technologies that privilege North Americans and Europeans. Meanwhile, like the Maldives, they are expected to be underwater in 50 years, right? Or climate crisis conditions hit people in the global south and poor countries more quickly. So a further disparity between global north and global South, more environmental racism, where we don't care about what happens to people in other parts of

the world, environmentally because we don't see those impacts. And that leads to, just like, a major pre-occupation, which is a degradation of our humanity. Why are we doing this? Oh, gosh, yeah, you can see where I sit. Yeah, it makes sense. I don't have a lot of love for generative AI, in terms of its being marketed to privileged people to make life better and faster. Yeah, I don't have a lot of love for that.

Nilushi Kumarasinghe

Research Associate at Sustainability in the Digital Age & Future Earth

KEY THEMES

Digital Sustainability Data Centers AI Solution Prioritization Data Ownership
Policy Making Transparency & Communication AI Policies Sustainable Energy

To start, could you tell me about some of the work you do?

So my background is environmental sciences and sustainability research. So my organization featured the SDA, and also I'm part of this organization called Codes, which is a very global coalition of actors who's advancing digital sustainability. So Codes made a really big pitch. We mobilized our community. We have a community of almost 1000 stakeholders everywhere in the world who're really interested in digital and sustainability, specifically the environment. So we really advocated for the environment to be considered in the Global Digital Compact. [The Global Digital Compact is one of those three agreements that was signed at the summit of the future, and it's almost, I would say, yeah, it is the first international

agreement or consensus that AI can have risks to the environment, to society. And it's kind of like a global call to all member states to start leveraging digital technologies in a sustainable way and for sustainability.] It was watered down to some extent, but there is still a principle on digital environmental sustainability, which is great, yeah. So, yeah, most of our work is really advocating that key messaging on the environment has to be considered, especially when we're talking about AI, then we're talking about data centers. We don't want to get lost in this dialog that's like, AI is great for climate. AI is the solution. That's not really the case.

I mean now, because everyone is talking about AI, we also just want to, I think the biggest issue is because everyone is so excited about AI, but no one really needs to pause and

like the problems, like the long term effects. To me when, like, I see posts of all these, like, Gen AI coming out tools, I'm very concerned, because we're just adding fake things to the internet and, yeah, and it's, it's very scary, but mindset around it as well that we really need to pause and think, do I really want to use chat, GPT to run this web search? You know, like simple things like that. I don't think people think about it. That's what we're trying to do, you know, like trying to tell people there is an environmental footprint. Actually I was on a call today. There was a webinar, and someone had a question for this speaker. The speaker was great. The question was, but if AI can solve climate, wouldn't it mitigate the emissions it's releasing now, which is a very problematic mindset, because AI is very broad, right? So I think, I think even on the AI and environment toolkit that we released, it's really important to know that not all AI solutions are climate solutions, and there's so many people who actually work, like climate scientists, who use AI, they are saying that how they use AI is like an application that can be run on a laptop. Yeah, it doesn't need, like, a huge data center. It's not that energy intensive. So it's really about like, what AI solutions should we be pursuing?

How do you see AI contributing to sustainable growth in various industries?

I think AI is being used in so many different ways, together with other applications, we have remote sensing and AI and remote sensing is supporting ecosystem monitoring and digital agriculture, like physician agriculture. So there are great examples of it. Obviously, I can also share with you this digital climate projects database. It showcases over 300 projects around the world, but it's not just AI and other tools that have been leveraged for specific sustainability efforts. Yeah, um, and AI is also supporting climate modeling all of these things. So there's lots of uses of AI for sustainability, even like buildings of efficiencies. You know, they're increasing energy efficiencies everywhere. So it's like I said, you know, they have great examples of AI, but we should be very cautious of over amplifying it to all AI.

What do you think are some key considerations like these industries should be aware of when implementing AI in trying to address environmental challenges?

I think I would go back to the toolkit where we had some of the recommendations already there. You know, we talk about doing cost benefit analysis to see whether the benefit of using AI outweighs the costs in each application. But like, I said, like, I don't think the AI applications being used for specific sustainability practices have that much of an impact.

