Paramount feat to sway and purge pollution by adopting computational intelligence

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Abstract: Human's can't imagine machines independent. From Vacuum Tubes technology to transistors and now with Integrated chip (IC), semiconductor technology defined another industrial revolution. The modern industrial twirl is already in transpire. Artificial intelligence (AI) is ushering in the new age of technologies that are super fast, more flexible, much potential, and initiating the world more digitally connected. No doubt the potential of IoT and AI to clean up the environment is cosmic. A computational concept like fuzzy logic, neural network, and machine learning will change the perspective of machine how they are used now. Our study reveals retrospect progression in the internet of things and artificial intelligence technologies to curb ecological pollution. New generation AI-enabled intelligent control systems are optimized with a complex algorithm to identify and eliminate pollutants for environmental clean-ups. With AI automation pollution management and mitigation, developments are examined. Adopting tech-savvy IoT and AI technology, dependency on machines can be seemly employed. For example; Transportation Management System using AI and IOT can be used to determine the best shipping routes by cutting fuel and gas consumption. To some extent ICT, wireless technology adds a contribution to reducing E-Waste. ICT together with IoT acts as a mediator while renting and sharing devices among people with different industries. AI helps to solve complex data analysis that supports Quick Decision System and policymaking. With intelligent robots, we can monitor and control acidification on Soil and water. The concept of neural network and fuzzy logic are greatly used to develop intelligent machines that predict different gas rates and chemical processes. AI machines that continuously check the pH level of water, Analysis Air Quality Index can be built to monitor water resources and atmosphere. Some AI robots can identify pollutants and helps to separate them. Now we are successful in a bifurcation of paper with plastic, Iron with aluminum. Such a method contributes to the waste management system appropriately. Our study also inspects the challenges of implementing AI, How data mining and big data management feed system.

Authentication/Authorization work with industry and governing authority. Inspection of a biased algorithm, poor network, and security. There is no new route to achieve our goal. Our goal is to achieve paramount measures with two concepts in mind, that are Humans assist machines and Machines assist humans to control and prevent pollution in these critical situations. Both humans and machines together find an instant solution with renting and sharing that helps to minimize ecosystem effluence

Keywords: Ramification, Fuzzy Logic, Treating Pollution, Global Warming.

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1. Introduction

"Go Green" and "Global warming" terms trending to grab universal attention for climate control. With rapid pollution, our ecosystem is at risk. "Act now", By reacting violently nature caveat humans to control and discharge greenhouse gases that are warming our planet. Fig-1 below displayed in NASA climate website shows facts (up to the year 2010) that global temperature is rapidly rising [1]. Instant decision and paramount measures are to be taken to purge pollution ASAP. We the people of India believe in "Vasudaiva kutumbakam" mother earth as a family. Since everything on earth is a family; pollution includes too. Treating pollution with high significance, Today we are in an era where each human cell immensely thinking about controlling pollution and treating effluence at best by reducing ecological toxic waste.

One side of our industries is consuming exhaustible natural resources in crest point. Flipside consuming endless natural resources is in expansion mode. These days the fall of ecological pollution leads to tremendous pressure on preservation with the recycling of natural resources that compels social and environmental outfits. Minimization, Mitigation and controlling pollution remains to magnetize approaches. Nonetheless, interactive, dynamic and paradoxical features are associated with a particular process, ensuring deadlock in management and control. Artificial intelligence (AI) is a trenchant approach for tackling these ramifications.

