



ROLE OF ARTIFICIAL INTELLIGENCE IN ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT:

Artificial Intelligence (also known as AI) is considered to be the biggest game-changer in the global economy. With its gradual increase in scope and application, it is estimated that by 2030, AI will contribute up to 15.7 trillion of the global economy which is more than the current output of China and India combined. India outputs around a million engineers every financial year, 20% of whom are jobless. AI has grown so much that it can place a jobless engineer in an industry-based company, if he has done an artificial intelligence course.

Keywords: Artificial Intelligence, Microsoft, Google, Tesla, Economy, Environment.

INTRODUCTION:

In recent years, the environmental issues have triggered debates, discussions, awareness programs and public outrage that have catapulted interest in new technologies, such as Artificial Intelligence. Artificial Intelligence finds application in a wide array of environmental sectors, including natural resource conservation, wildlife protection, energy management, clean energy, waste management, pollution control and agriculture.

The UN Artificial Intelligence Summit held in Geneva (2017) identified that AI has the potential to accelerate progress towards a dignified life, in peace and prosperity, for all people and have suggested to refocus the use of this technology, that is responsible for self-driving cars and voice/face recognition smart phones, on sustainable development and

assisting global efforts to eliminate poverty and hunger, and to protect the environment and conserve natural resources.

AI Applications in Environmental Sector

Many organizations like *Microsoft, Google and Tesla*, whilst pushing the boundaries for human innovations, have made considerable efforts in developing 'Earth

Friendly' AI systems. For instance, Google's very own *DeepMind* AI has helped the organization to curb their data center energy usage by 40 percent making them more energy efficient and reducing overall GHG emissions. As data centers alone consume 3 percent of global energy each year, development of such AI's not only improve the energy efficiency but also assist in providing energy access to remote communities, setting up microgrids and integrating renewable energy resources.

Installation of smart grids in cities can utilize artificial intelligence techniques to regulate and control parts of neighborhood power grid to deliver exactly the amount of electricity needed, or requested from its dependents, against the use of conventional power grids

that can be wasteful due to unplanned power distribution.

With AI-driven autonomous vehicles waiting to break into the automobile market, techniques like route optimization, eco-driving algorithms and ride-sharing services would help in streamlining the carbon footprint and reducing the overall number of vehicles on the road.

Viewed on a macro scale, the emergence of smart buildings and the smart cities in which they are built can leverage built-in sensors to use energy efficiently, and buildings and roads will also be constructed out of materials that work more intelligently. Taking a nod from natural patterns, material scientists and architects have developed innovative building materials from natural resources, such as bricks made of bacteria, cement that captures carbon dioxide, and cooling systems that use wind and sun. Solar power is increasingly present within cities and outside to supply larger urban area. These are the first early steps towards sustainable infrastructure cutting costs and helping to make us environmentally conscious.

Controlling industrial emissions and waste management is another challenge that can be dealt with the advanced learning machines and smart networks that could detect leaks, potential hazards and diversions from industrial standards and governmental regulations. For example, IoT technology was incorporated into several industrial ventures, from refrigerators and thermostats and even retail shops.

As scientists still struggle to predict climate changes and other potential environmental hurdles or bottlenecks due to lack of algorithms for converting the collected useful data into required solutions, *Microsoft's AI for*

Earth, a 50 million dollar initiative, was announced in 2017 with the sole purpose to find solutions to various challenges related to climatic changes, agriculture, water and biodiversity.

Other similar AI infused Earth applications are *iNaturalist* and *eBirds* that collect data from its vast circle of experts on the species encountered, which would help to keep track of their population, favorable eco systems and migration patterns. These applications have also played a significant role in the better identification and protection of fresh water and marine ecosystems.

There are various institutions, NGOs and start-ups that work to deliver smart agricultural solutions by implementing fuzzy neural networks. Besides the use of both artificial and bio-sensor driven algorithms to provide a complete monitoring of the soil and crop yield, there are technologies that can be used to provide predictive analytic models to track and predict various factors and variables that could affect future yields.

Berlin-based agricultural tech start up *PEAT* has developed a deep learning application called *Plantix* that reportedly identifies potential defects and nutrient deficiencies in soil. Analysis is conducted by software algorithms which correlate particular foliage patterns with certain soil defects, plant pests and diseases.