So it's, I mean, speaking environmentally, there's a lot of other issues when you're using, especially in digital agriculture, about their ownership, big tech coming in and benefiting from farming information, etc. That's a different situation. But environmentally, I don't think those applications, or at least what I understand of them, have that much of an impact, okay, um, but again, with any digital solution that you're coming to, with this community, with any stakeholder like a huge issue is that often people come with a digital solution and try to apply to particular communities, organizations, it really should be co-designed from the bottom up, even asking them, do you want a digital solution to this problem is a really important question to ask.

Like, people don't understand technology, so you need to make sure that they understand how the tech is

being used, how your data is being used, how your data is being protected, etc. So I see there has to be communication from the get go.

Do you think this transparency and communication in regard to what it means to build a digital solution exists? Or is it being done well?

Um, no, but I think people are making their effort. Especially in—I know I have a colleague who's working with indigenous community representatives on how we can use AI to support nature based solutions in Canada, etc. So it's, I think one of the biggest issues about stakeholders and digital is really about data ownership, because I mean, there's this, like, very popular phrase, saying that data is the new oil. So it really can be extractive.

It has, yeah, it has a lot of negative impacts socially, when we're speaking, people can be exploited through digital technologies, and people are being exploited through digital technologies. I think now, like, even for like, things like I said, the Global Digital Compact coming out, it's there is a push, or at least an acknowledgment from member states, from many

actors around the world, saying that there is a risk of digital technologies, and there is a way to do it. So I think it starts with education and informing people that it is occurring. There's a better way of doing things. So I think there's a small movement towards okay, but yeah, again, depends on the AI application I see, yeah.

Would you say that one of the greatest obstacles is the communication of the effects of digital solutions?

I would say the effects of the digital solution, because, I mean, it's not really fair that we have, maybe, like Instagram, WhatsApp, posting an AI tool on those applications. That's being asked. I've tried many times together, but it's just, it's like, small additions that you might not notice. But why do I need this on my application? Like, I didn't ask for it. I feel like, yeah, those, even those things, you know, like, I don't know whether they had a consultation with WhatsApp users to be like, Hey, do you want AI, yeah, your tool? And I think people should know that generative AI is more energy consuming than doing a web search. You know?

I think it's, I think it's important, like the questions you're asking, you

know, what? How can we develop digital solutions for sustainability? But really, at this point, we also just as important are the sustainability of all digital solutions, sustainability of large language models, chatgpt, yes, the data centers that are being built. If you listen to the podcast, I recommend it as he does an amazing analysis of how much data, how many data centers are being built, and the secrecy behind data centers. It's very interesting.

I got from his podcast, like in Ireland, there's a there's a clip of a policymaker in Ireland who was speaking at the input podcast, and she says that 80% of their wind energy is going to support data centers. So that could literally support so many, like maybe even a city, but yeah, used to support a data center, and these are countries that need electricity for heating.

So yeah, even though organizations will say, yeah, they listen to me, use clean energy. But the idea right now is not to increase our energy demand. We need to reduce. We need to go negative. You know, it's not about cancelation. We have to reduce. And just because a data center is using clean energy, it doesn't mean that it's, it's still adding to increased energy demand, and I see a need to reduce

it. I don't think that them saying that they're going to use clean energy is a huge I mean, yeah, obviously it's better than using coal, but you're still adding to a significant amount of energy consumption.

And I think there was a case of a data center being built somewhere in Oregon, Dale. I remember the name of the city, but maybe Dallas, but I'm not sure. So they refuse to reveal how much water they use for a long time, like they actually paid the government to sue the newspaper that was asking these questions about water consumption, because there's so much secrecy around it, they don't want to reveal that information. And I know that Microsoft and maybe even Google, had gone on record saying that they can't meet their climate change goals anymore because of the growing demand for AI.

It's really problematic. But at the same time, the demand for data centers is going high and high, high and high and yeah, I think people need to just understand that when they're thinking of digital, it doesn't mean immaterial, material behind it, yeah, and, and the rate of these things are increasing. Policy just hasn't caught up.

In regard to policy, and policy making, it takes a longer time to create and implement them, would you say there's much policy on AI and how we use it? Especially in terms of the environment?