Figure-1: Scientific Consensus: Earth's Climate is Warming
Source: NASA's Earth Observatory
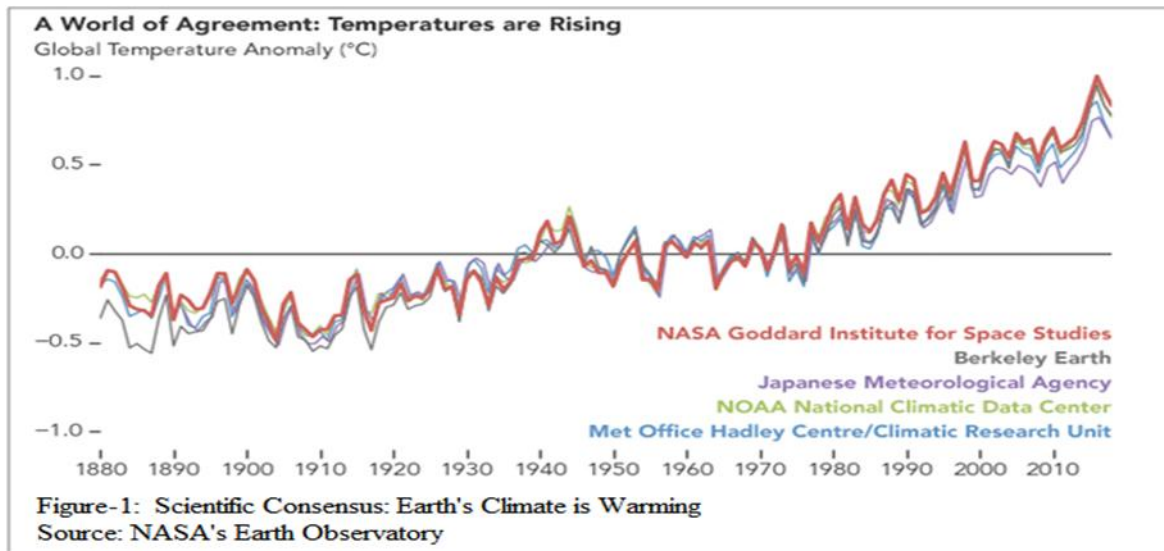
In this study, contemporary improvement of Artificial Intelligence (AI) based automation for management and curb of pollution can be cutback and mitigation developments are examined. Literature significant to the field of application of Artificial Intelligence AI to Manage and control pollution minimization plus mitigation processes is scrutinized. Specifically, technologies of expert systems, neural networks and fuzzy logic, which materialized as the most periodically employed approach for attaining process control, are highlighted.

The outcome not only provides a review of the updated progress in the study field but likewise, more importantly, acknowledges perspectives of analysis for new dynamic substantial process control over the AI-promoted measures. several appealing areas for enhanced research attempts are discussed, along with issues of system complexity, methodology validity data availability, and authenticity.

1.1 Metamorphosis in economic maturity

Recently two most topics are in debate. "Go Green" and "Global warming [2]". According to Wikipedia Global warming defined as a "long-term rise in the average temperature of the Earth's climate system" and Go green is a slogan used worldwide to condense climate. These vibrating terms created fascination on this planet earth. These terms are frequently used by India and world governments, every industry with Intergovernmental Panel on Climate Change (IPCC). The evolution in the mechanical and electronics industry initiated a new era of economic growth. Machines made people's life comfortable and easy with new pollutants like radiation, noise, and E-waste. The below fig-2 represents the percentage of each category of environmental forensics [3].
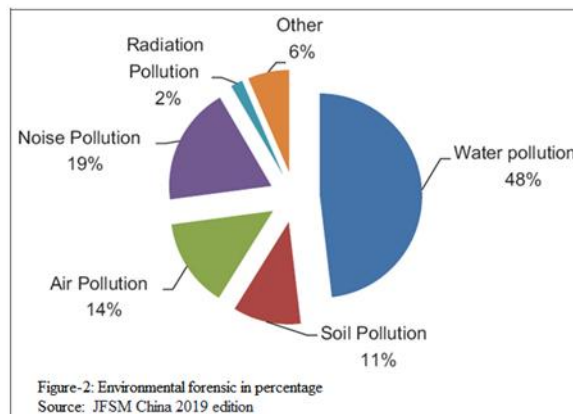
Figure-2: Environmental forensic in percentage
Source: JFSM China 2019 edition

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" giant economy comes with great accountability"

As the new era began it came with a new possible way of polluting earth in an unimagined manner. Rapid use of machines and advance technology lead to E-waste by polluting earth and its surrounding space. Frequent changes in hardware and software and its upgrade created an additional crisis for the environment. Currently,

Electronic-waste, popularly known as E-Waste is also one of the major contributors in alliance with Air, Water, and Land Pollution.

Our economy is greater than that of before. In the same way, pollution also increased substantially. Due to globalization even a small modification in machines and its associated software with Internet Communication Technology (ICT) impacting almost every countries economy. Dumping E-waste on the land creating tremendous pressure on governments to dispose of E-pollutants properly and eco-friendly using new differently waste management techniques.

2 Literature Survey

Humans and AI are two joining forces. The best complementary to human intelligence is Artificial Intelligence. This technology can be intended to recognize many patterns that are too monotonous for the human eye. Both humans and AI can join hand to hand to battle against pollution. Two great prospects

