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SUNAIN FATIMA
0312-6476617

Essay

AI Can Help to Build a MORE Resilient and Climate-Secure Future

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Artificial intelligence has potential to accelerate transition to clean energy, improve climate resilience, and ensure a secure future. By optimizing everything from energy system to agriculture, Artificial Intelligence can help us mitigate and adapt to climate change.

(GINA MacCarthy; Former EPA Administrator)

Climate change is one of the biggest challenges of 21st century. Climate change is the long-term change in the average weather patterns that define earth's regional and global climate. It includes average increase in earth's temperature as well as heavy rainfalls, frequent floods, earthquakes and tornadoes. There has been an increase in the intensity and frequency of natural disasters. It poses a threat to coastal population

as well as marine life. Climate change has intensified the economic burden on countries also. It has become important to address the issue and take important steps to deal with its hazardous effects. Artificial intelligence can be of significant help in this regard. AI can be helpful for creating a resilient and climate-secure future by using predictive modelling and helping in climate forecasting. It can be beneficial in achieving energy optimisation. Use of AI in agriculture will promote sustainable practices. It can help in forest conservation and preventing deforestation by providing real-time monitoring. Financial and ethical challenges must be considered, while implementing AI. Thus, AI through its different techniques can be of great help in mitigating and building resilience against climate changes, but

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challenges in implementing AI must be considered thoroughly.

Firstly, artificial intelligence models such as machine learning algorithms; valuable insights and patterns can be extracted from the historical data. These insights enable accurate predictions about future outcomes. So, artifical intelligence can be of great help in predictive modelling and climate forecasting, aiding in mitigation of climate change. IBM's Green Horizon Project is based on predictive modelling and helps in the environment protection by reducing the traffic emissions. This project is also being replicated by other countries like China to deal with the monsta. Thus, climate change mitigation can be achieved using artificial intelligence models.

In addition, artificial intelligence can be utilised for energy optimization using machine learning models, data collection and real-time optimization. Deepmind - a susidary of Alphabet - applied machine learning algorithms to reduce energy usage while maintaining performance. Deep mind reported that they achieved a reduction of upto forty percent in the energy used for cooling, using AI models. This not only lowered the operational costs but also contributed to sustainability efforts by reducing the carbon footprint of the data centers. The techniques developed can be applied to other industries where energy consumption is a concern such as manufacturing, transportation and building management. So, AI models can be used to reduce the carbon emissions by optimizing energy production. In the words of

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Sundar Pichai, CEO google :

"AI can be a powerful tool for addressing climate change. It can help new solutions for sustainable energy, reduce waste and create resilient infrastructure contributing to a more secure and sustainable future."

Moreover, usage of AI models in agriculture sector promote sustainable practices by reducing water consumption, assessing soil health, crop mapping, forecasting crop yields and identifying major risks. John Deere, a leading manufacturer of agricultural machinery, has been actively collaborating with AI research to enhance its products and services. The company is using AI to provide farmers with actionable insights to maximize yields, minimize resource use, develop autonomous

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machines, and make informed decisions about planting, fertilization, and harvesting. Hence, AI models usage in agricultural practices holds better prospects for future.

Furthermore, artificial intelligence can play a significant role in preventing deforestation and promoting forest conservation by providing real-time monitoring. The integration of AI with satellite imaging enhances the detection of subtle changes in forest canopy, which might be overlooked by the human eye, and enables the identification of deforestation patterns over time. Global Forest Watch uses satellite imagery combined with AI to track deforestation in real-time. The AI-powered track provides accurate data on forest cover loss and helps governments, NGOs and private companies to protect forests.

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The role of AI in environment protection can be demonstrated by the following words of the former executive secretary of UNFCCC, Christiana Figueres:

"Artificial intelligence, when harnessed responsibly, holds immense promise to help address climate change. It can empower governments, industries and communities to anticipate and respond to environmental risks creating a more resilient global system."