I think the EU is probably the most advanced they have. The EU AI act, I recommend, like, it was finalized. I don't know if I remember it was this year, last year, but I mean it, it's a great first step. And I know there is another, I forgot the name of it, but there was something else that came out from the States. But I think in terms of policy, the EU is quite advanced AI, and I know there's, there's so many governments frameworks around AI, ethics, etc, and even now, more and more environment, but it's not—it has to be mandatory for it to actually influence stakeholders and for that to happen, member states really need to start acknowledging the water use, the energy use of these data centers, etc.

So because I think that their number of data centers have tripled between like five years or something, and there's more to come. Yeah, there's lots of crazy statistics going around on LinkedIn, and you probably know

all those, but, yeah, it's, it's very scary, and countries just need to be better prepared.

In your opinion, thinking long term, how do you see things evolving in policy and how we think of digital solutions?

I think like, I hope member states will start at least putting restrictions on the particular uses of AI. That's kind of what the EU has started doing. They had prohibited the use of AI for certain applications because AI can be used for facial screening. I mean, there's there's, there's just the social bias behind AI is insane. There's so much behind that. But I just hope, I mean, personally, I hope there's going to be a cap on generative AI, or people just starting to regulate generative AI, because it's just so problematic, and I don't really see a direct benefit, and just really prioritizing AI for social challenges, for healthcare. You know, sure, I'm not just saying AI like, yeah, digital tech in general. I think we should just prioritize what AI solutions we're going to pursue, and they have to be oriented towards addressing a problem. Yes. Can't be like, we can't have the private sector just putting out all these tools and being like, yeah, we're not account-

able for how they're being used. You know, like, there's so many cases of chat, of generative AI, being used to produce inappropriate pictures of schoolgirls. And there was a case of someone in the EU, I think in the Netherlands, can't remember, but who committed suicide because he was having a chat with chatgpt. Oh my gosh. Them to kill themselves. So it's like, it's that. So I think, I think, yeah, alternative AI needs to be regulated to a large extent. Yes, that's just using the principles of sustainability. By putting an emphasis on using digital tech for sustainable growth that might help us refine the diverse applications out there.

Interview Insights

Key insights gathered from the interviews and discussions with Crystal Chokshi and Nilushi Kumarasinghe.

Crystal Chokshi

Crystal touches on the risks and costs of AI on human connection and the environment. She highlighted the importance of increasing visibility of these risks through communication and AI education.

Insight one

The goals surrounding the development of Generative AI center around profit. The increased efficiency and speed in work do not necessarily benefit the lives of people, but may reinforce unhealthy labour practices and more efficiently worsen climate change issues.

Insight two

An increased reliance on AI creates a disconnect between people and how they communicate with each other. There can lead to a larger concerns of a loss of agency, meaning a decrease in a person's capacity to act based on their own conscious, reflective, and creative thoughts.

Insight three

Generative AI and the inaccurate data it uses can lead to the increased usage of AI to spread disinformation. Deciphering which content is accurate may become more difficult and audiences who do not have knowledge on critically examining content are more susceptible to this.

Nilushi Kwumarsinghe

Nilushi provides context for the value of digital sustainability in regard to AI, obstacles in policy making, and the misconceptions of the environmental benefits of AI.

Insight one

Although AI can be and is used as a tool to address societal and environmental challenges, the low energy costs associated with their specific AI usage is very minimal compared to the larger negative impact of the private sector's maximization of AI. The sustainable use of AI entails prioritizing its use for addressing more urgent and important global challenges.

Insight two

Many policies regarding AI ethics, and governmental frameworks are being developed, but the obstacles that prevent these policies from being effective are the slow policy making processes and the optional nature of these policies. The lack of transparency in regard to data center water and energy usage are preventing these policies from being more concrete.

Insight three

There is an extreme lack of AI education and communication between tech companies and users. There are misconceptions of the environmental footprint of the digital world, the counterintuitiveness of AI innovation, and the dangers of data exploitation.

Fieldwork

Further exploration of the topic through data collection on my own experiences on AI exposure and its influences on my patterns and thought processes. The fieldwork includes data collection and reflective journal entries.

Data Collection

With AI's rapid growth and integration in the digital world, it can be seen across a variety of sectors and touches on the daily lives of those exposed to the internet. With its widespread integration into technology, it makes it difficult for us consumers to question what this large scale exposure and usage entails for society and an individual. It presents the questions, is AI necessary for all of its current applications? What purpose does it really serve for people? The goal of my fieldwork is to explore how prevalent AI is in my daily life and gain a deeper understanding of how much I benefit from the convenience of AI and how it influences my own negative behaviour.