•Humans can aid machines and

•Machines assist humans

When humans and machines work together side by side, performance is significantly improved. This is concluded by the Harvard Business Review study of 1,500 companies. AI became one of the greatest assets in modern society. It helps to solve complex problems, analyses problems to a greater extent than life to protect mother earth and its natural environment. The below image [4] shows the collaboration of AI machines with humans.
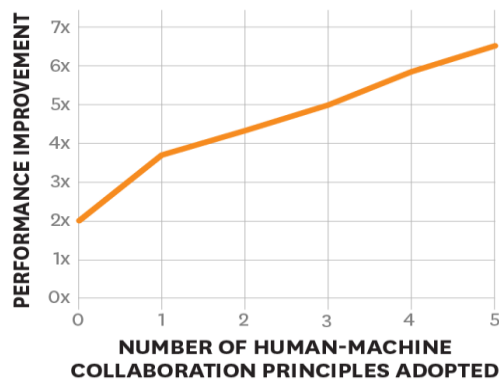
Dr. Jiang Kejun is a Senior Researcher at the Energy Research Institute in China stated that "This is more about technology than politics,". In alliance with IoT, ICT, AI, and Robots, Our understanding is enhanced to monitor stress on the soil, water, and air. Current technology is capable to reduce energy usage. According to ITI (The Information Technology Industry Council) US alone reducing energy consumption by 12% to 22%. Recent UN IPCC (Intergovernmental Panel on Climate Change) report [5] that exposed how climate is changing rapidly. Between 2006 to 2015 there were 0.87°C global warming observed on global mean surface temperature (GMST) by IPCC. Presently 1.0°C global warming estimated and likely to increase by 1.5°C after 2030. By reducing pollution and energy only we can control climate change.

3 Survey on Fiery Facts

"Every country is affected," in 2015 World Health Organization (WHO) and Organization for Economic Cooperation and Development (OECD) estimated USD 1.6 trillion toll cost that affected the US economy alone due to premature death and disability from air pollution. More or less the situation is approximately identical in every nation. Recently on November 13, 2019 , The supreme court of India tore governments for failing to ensure the retrograde air quality levels in the National Capital Region (NCR) Delhi [6]. Our National Air Quality Index (AQI) recorded severe about 500+ and declared public health emergency [7] in all Delhi region by Environment Pollution (Prevention & Control) Authority for National Capital Region (EPCC).

In 2017, WHO released some disturbing key facts [8] on drinking water. In the present world, the population is about 7.7 billion. It is given that out of this 2 billion-plus people don't have proper access to clean drinkable water. Most of the water sources used by people are contaminated with feces. This spread diseases like polio, cholera, dysentery, typhoid like other diseases and estimated deaths of nearly 1 billion people every year. By 2025, most of the world's population lives in the water-stressed area. Underdeveloped African region countries [9] like Niger, Central African Republic, South Sudan, Chad, Burundi, Sierra Leone, Mali, Liberia, Mozambique with other

countries facing water insufficiency up to 22% of their health sector. 21% of people don't have sanitization service. 22% people are under poor waste management service.

Jonathan Watts is the Guardian's global environment editor. On March 26, 2018, in his article [10] raised a concern about effects due to land pollution. He quotes that more than 3.2 billion publics stirred with the biggest global environmental problems. Two-fifth land by now polluted causing soil erosion and the loss of soil constituents. Soils are the main platform on Biodiversity and Ecosystem. Dumping unrefined waste like on bare lands disturbed biodiversity ever than before. Soil contamination aftereffect deforestation, Massive mining activities, and urbanization, pollutants like construction materials, agriculture waste, chemicals disposed of by agriculture and industries highly contributing to pollution.

Hefty E-waste is new-age environment pollutants causing distress. On the rise of using electrical and electronic equipment (EEE), Every year nearly 9.3 million metric tons of E-waste generated so far and it is growing extremely around the globe[11]. Trashing old unused mechanical and electronics waste deposing affected millions of millions of people at risk. Approximately 23% of death is due to E-pollutants. Nearly 200 million people around the globe are at risk of exposure to E-venomous waste due to trashing E-waste.

On October 23, 2017, author at the state of the planet Steve Cohen quotes the facts [12]. In 2015, diseases caused by air, water, and soil pollution were responsible for 9 million premature demises, which is 16% of the entire global death. Exposures to contaminated air, water and soil slew more people unlike smoking, hunger, natural disasters, war, AIDS, or malaria.

4 Tech savvy scope and challenges

IoT, ICT and AI can help us to squeaky-clean our Air, Water, Land, and E-Waste. Reducing machine dependency won't work in the modern era. Working with smart hybrid automated machines we can adopt a new policy with zero tolerance to E-waste. The ecological and biological challenges in our region are countless and interlinked, include

•Adapting new technology that robotically work as and when needed.

•Transportation Management System using ICT and IoT.

•ICT with wireless network communication can reduce certain e-waste

•Proper administration green power system using computer technology

•Bifurcating pollutants is a global task and it can be done using automated machines.

•With Artificial Intelligence (AI) we can separate and collect pollutants.

•IoT as a mediator help in renting machines among farmers and industries whoever needs

•Waste management among industries to rebuild or reuse pollutants using Management Information System (MIS).