Artificial Intelligence can provide invaluable assistance in environment protection and resource conservation. *A Where and Farm Shots*, both United States based companies use machine learning algorithms in connection with satellites to predict weather, analyze crop sustainability and evaluate farms for the presence of diseases and pests. Adaptive

irrigation systems in which the land is automatically irrigated based on the data collected from the soil via sensors by an AI system is also gaining wide popularity among the farmers for its important role in water management.

Developments in the Middle East

As more countries drastically shift towards the use of AI and other advanced technologies, this enormous wave has hit the Middle East region too. The United Arab Emirates, Saudi Arabia and Qatar have shown a promising commitment towards the development and implementation of technologies like information technology and digital transformation, to improve the efficiency and effectiveness of the healthcare sector and to provide citizens with knowledge and skills to meet the future needs of the labor market.

By 2030, the Middle East countries are expected to be one of the major players in this field as the volatility of oil prices have forced the economy to look for new sources for revenue and growth. With numerous untapped markets and sectors, the future investments in AI in the MENA region are estimated to contribute to around 15 per cent of their combined GDP. It can also be expected that with this rapid growth, the Governments will also consider a much more aggressive approach towards using these technologies for putting together an effective model for environmental sustainability.

With many countries in the Middle East strongly committed to protect the aquatic diversity of its surrounding waters, an intelligent tracking system could help to prevent overfishing and contamination, and implement much more effective aquaculture techniques, innovations in sea farming and

better utilization and protection of freshwater resources.

Technology is everywhere:

This is a technology revolution era. Technology is contributing in almost all fields of human life. Technologies enhance the capability and functionality of our daily routine life activities and serving mankind in its best. Technology is everywhere; we are using latest technology trends in our daily life activities like shopping, education, healthcare, sports, banking, stock market, public services, transportation and logistics as well as crisis or emergency management. We have same computational power⁵ in our pockets as was to get Neil Armstrong to the moon. Varieties of technologies are available and serving mankind but Computing and telecommunication are two main, most popular and adopting technologies now a days. The technologies covered the computer system, Internet, e-mail, mobile devices, and fax machine. ICT is a revolutionary technology and becoming most popular, fastest growing and vastly adopting technology⁶ in almost all the concerns of human life activities. Rapid development and advancement of Information and Communication Technology (ICT) and Mobile Technology (MT) cannot be underestimated. Accelerating adoption of MT is creating opportunities in providing variety of useful services through mobile devices.

MATERIAL AND METHODS:

The role of ICT in adaptation, mitigation and monitoring climate change discussed and emphasis using ICT by developed and developing countries to reduce the impacts of climate or at least observe the current changes in environment and take appropriate decision according to situation. Information and

Communication Technology can play a pivotal role in monitoring, mitigation and adaptation of Climate changes challenges. These ICT technologies includes Geographical Information System (GIS), Wireless Sensor Networks (WSN), Mobile Technology (MT), Web based applications , Satellite Technology, Remote Sensing (RS). Weather patterns are changing intensively due to change in temperature globally. ICTs are enabling tools if integrated strategically can improve efficiency and effectiveness of efforts doing in climate change mitigation and adaptation; it includes knowledge centers, community radio, mobile phones and interactive media. ICT can help vulnerable community to reduce the risk related to climate changes by education and awareness at lowest level of community, sharing practical and theoretical knowledge, empowering community to access the knowledge and relevant information applicable locally to save lives . Developing countries has seriously concerns regarding climate changes and looking for perspective technologies for monitoring, mitigating and adapting climate changes to reduce the vulnerability of the region. Developing countries are facing GHG emission problem due to rapid industrialization and transportation. ICT can



be used in designing smart buildings, using ICT smart grids can be implemented in energy generation and power consumption, ICT can control transmission and distribution of energy.

CONCLUSIONS:

Researchers and scientists must ensure that the data provided through Artificial Intelligence systems are transparent, fair and trustworthy. With an increasing demand of automation solutions and higher precision data-study for environment related problems and challenges, more multinational companies, educational institutions and government sectors need to fund more R&D of such technologies and provide proper standardizations for producing and applying them.

In addition, there is a necessity to bring in more technologists and developers to this technology. Artificial intelligence is steadily becoming a part in our daily lives, and its impact can be seen through the advancements made in the field of environmental sciences and environmental

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