In my fieldwork, I will be collecting data over the span of 7 days to examine my exposure to AI and its influence on my daily behaviour and thought processes, and present reflective journal entries of my experiences during this data collection.

Data Collection Plan

For the data collection of my AI exposure, I created a coding categories based on my knowledge and assumptions of how I would be consuming any AI related content within the time frame. My AI consumption almost exclusively comes from my mobile device and laptop, which is typical for me as a full-time university student. The categories I came up with to track my usage are also shaped around my digital habits. The categories include: content type, source, engagement, and emotion.

Content Type	Source	Engagement	Emotion
Advertisements	Streaming platforms	Passive/low	Negative
Reccomendations	Shopping	Moderate	Neutral
AI tools (GenAI)	Music	High	Positive
Curated playlists	Educational tools		
Other	Social media		

At the end of the data collection period, I will examine the patterns presented and pull insights that bring light to the personal value and harm of my AI exposure.

Limitations of Data Collection

During the week of data collection, I happened to be busy with school, work, and other commitments that had allowed me to be off my phone which reduced my normal exposure to the sources listed in the data collection such as social media, streaming platforms, and shopping.

For the instances where I was able to track my AI exposure, inputting data into the spreadsheet became difficult due to my own passive digital consumption. It was not practical for me to record each instance I saw a targeted advertisement on Instagram or monitor how much recommended content I was seeing. So I was most able to record the instances where I opened the app or website and encountered the advertisements I noticed and the recommended content present in the time between opening and closing that app.

For a more accurate data collection, having a system that would allow me the content type and source would result in a larger and more informative data set. There were likely many instances where I was exposed to AI that is not accounted for in my spreadsheet. The image displays a snapshot of my data collection spreadsheet.

	Content Type	Source	Engagement	Emotions	
	Advertisements	Streaming platforms	Passive/low	Negative	
	Recommended content	Shopping	Moderate	Neutral	
	AI tools (GenAI)	Music	High	Positive	
	Curated playlists	Educational Tools			
	Other	Social Media			
	Content Type	Source	Engagement	Emotions	Notes
October 1	Curated Playlists	Music	Moderate	Neutral	playlist wasn't hitting
October 1	GenAI	Social media	High	Positive	snapchat filters
October 1	Advertisements	Social media	Passive	Negative	Soap for hyper pigmentation
October 1	Recommended content	Social media	High	Positive	Instagram, doom scrolling
October 1	Recommended content	streaming platforms	High	Positive	good youtube recs but same as always, and procrast
October 1	Recommended content	Social media	High	Positive	Pinterest clothes
October 1	GenAI	shopping	High	Positive	travel, really helpful
October 1	GenAI	Educational tools	High	Positive	Helped me with homework
October 1	Recommended content	Streaming platforms	Moderate	Positive	
October 1	Advertisements	Social media	High	Positive	The time left thing
October 2	Recommended content	Social media	Moderate	Negative	Same three accounts
October 2	Advertisements	Social media	Passive	Negative	Gemüse add for sofa
October 2	Advertisements	Shopping	High	Positive	Shoes I liked
October 2	Advertisements	Social media	Moderate	Neutral	Random ad for lunchables
October 2	Curated Playlists	Music	moderate	Neutral	
October 2	Curated Playlists	Music	High	Positive	
October 2	Advertisements	Social media	Passive	Positive	jhene concert
October 2	Advertisements	Social media	Passive	Neutral	
October 2	Recommended content	Social media	Moderate	Neutral	
October 3	Curated Playlists	Music	Moderate	Negative	
October 3	Recommended content	Social media	High	Negative	my content is not diverse
October 3	Advertisements	Social media	Moderate	Neutral	wide variety of ads (random and targeted)
October 4	Curated Playlists	Music	Moderate	Negative	
October 4	Advertisements	Shopping	High	Negative	
October 4	Recommended content	Social media	Moderate	Negative	
October 4	Curated Playlists	Music	Passive	Neutral	
October 5	GenAI	Social media	Moderate	Neutral	
October 5	GenAI	Social media	High	Positive	
October 5	GenAI	Social media	High	Positive	
October 5	Recommended content	Shopping	High	Neutral	
October 5	GenAI	Social media	High	Positive	
October 5	Recommended content	Social media	High	Positive	doom scrolling
October 6	Recommended content	Social media	High	Positive	pinterest
October 6	Curated Playlists	Music	Passive	Negative	
October 6	Advertisements	Social media	Passive	Negative	stuff i dont need
October 6	Recommended content	Social media	High	Negative	getting same type of content
October 6	Recommended content	Shopping	High	Negative	not getting what i want
October 6	Recommended content	Social media	Passive	Neutral	
October 6	Curated Playlists	Music	High	Positive	spotify DJ
October 6	Recommended content	Shopping	High	Positive	best thing for the lowest price
October 6	Recommended content	Social media	Moderate	Neutral	
October 7	Curated Playlists	Music	High	Positive	
October 7	Recommended content	Social media	Moderate	Positive	some diversity
October 7	GenAI	Social media	Moderate	Neutral	
October 7	GenAI	Social media	Moderate	Neutral	
October 7	Curated Playlists	Music	High	Positive	

