

TACKLING OF ENVIRONMENT BY ARTIFICIAL INTELLIGENCE

Abstract

Artificial intelligence is revolutionizing our approach to tackling environmental challenges. Through initiatives like the Environment Situation Room and the International Methane Emissions Observatory (IMEO), AI is being leveraged to monitor air quality, measure carbon footprints, and track environmental indicators in real-time. By collecting and analyzing data, AI enables us to reduce technology industry emissions, improve energy efficiency, and implement wildlife conservation efforts more effectively.

Moreover, AI facilitates the reduction of ICT emissions and ensures justice for the environment and human rights by providing insights into environmental impacts and holding accountable those responsible for environmental degradation. With AI, we have the tools to measure environmental footprints accurately and address pressing global concerns. The innovative use of technology like AI presents an opportunity to make significant strides in protecting our planet and creating a sustainable future.

Keywords: Artificial intelligence, environmental, degradation, footprints, sustainable.

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I. INTRODUCTION

The system or devices that can carry out tasks that traditionally require human intelligence are known as artificial intelligence, or AI. They differ from robots that can be trained to carry out a specific task or tasks. This is due to the fact that AI may gradually learn to improve itself by processing the knowledge it has gathered and using it to shape its decisions or actions in the future.

According to David Jensen, coordinator of the United Nations Environment Program's (UNEP) Digital Transformation sub-programme, artificial intelligence (AI) refers to systems or machines that can iteratively improve themselves over time based on the information they gather while performing tasks that ordinarily require human intelligence.

II. REAL-TIME ANALYSIS'S RECOMMENDATIONS

One instance of how AI is being used to assess complex, varied datasets is the World Environment Situation Room (WESR), a digital platform created by UNEP and scheduled to launch in 2022.

"WESR is being developed to become a user-friendly, demand-driven platform that leverages data into government offices, classrooms, mayor's offices, and boardrooms," asserts Jensen. He says, "In order to inform decisions and advance transparency, we need credible, trustworthy, and unbiased data. "WESR offers that.

We want WESR to someday look like a planet-sized mission control center where all of our key environmental indicators can be continuously tracked to inform our decisions.

III. MONITORING METHANE EMISSIONS

One of the UNEP-led initiatives in the WESR digital ecosystem, the International Methane Emissions Observatory (IMEO), employs AI to transform the way methane emissions are monitored and managed.

"IMEO's technology enables us to collect and integrate a variety of empirically verified methane emissions data streams to create a global public record of methane emissions at an unmatched level of accuracy and granularity,"

Reliable data-driven action will play a significant part in achieving these reductions. "Reducing methane emissions from the energy sector is one of the fastest, most practical, and economical ways to limit the effects of climate change,"

IV. MONITORING AIR QUALITY IN THE AIR

With the help of these platforms, the public and commercial sectors may use data and digital technology to expedite global environmental action and radically alter how business is done.

In the end, they are capable of bringing about systemic change at a speed and scale never before seen.

V. ENVIRONMENTAL FOOTPRINT MEASUREMENTS

It can calculate a product's footprint across its entire lifecycle and supply chain, enabling businesses and consumers to make the most informed and effective decisions. "AI will be fundamental in this area," says the author. On e-commerce platforms, this kind of data is required for long-term digital nudging.

VI. ICT EMISSIONS REDUCTION

Data centers use a lot of water for cooling, and the ICT sector is responsible for 3-4% of emissions. One method for reducing this footprint is the CODES Action Plan for a Sustainable Planet in the Digital Age, a project that sprang out of the UN Secretary General's Roadmap for Digital Cooperation.

However, only 17.4% of e-waste is now recycled and disposed of in an eco-friendly manner, which is a major worry. According to the UN Global E-waste Monitor report, by 2030, there will be around 75 million metric tons of e-waste.

