Artificial Intelligence, Businesses, and Climate Change

Introduction

With the rise of conversation surrounding the immense power and capability of AI technology, particularly as its uses have become more popular in recent years, the question of its relevance in the climate change matter has also surfaced as well. This is exemplified by the advent of the self-driving car, in that this AI-driven innovation not only provides ease of use and comfortability for the user, but also has environmentally friendly implications; in a World101 article titled, “How Can Artificial Intelligence Combat Climate Change,” it notes that experts estimate that self-driving cars have the potential to lower vehicle emissions by 50% by 2025 *(How Can Artificial Intelligence Combat Climate Change?, n.d.)*. As such, the potential for AI in securing a future by which human satisfaction and leisure do not necessarily come at the expense of environmental health appears on the horizon. However, this prospect in large part remains at the hands of large, influential businesses and companies who have the responsibility of choosing how to utilize this technology for sustainable business practices and products. Moreover, one has to consider the potential unintended consequences of AI that might counter any benefits it may have in combating climate change as well. A CBS article providing a general overview of AI regarding both its costs and benefits notes, “its own carbon footprint could be a problem” *(Chasan, 2023)*. With that in mind, this paper intends to examine both the benefits and possible consequences of AI technology in its relation to the climate crisis, as it pertains to the business context.

Benefits: More Sustainable Business Models & Practices

One of the most important ways in which AI can prove especially useful is its ability to create sustainable models for business activities, such that businesses are not faced with the same tradeoffs between profitability and environmental health that they may currently be grappling with. The very appeal of AI technology is that it provides many of the answers for us; it's design utilizes a dimension reduction approach to maximize both efficiency and sustainability when prompted *(Huntingford et al., 2019)*. So, one of the most obvious benefits of the technology lies in its ability to balance output, efficiency, and an ethically viable means of doing so. For example, A Penn State University project known as

“PlantVillage” that involves the development of an app for diagnosing plant diseases, demonstrates the extent to which AI can be used to improve agricultural practices through a relatively low cost, high yield solution that doesn’t require vast amounts of external resources, aside from just the mobile device the app is based on *(Goralski & Tan, 2020)*. In fact, this tool is expected to save farmers and related businesses from the reduction of crop yields by up to 40% that they’d otherwise lose due to plant diseases and local pests *(Goralski & Tan, 2020)*. Such transformations in agriculture demonstrates how it not only provides the knowledge to more easily root out issues affecting production through an extensive, globally accessible database, but also does so in a way that avoids depleting other natural resources through its ease of use. Another point raised by the article, “How AI Can Help Combat Climate Change,” illustrates its prevalence in transitioning closer to a carbon neutral economy. For instance, it can be used to assist in the design, creation, and planning of materials needed for establishing more sustainable manufacturing infrastructure, including windmill farms, the electrification of transportation, and smart electrical grids, in an equally cost effective manner *(Mastrola, 2023)*. A third example is presented in the food industry, where AI can fix a major problem plaguing the supply chain management: post-harvest loss and food waste. Managers can implement new sensor and communication technologies, providing the foundations for smart supply chain systems that monitor and forecast perishability of cargo and products *(Toniolo et al., 2020)*. Ultimately, this goes to show the ways in which AI can be relied on for improving management systems that minimize waste, carbon footprints, and resource depletion that are not only healthier for the environment but also work out feasible solutions to challenges related to output and efficiency. In this way, businesses are not faced with the same tradeoffs between environmental efficacy and private interests because AI-based solutions intend to further both, simultaneously.

Costs: The Potential Unintended Consequences

While the prospect of AI appears limitless in terms of its capacity for environmental protectionism, there are ways it can produce consequences that counteract this very purpose. In an article titled, “The Carbon Impact of Artificial Intelligence,” the work highlights the dual role played by AI technology, in that it can aid in the development of low-emission infrastructure on the one hand, while generating a large carbon cost on the other. For one, there’s an issue involved with the absence of a standard measurement quantifying the cost and resources used for building machine learning based systems, especially on larger scales as it becomes increasingly popular *(Dhar, 2020)*. The pursuit of businesses to utilize AI-based infrastructure is certainly noble, and one that consumers and governments should continue to urge them to adopt. However these uses need

to be kept in check by emissions calculators to measure the energy use and environmental impact of training such ML models, and further make adjustments depending on the efficiency of current GPUs *(Dhar, 2020)*. For example, the article also notes three factors affecting the production of an ML-based results that raise carbon footprint concerns: the cost of executing the model on a single example; the size of the training dataset; and the number of hyperparameter experiments, all of which increases the cost linearly for each quantity *(Dhar, 2020)*. Another critique against AI reliance is that it may in fact be too efficient in production and distribution, so much so that it can lead to widespread job displacement as a result. For example, the article by Goralski et al. cites the case in which Goldman Sachs went from six hundred human traders in 2000 to only two in 2017, due to the advancements and improvements made just by narrow AI *(Goralski & Tan, 2020)*. This can be especially troubling in developing countries with a weaker set of social protections against labor rights and unemployment *(Goralski & Tan, 2020)*. For this reason, another factor to consider within the widespread adoption of AI relates to its ability to counter income inequality and economic displacement.

Conclusion: Going Forward

Ultimately all of that being said, the future of AI lies in its ability to influence environmental governance going forward, as it can eliminate the information gaps and of course the emotional factor tied to challenges confronting implementation *(Nishant et al., 2020)*. With AI being able to remove the information asymmetries that create ambiguity surrounding the phenomenon, we can and should move forward as a society in using this technology to drive governance and decision making structures that align practices with environmental health. Companies should further be motivated by the fact that using AI in this way does not mean profitability will be compromised as a result, if nothing else. Certainly, as it has been shown, there remain potential, unintended drawbacks tied to its use. There is something to be said regarding its capacity to neutralize, and perhaps even outweigh the positives it offers when considering the carbon footprint and economic implications for instance. However, if we can learn to refine its production in terms of impact, and more importantly prioritize using the technology for preservation purposes, we can hopefully cancel out such negatives. Just as well, the nature of the technology and the outcomes it can produce depends on its mindful use, and the hands it's placed in.

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