Data Collection Insights

Based on the data collection, I was able to gather insights which display the positive and negative influences of AI integration throughout the various sources I was exposed to within a week. The insights below are based on the data and data collection notes I gathered. Detailed notes of my experience during the data collection can be found under the Reflective Journal Entries.

Insight one

Most emotionally negative experiences present in the data collection are primarily from social media advertisements and recommended content. Advertisements sometimes consisted of beauty products which tried to highlight flaws of the consumer or tried to sell unnecessary products, which can fuel my poor purchasing and overconsumption patterns. The recommended content followed a similar theme of presenting society's beauty standards.

Insight two

There were many instances of short term positive feelings from recommended content and generative AI on streaming platforms and social media (Snapchat, Pinterest, and YouTube), however they also contribute to negative behaviour patterns such as procrastination and doomscrolling. The recommended content was not diverse and provided a very narrow scope of content.

Insight three

Instances where AI proved to be a positive influence on my daily life was when it made certain more time-consuming tasks more efficient. Tasks such as playlist creation, travel planning, and online shopping were more productive due to the integration of AI.

Coding Legend

Convenience and efficiency

The ways in which my interactions with AI were used or resulted in a more efficient and convenient experience, or seemed to create more obstacles.

Content variety and relevance

The quality and diversity of content presented to me based on my digital footprint and psychological footprint determined by AI algorithms.

Fueling negative consumption patterns

Experiences linked to short term gratification, poor purchasing habits, doom scrolling, and procrastination.

Reinforce harmful socio-cultural ideals

Consumption of content that reinforces toxic societal standards and fuels unhealthy thought patterns.

User control

The matters of choice, control, and customization of the content a consumer is exposed to on all platforms.

Reflective Journal Entries

Detailed journal entries reflecting on my experiences during the data collection on my AI exposure.

Day 1 to 3

From the initial tracking of the data, which has been a little difficult considering how passively I go on my phone. I'm finding that my experience has been pretty positive in the last 3 days due to the convenience it offers and how it makes content cater to my tastes. I listen to music a lot and since I haven't had time to look for new music or make new playlists, there are a lot of days in which I exclusively use an AI curated playlist while I do different things throughout the day—like driving, cleaning, getting ready, working out, or doing homework—there's a playlist for every vibe and genre I'm looking for.

For social media, this is where I run into advertisements and recommended content the most, and sometimes I'll use snapchat where some filters use generative AI. For advertisements on Instagram, I feel like there are some that are good and of interest to me, and sometimes they frustrate me and feed into consumption patterns I don't like. For the advertisements I like, it was for concerts of artists I enjoy, TimeLeft which I find interesting. On the negative signs of advertisements, one started off with "do you struggle with hyperpigmentation?" and proceeded to advertise soap products, or another ad for Temu furniture that was nice, but something I don't need. However, since it was appealing to me, I did consider it for a second, but I personally get the tiniest bit frustrated when I am influenced to consider buying something I don't need and wouldn't serve me in any way. Rarely, I would get random advertisements like a lunchables ad which is random, but I felt neutral towards it because I feel like even though the algorithm is trying to shape which content I receive, I do like diversity in my ads.