Justice for the Environment and Human Rights

The burdens of pollution and contamination are frequently disproportionately placed on vulnerable communities. The scarcity of information about the state of both human and environmental health has historically made the effects difficult to understand. With the advent of remote sensing methods for measuring the quality of the air and water as well as the quick growth of ground-based sensor networks, this is now changing. Slavery in the fish industry serves as an example of how human rights violations can be closely related to the utilization of natural resources. There are issues with environmental justice and violations of human rights in the mining, agricultural, and industrial sectors of the extractive industries. In order to address these challenges, new techniques that can track, for instance, lighting patterns linked to problems like human trafficking/slavery, illegal harvesting, and harm to the environment. By monitoring the environmental impact of activities and meaningfully tying it to human outcomes, AI could play a significant role in the development, adoption, and enforcement of environmental laws, regulations, and policies.

These are a few of the Applications

- **Reducing Technology Industry Emissions:** While scientists are always working to develop novel and cutting-edge technology to lessen the effects of climate change. Even the technologies and software itself release some greenhouse emissions. The IT sector produces and assembles these technologies, which accounts for 3-4% of global emissions. This is where artificial intelligence (AI) may help by calculating those emissions.
- **Real Time Data Collection and Analysis:** In 2022, UNEP opened the world environment situation room, which gathered information by watching the globe and the events that are happening on it in real time. Additionally, satellites regularly track the world's greenhouse gas emissions using AI technology.

- **Measuring Carbon Footprints:** AI may be used to calculate the environmental footprints of certain products or human activities by feeding it relevant information. It gathers all the data from the beginning to the end of supply chains and life cycles, assisting businesses, customers, and industries in being more responsible for their activities.
- **Wildlife Conservation:** It can assist in determining the locations of flora and fauna species, places where they are commonly spotted, their social groups, and abundance. All of these details can help us learn about the migratory patterns of these species, as well as any alterations to their behaviour or breeding habits.
- **Monitoring Environmental Indicators:** The environment can jointly benefit from its use to monitor pollution and several other environmental health indicators. For example, the data gathered from numerous pollution monitoring devices can be combined and input into AI software that can offer precise measurements and effective decision-making tools for lowering the pollution.
- **Improving Energy Efficiency:** AI is capable of managing, computing, and optimizing energy output and generation in the power grid. Additionally, it has the capacity to enhance energy storage and can manage any variations in power voltage.

Recently, AI has become a technology that has the potential to significantly alter our lives. Additionally, it is actively employed to combat climate change and save the environment. Self-driving or "smart" cars that can navigate themselves are a few examples.

By figuring out the best path for each car that would also avoid congestion and traffic jams, they can be changed to produce 50% fewer emissions by 2050. Traffic congestion produces a substantial amount of pollution because cars frequently leave their engines running while they wait for the signal to change. Significant emissions are produced into the atmosphere as a result.

Additionally, AI can be applied to agriculture, as demonstrated by the case of India, where farmers have witnessed a 30% boost in yields. Low harvests were produced in several places. Since many years, it has been assumed to be a result of numerous droughts.

They were able to achieve this result thanks to AI's provision of them with adequate and accurate measures for the soil fertility, weather pattern, water quality, and the period suitable for growing their crops.

As a result, AI is a great promise for both scientists and the general public because it can be used to lessen the effects of climate change.

It's an important time for artificial intelligence (AI), to put it simply. An open source community for tools that lower entry barriers for both industry and start-ups is coming together with big data, technological improvements, freshly developing potent AI algorithms, and other factors.

As a result, AI is being incorporated into more and more aspects of our daily life, including internet services, ride-sharing, energy networks, and city navigation.

2018 has seen a widespread acceptance of AI's economic advantages. Technology is being added to more and more things every year, and as it becomes smarter and more advanced, it accelerates human innovation. But as AI develops in power, autonomy, and range of uses and consequences, the issue of AI safety becomes more and more significant. Risks include bias, poor judgment, lack of transparency, job losses, and malevolent use of AI, including the development of autonomous weapons.

However, the difficulty extends beyond assuring "Earth friendly AI" to guiding "human friendly AI".

