



ETHICS OF AI AND CLIMATE CHANGE

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Outline

- Learning outcomes
- Introduction
- AI for Climate Change Framing
- Attending to Power Dynamics in AI for Climate Change
- Ethics



Learning Outcomes

At the end of this presentation, the learner would be able to understand:

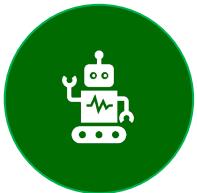
The different framings of AI and climate change crises

The power dynamics that shape the AI for climate discourse

The ethical perspectives of AI in relation to climate change



Introduction



AI has created profound impacts on multiple sectors and society.



The narrative of **technofixes** and **technosolutionism** must be **scrutinized** and **avoided**.



AI systems have both positive and negative impacts



Such ideological perspectives and approach to the interlink between AI, environment and society result from **unbalanced power dynamics**, which exacerbate **inequality** and exclude **communities in the margins**.



Concerns revolve around **ethics**, **equity/inclusivity**, and **justice**, both in AI design and deployment.



This presentation delves into the ethics of AI and **climate change**, highlighting power dynamics of AI deployment, how **AI and climate change** is framed, and **equity/justice** and the **ethical** considerations.

Climate Change Concepts

These include; **mitigation**, **adaptation**, and **equity/justice**.

In the previous lectures, the presenters have focused on the link between AI and;

- **Climate change mitigation** which focuses on reducing greenhouse gas emissions through methods like adopting renewable energy sources.
- **Climate Adaptation** involves strategies to cope with climate impacts, such as using AI for predictive modelling and optimizing resource management.
- **Climate equity and justice** ensure fair treatment and support for vulnerable communities in climate action. AI systems can promote equity by informing policy decisions but can also worsen inequalities if not implemented thoughtfully and inclusively.



Selected Sectors and their importance in Climate Change and AI

Agriculture:

- **Positive** - Increased efficiency, crop/resource management, precision agriculture, climate adaptation, through improved farm level decision making etc. This leads to improved food production, hence food security.
- **Adverse** - ethical & Data Privacy and value Concerns, job loss, environmental impacts etc

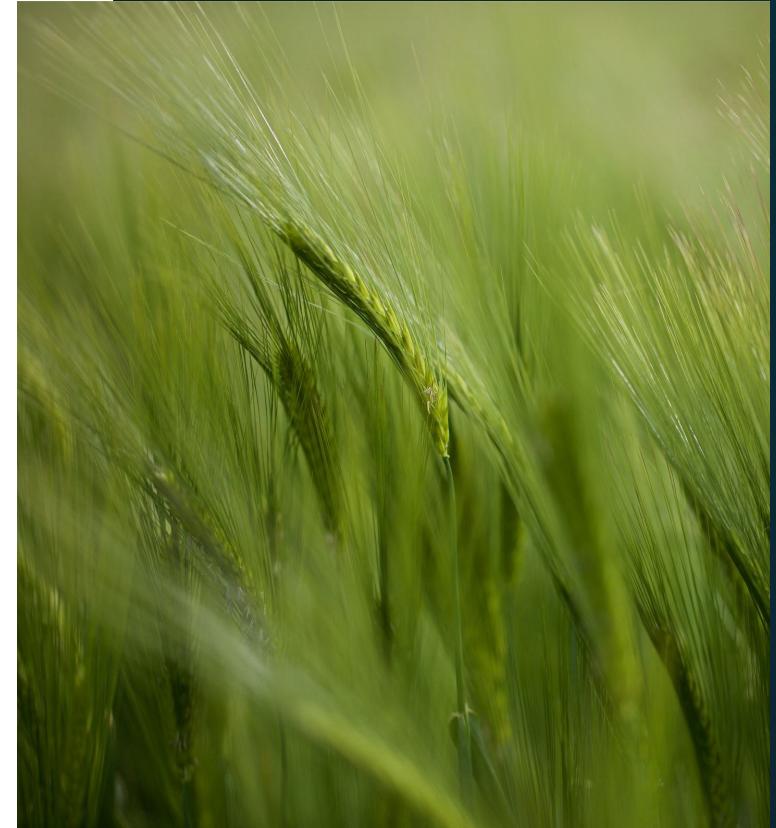
Environment:

- **Positive** – monitoring weather patterns, monitoring adverse weather events, monitoring deep sea activities, and forest fires, monitoring air quality. This also includes monitoring and protection of endangered species among others.
- **Negative** - environmental impacts from destruction of landscapes, exploitation of rare metals and production and disposal of AI hardware)

Energy and Water Resources:

- **Positive** – This includes but not limited to improving energy efficiency, leak detection, water purification systems and water quality management etc.
- **Negative** – High consumption of electricity which directly increases greenhouse gas emission. Copious consumption of water by data centres. This indirectly impacts energy and water access by different populations.