I would find recommended content on streaming platforms and social media. How this impacts me gets a little more complicated because on social media, more specifically Instagram reels, I would feel positively scrolling but it would impact me negatively because I would doom scroll to the point of procrastination and not doing other tasks, like homework or working out. Sometimes Instagram also shows me very limited content. There was one day where it

felt like I was only looking at reels from 3 different accounts which I thought was odd, the variety of my content suddenly declined and there was nothing I could do to change that. With YouTube, there's decent recommendations on my homepage, but again it's super limited and I don't know how to diversify my YouTube recommendations. It puts me in the cycle of only watching the same 5 types of content in a situation where I want to try something new. Pinterest on the other hand is almost always the best for recommended content. I think this is because over the years I've been saving items which has allowed my Pinterest homepage to be diverse and cater to my tastes at the same time. However, my pinterest is exclusively for aesthetic content and not for much else. The recommended content I saw on Streaming Platforms are kind of a mess because I share a Netflix and Prime Video account, so they were not catered so much to my tastes, but having others' preferences in there helps diversify what recommendations I get so I don't mind it.

For generative AI, which I rarely used in the last 3 days, I found it helpful and positive. There were only a few instances where I used it. One was a generative AI snapchat filter, another was using Chat-GPT to come up with a team name, and another was on Skyscanner to help me look for travel deals. For the travel deals and planning, it was super helpful and I will be using it in the future. It really helps save time and energy in looking on your own where things can become more costly. I was just looking for cheap flights to anywhere and it gave me so many options and ideas. For using Chat-GPT for making a team name, I think this saved some brain power and team names are kind of hard to come up with on the spot for me personally. And lastly Snapchat GenAi filters are really just for entertainment and it's not really useful but it is fun.

Day 4 to 7

These last few days have been pretty similar to the first few days. I was listening to music a lot more and I was finding that the curated playlists were getting repetitive and not really integrating too much new music or different genres. However, they were still better than my manually made playlists and song library. A highlight of curated playlists and AI on Spotify though has been the Spotify DJ. I used this in the last couple days and it was interesting with the DJ speaking in between “sets” but it did really give the best songs and the most diversity. I’m also realizing that tracking my own consumption is not that easy. Sometimes advertisements on social media look like regular recommended content because influencers are getting paid to promote products and it doesn’t initially look like an ad. Luckily I haven’t been going on my phone too often due to school, work, and being out so I don’t think I missed too many instances of AI consumption.

The times I do go on social media are sometimes for times as short as 5 minutes, sometimes they can be for over an hour. But because of my doom scrolling tendencies I feel like I notice when my recommended content on Instagram is repetitive and not diverse, but at the same time I use it less which is better because the content is getting boring for me. However, I’m not sure why certain content pops up when it does. For this week in particular, I was seeing a lot of reels on fashion week, going to the gym, makeup tutorials, and things of that nature. It made me wonder why I was seeing this and how this content has negatively affected me. Why am I being targeted for this content? Do I want to be targeted for this content to this extent? It’s almost as if my algorithm is trying to tell me something. Either way, I don’t really know how to change the content I receive.

In the last few days I have been using GenAI on social media, almost exclusively GenAI for Snapchat filters. There is no other purpose that these filters serve other than entertainment between friends and it’s not adding much positive or negative influence to my life, but it poses the question if these kinds of

GenAI features are necessary. Especially considering their lack of meaning and knowing how much energy they consume, it makes me consider if responsible and truly meaningful AI development exists in regard to individual consumption. My recommended content in the last few days has been to make things more convenient for me through shopping or finding the right thing to watch, but now I’m not too sure if this convenience is really necessary or valuable to me. I was able to shop and find movies before AI algorithms made them easy to find.

After monitoring my AI exposure this week, a part of me does really miss how much more organic content felt before large scale AI changes. Now everything feels like it’s catered to my most recent digital footprint and it feels more limiting even though it times it could be convenient and positive. For advertisements, it does feed into some of my negative shopping habits, but it also shows me things I would love to experience. At some point, it does feel like an unsettling balance act. AI touches many of my digital interactions and it’s becoming hard to distinguish its benefits and consequences.