We now have the possibility to investigate how conventional sectors and systems may be transformed to address climate change, provide food and water security, construct sustainable cities, and safeguard biodiversity and human wellness. This is crucial as the scope and severity of the negative effects of our declining natural environment on the economy and human health expand. In a recent Forum-PwC research that was unveiled at Davos this year, we emphasize the enormous potential to harness AI for the Earth. Here are eight "game-changing" AI applications for solving the issues the world is facing:

1. Electric Automobiles that are Connected and Autonomous

Over the following years and decades, the transition to on-demand mobility will be made possible by AI-guided autonomous vehicles (AVs).

Significant greenhouse gas reductions for urban transportation can be achieved by route and traffic planning, eco-driving algorithms, programmed "platooning" of cars to traffic, and autonomous ride-sharing systems. Fleets of electric AVs are needed to realize considerable improvements.

2. Distributed Energy Grids

AI may aid with the integration and dependability of renewable energy sources, enhance energy storage, efficiency, and load control, enable dynamic pricing and trading, and promote market incentives. Additionally, it can improve a distributed grid's ability to estimate demand and supply for renewable energy.

3. Intelligent Food and Agricultural Systems

AI-augmented agriculture uses automated data gathering, decision-making, and remedial measures via robotics to enable early diagnosis of crop diseases and concerns, to deliver timely nutrition to livestock, and generally to optimize agricultural inputs and returns depending on supply and demand. By using less water, fertilizer, and pesticides—all of which damage important ecosystems—agriculture might become more resource-efficient and become more resilient to climate extremes.

4. Next Generation Weather and Climate Prediction

Artificial intelligence (AI) is radically changing weather forecasting, and a new field called "Climate Informatics" is emerging to better understand the impacts of climate change. Deep-learning networks have the ability to significantly speed up computations and include more complexity from "real-world" systems, which is something that this industry typically expects of high performance, energy-intensive computing.

Home computers will be as powerful as supercomputers in just over ten years thanks to breakthroughs in processing power and artificial intelligence, which will cut the cost of research, increase scientific productivity, and speed up discoveries. AI methods may also be used to model impacts, predict extreme events, and extract the most pertinent data in order to prevent data deterioration.

5. Smart Disaster Response

AI can assess simulations and real-time data of meteorological events and disasters in a region to detect gaps in disaster preparation, provide early warning, and prioritize action. This is done through synchronizing emergency information capabilities. Deep reinforcement learning may one day be used in disaster simulations to select the optimal response strategies, similar to how AI is now being used to select moves in games like AlphaGo.

6. AI-designed Intelligent, Connected and Liveable Cities

AI could be used to mimic and automate the creation of zoning laws, construction ordinances, and floodplains in conjunction with augmented and virtual reality (AR and VR). To maximize urban sustainability, a "urban dashboard" might be developed combining real-time citywide data on energy use, water availability and consumption, traffic patterns, population movements, and weather.

7. A Transparent Digital Earth

A real-time, open API, AI-infused, digital geographic dashboard for the entire world would enable the monitoring, modelling, and management of environmental systems at a scale and speed never previously achievable. In addition to addressing air pollution, natural disaster preparedness, and intelligent agriculture, this would also handle illicit deforestation, water extraction, fishing, and poaching.

8. Learning Reinforcement for Advancements in Earth Sciences

This emerging AI method, which learns from itself and is similar to evolution in that it takes no input data and little processing resources, may soon advance to the point where it may be used to solve practical issues in the natural sciences. Finding systems from disciplines like biology, materials science, and climate science that can be codified to employ reinforcement learning for research advancement and discoveries requires collaboration with Earth scientists. For instance, co-founder of Deep Mind Demis Hassabis has proposed using an ancestor of AlphaGo Zero to search for a hypothetical substance dubbed a room temperature superconductor, which would enable incredibly efficient energy systems.

CONCLUSION

These are dynamic times. It is now possible to address some of the most pressing global concerns because to innovative technology like AI. It's time to use AI to benefit the world.