Adding on, artificial intelligence through predictive analytics, route optimization, waste bin monitoring scanning for dangerous items and helping manufacturers design better packaging and products, is playing a significant role in waste management. It helps (to opti:) in optimizing carbon capture process

and in its sequestration. Carbon Clear Solutions - an American company - uses AI to optimize its carbon capture process in real-time, making it more efficient. By capturing carbon dioxide emissions from the industrial plants and converting them into useful products such as chemicals or fuels. This system significantly reduces the amount of carbon dioxide released into the atmosphere. The captured carbon dioxide is used to create valuable products which promotes circular economy. The company has expanded the application of this AI-powered technology to multiple industries, helping reduce global industrial emissions. The use of AI for carbon capture and sequestration needs to be strengthened for a climate-secure future.

What is more crucial is the

role of AI in forming sound climate policies. Using artificial intelligence, accurate data can be processed and more efficient predictive models can be created. These predictive models can help in better climate forecasting, better risk analysis and sound policies can be formulated. The incorporation of technology, innovation and leadership is the need of hour for the betterment of the planet. As Banki-Moon, (former UN Secretary General, emphasizes:

> The future of our planet depends on the ability to combine technology, innovation and leadership. AI can drive solutions for a more resilient and sustainable climate by improving data analysis and fostering environmental action.

Artificial intelligence technology

can also be significant in the conservation of biodiversity and maintaining of the ecosystem. Biodiversity loss is one of the most serious impacts of climate change and pose a serious threat to the (~~maintena~~) ecosystem. The integration of AI with satellite imagery improves the efficiency of monitoring systems to detect illegal and unregulated hunting activities. Such an attempt has been done by Ocean Mind - a non-profit organization - uses AI to detect illegal, unreported and unregulated fishing by analyzing the satellite data and marine traffics. AI helps in identifying vessels that are operating illegally, which contributes to over-fishing and degradation of ecosystem. It is essential to realise the global level impact of using AI for the maintenance of ecosystem.

Elaborating further, AI models

can be used to plan urban cities with better resilience against the intensified and more frequent natural calamities. Smart grids can realise real-time monitoring and dispatching of solar power generation system through advanced sensor, communication and data analysis technology. In this way, smart grids can optimise energy consumption and must be enrolled in constructions of the buildings. Predictive analytics can also identify high-risk areas and times, allowing for targeted interventions to prevent accidents. It can also help in reducing congestion leading to lower vehicle emissions improved air quality and reduced green house gases emission. Beijing Urban City Model is based on usage of AI models to optimise energy consumption, reduce vehicular emissions and construct resilient-buildings against

natural disasters.

Although, AI models hold multi-faceted prospects regarding mitigation and creation of resilience against climate change, some challenges must be thoroughly considered which one might face during implementation of these AI models.

Firstly, it is not easy to implement these models considering the financial restrains. Secondly, artificial intelligence technology pose a serious threat to data privacy and increases the risks for data leakage. Thirdly, idea of implementing artificial intelligence into multiple sectors is one thing, but it is not backed up by broad-spectrum research and practical implementation. There is a dire need of strengthened collaboration between AI developers and climate scientists to bring the dream into reality. Lastly, Global

North and Global south should also join hand in {adopting} AI techniques in the mitigation of the climate change.

In short, artificial intelligence is the present and future. It is a ray of hope. When harnessed properly, artificial intelligence holds broad-spectrum advantages in the fight against climate change. Artificial intelligence techniques can play the promising role in the conservation of biodiversity and preventing the degradation of ecosystem. AI can help in better policy making regarding climate by {providing} analysing thousand-folds data and accurate predictive modelling. AI will improve circular economy, reduce carbon foot-prints and help in solid waste management. Its prospect in forest conservation

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can not be neglected too. For implementing AI techniques, it is pertinent to counter the challenges in its implementation. Issues of data breech, financial constraints and lack of collaboration must be countered in the nick of time to get maximum advantage of artificial intelligence in building resilience and mitigating climate change.

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