•Using IT to collect live information, Quick Decision System and policymaking

•Monitoring and Controlling acidification on Soil and water

5 Deposing pollutant from rising IT technology

The potential of IoT, ICT and AI to clean up the terrain is enormous. With these emerging technologies like cognitive science, Bio-Technology, nanotechnology, and robotics will accelerate tenable efforts. Unlike conventional air monitoring systems, using a sensor network with IoT we can forecast and monitor air pollution automatically. Data received from sensors are analyzed using a neural network. Monitoring pollutants in the atmospheric corrosion assesses the trend with the cost of corrosion and pollution. AI helps to take crucial action against the cause.

By using GPS location we can monitor the transport system to avoid more collisions on the road and rerouting vehicles not only decreases traffic also decreases vehicle emission in that area. Using IoT and ICT if air pollution is above the risk line, machines that cause pollution can be automatically shut down for a short period. We were able to bifurcate toxic substances from the air before releasing it to the environment using sensor automation. This can be achieved through AI.

A fuzzy logic model can be developed to predict the pH level in gradients present in the chemical. Using mesophilic reactors, wastewater can be treated through molasses. Thus the efficiency of the reactors can be increased. With the rule-based expert system and artificial neural network combination, Quality Analysis System (QAS) can be improved. Pollution analysis and flood impacts related to case studies can be analyzed using an

artificial intelligence technique. Accordingly, the Decision Support System can be enhanced to supervise a variety of ecological critical situation (like a flood), and to inform the public about the quality of the environment..

Using fuzzy logic composting process control system[13] can be adopted to treat agriculture waste where compost heat can be reused in another place. Such system development in which the aeration rate and heat removal rate can be attuned in the composting system by maximizing thermal heat and minimizing the time of the composting process.

Digitally monitored electrification technology helps billion people at present lacking it. This strengthens modern energy security by reducing energy prices that cut the expenses of outdoor air pollution global. A wise water management system can be developed using AI. The popular method like drip irrigation can be accessed remotely using ICT and can be controlled with AI. Even the pH water level can be automatically monitored by the AI system by removing water pollutants. The efficient use of construction material, metals and wood materials can be properly managed using MIS. With Management Information System, a circular business economy can be developed to decouple economic growth within industrial activities. The efficient use of construction and industrial material like metals and wood materials can be properly managed using software management. Thus de-carbonization can be achieved.

New machines equipped with AI programs and IoT sensors are a new revolutionary model in the waste managing sector. An intelligent robotic system is changing the economics of recycling. these are low cost, high efficiency, improved monitoring, and fast implementing system. Thanks to machine learning. Using smart robotic stations are able to identify most garbage types. Purification can be initiated with this capable smart hybrid machines. A high-tech sensor now used to bifurcate papers from plastic, they are capable to sort iron and aluminum using sophisticated sensors. Building such intelligent robots boosts paramount measures to sway and purge pollution by boosting the digital economy. Recycling used mechanicals, electrical and electronic device

6 Technology Constraints

A key challenge to implement ICT and IoT enabled AI are

•Data mining, processing, and big data management techniques

•Depending on Internet or mobile network

•Complications in Authentication/Authorization

•Poor or insecure network management and security.

•Bias in the algorithm and program design

Most of the IoT enabled AI devices facing problems in deployment on devices. The available AI device has the precise computational capacity, poor storage management like sensors with some embedded tools. Implementation of AI devices cost high and in case of error human need to fix. This increases the budget and resources. AI machines depend on language and their APIs [14].

Developing an API application is not a simple task. AI will learn from the task but developing their own complex algorithm and program are complicated. Data privacy is a global concern while big data management. So far AI-enabled robots are mostly assistive functions. If they start to take automated essential decisions, the human general perspective towards industry may change due to trailing their employment. Autonomous data driving is a concern. Malfunction in the AI system may lead to a deadly situation where handling becomes more difficult. Lack of legal aspects.

7 Conclusion and prospects

It is undeniable that AI is the future robotic machines that can help mankind to control and manage pollution. Irrespective type of pollution, collaboration with IoT, ICT and AI helps to take paramount measures to purge the impacts of pollution. Internet of things and tech-savvy methods controls pollution and plays a distinct role in decision support system. With the concept of fuzzy logic, neural network and machine learning will change the perspective of machine how they are used now. While assisting humans, intelligent machines will play a significant role during critical situations. While creating public awareness IoT helps us to utilize resources within ourselves. With good policy and governance, we can overcome any financial barriers that help to save the blue planet by reducing pollutions.

Days are ahead, where each and every country with the general public have to sense that "not to own machines individually" by sharing and renting "AI machines" with ICT and IoT redefines innovative framework.

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