Socio-economic Impacts – economic polarization and induction of social inequalities for populations that are impacted by mineral exploitation and other adverse weather changes.



Climate Change and AI

- Climate change impacts are immense, ranging from **loss of lives**, loss of livelihoods, **economic losses**, **environmental degradation**, to general **destruction of human and natural infrastructure**.
- In 2018, **315 cases** of natural disasters were reported globally, affecting approximately **68.5 million people** and causing losses amounting to **\$131.7 billion**.
- **Infrastructure, health, food, water, human habitat, and ecosystem** remain vulnerable to climate change impacts.
- AI systems can address the impacts of climate change through:
 - Short and long-term climate change predictions
 - Expanding the understanding and combating climate change impacts
 - Enhancing environmental conservation efforts,
 - Optimizing resource management and energy consumption
- **However**, AI deployment raises myriad **ethical, societal, and environmental** issues. For instance, computation-intensive systems and training data contribute **significant greenhouse gas emissions and energy consumption**; AI industry generates **e-waste**, and the need for parts **threatens landscapes, host communities and natural ecosystems**.



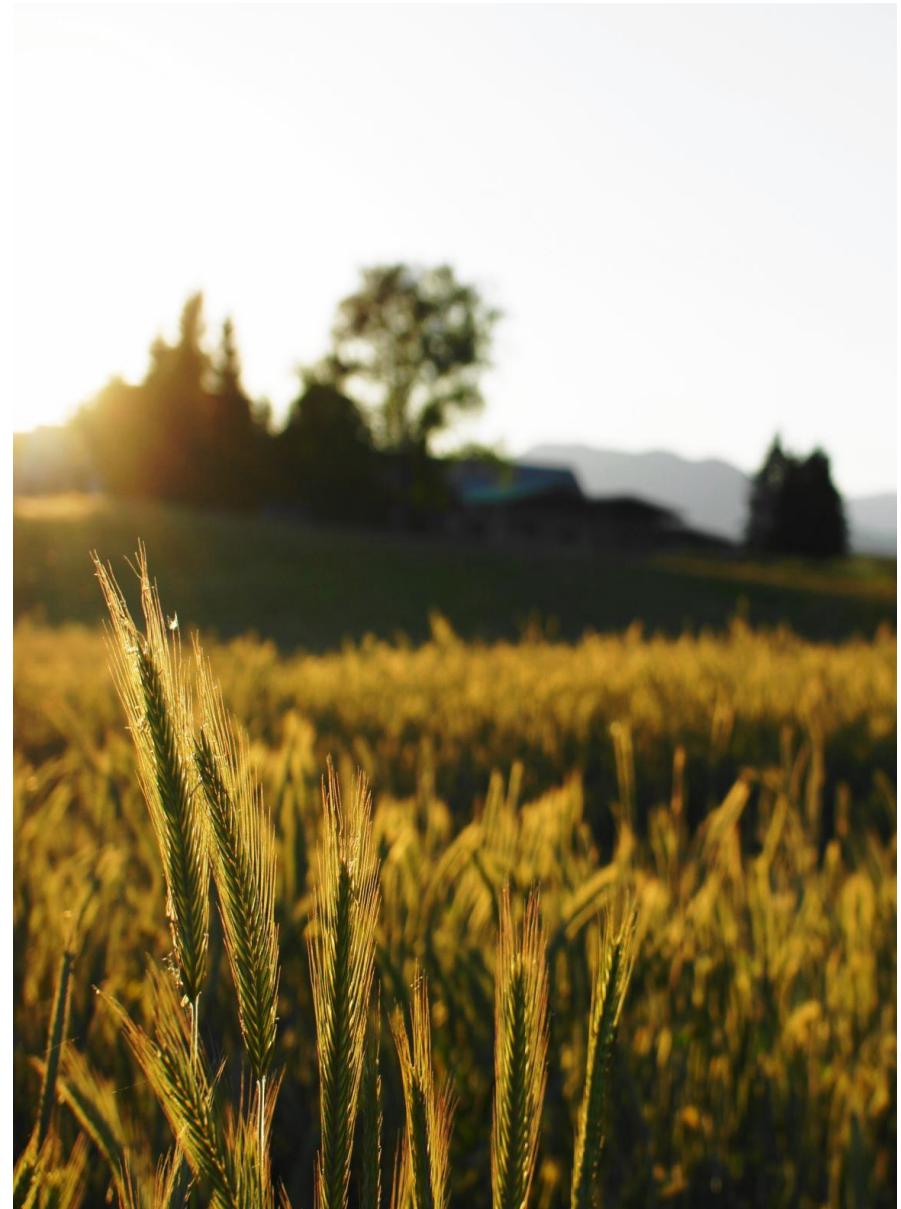
AI and Climate Framing Nuance

1. Framing Nuance

- How AI is being framed in the context of climate change
- **Positive framings**, such as the potential of AI to optimize energy use and agricultural productivity and enhance climate resilience.
- Inadequate emphasis on **Responsible AI** (including ethics, equity, and human rights).

2. Critical Perspectives on Framing of AI and Climate Change

- The environmental concerns vs negative framings, including **real environmental costs**, invisibilized by **technofix** and **techno-solutionism narratives**, with the **risk of greenwashing AI**.
- How might these framings propagate existing **inequalities** and undermine the efforts to address the underlying climate change and societal issues
- **Questions to address include;** What are the power dynamics in the deployment of AI and how do they shape existing inequalities; Who benefits from AI systems and who is adversely affected or marginalized; Are local communities meaningfully involved in the deployment of AI projects for climate change; and who ensures that they retain control over their data?



Power Dynamics in AI Deployment

1. Influence of Global Powers

- How do global tech companies and developed nations influence AI deployment.
- Technology dependency and data sovereignty.

2. Local vs. Global benefits

- Who benefits from AI technologies and who might be marginalized.
- Distribution of power and resources, and how it affects local communities.

3. Community Involvement

- The need to involve local communities in AI for climate change design and deployment



Ethical Considerations of AI in Climate Change



Ethical Drawbacks and Bias

Ethical drawbacks and biases in AI applications.
The importance of equity considerations in AI deployment.



Potential Side Effects and Unintended Consequences

The potential side effects and unintended consequences of AI in climate action.
The need for proactive mitigation strategies.



Ethical Frameworks and Guidelines

Existing ethical frameworks and guidelines for AI.
The importance of adhering to these guidelines to ensure responsible AI use.

Conclusion and Q&A

1. Summary of Key Points

- Recap the main points covered in the presentation.
- Reinforcing the importance of a critical approach to AI in climate change, considering framing, power dynamics, and ethical considerations.



References

- Akter, M. S. (2024). Harnessing Technology for Environmental Sustainability: Utilizing AI to Tackle Global Ecological Challenge. *Journal of Artificial Intelligence General science (JAIGS) ISSN: 3006-4023*, 2(1), 61-70.
- Arrieta, A. B., Díaz-Rodríguez, N., Del Ser, J., Bennetot, A., Tabik, S., Barbado, A., ... & Herrera, F. (2020). Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI. *Information fusion*, 58, 82-115.
- 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*, 1-25.
- Eke, D. O., Wakunuma, K., & Akintoye, S. (2023). Responsible AI in Africa: challenges and opportunities.
- Fawzy, S., Osman, A. I., Doran, J., & Rooney, D. W. (2020). Strategies for mitigation of climate change: a review. *Environmental Chemistry Letters*, 18, 2069-2094.
- Roche, C., Wall, P. J., & Lewis, D. (2023). Ethics and diversity in artificial intelligence policies, strategies and initiatives. *AI and Ethics*, 3(4), 1095-1115.
- Rutenberg, I., Gwagwa, A., & Omino, M. (2021). Use and impact of artificial intelligence on climate change adaptation in Africa. In *African Handbook of Climate Change Adaptation* (pp. 1107-1126). Cham: Springer International Publishing.
- Wang, P., Zhang, L. Y., Tzachor, A., Masanet, E., & Chen, W. Q. (2024). E-waste Challenges of Generative Artificial Intelligence.
- Whittlestone, J., & Clarke, S. (2022). AI challenges for society and ethics. In *The Oxford Handbook of AI Governance*. Oxford University Press.



THANK YOU

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