

Artificial Intelligence and Sustainability The Use of AI in Sustainability Initiatives

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Abstract

Sustainable development is currently among the greatest challenges. Sustainability and development are apparently opposite. The current efforts to face the Planet Crisis by separate actions generate less impact than expected. The capacity of available technology and in particular whole spectrum of Artificial intelligence is underexplored. Eco-innovation actions focus mainly on smart transportation, smart use of energy and water and waste recycling but do not consider the necessary evolution of behaviors and focus. The concepts such as Smart City is a perfect playground for prototyping. Most of related research focus on satellite image analysis and data processing with statistical/optimization methods. This track is just a beginning in applying AI approaches and techniques to balance sustainability with environmental concern. Combined with adequate thinking, they may help innovating the way of facing Planet Crisis.

1. Introduction

Many factors affect the sustainability. One of them is quick technological progress, considered as powerful engine of economy. It brings many benefits for humanity, but contributes also to Planet Crisis. Computers, smartphones, IoT and other devices are quickly outdated. The combination of various communicating software requires “up-to-date” hardware to run correctly. Most of hardware is not eco-designed and need raw material that has become scarce. Despite the large introduction of Corporate Social Responsibility, some companies still practice planned obsolescence to generate more revenues [1].

Social networks and various applications generate an exponential amount of data stored in data centers that need cooling. Fortunately, some apply circular

energy to reduce impact on environment, but still those in Scandinavian countries clearly contribute to the rise of temperature and melting of ice [2].

Globalization has changed the economic landscape. Opening to business and quick development of China and other Asian and South American countries offering the low labor cost increases the relocation-out from origin countries, mainly US and Europe, in search of quick and high revenues. However, this process requires transportation across the world by ships and airplanes, which increases pollution [3]. Besides, the end buyers have to recycle products, often of poor quality, made just for sale. Repairing cost often more than new product and require the availability of spare pieces and related know-how.

The COP (Conference of the Parties) initiated in 1995 to deal with climate change takes place on annual basis. Their current vision is the following: “We are convinced that climate action and sustainable development do not run parallel lanes. On the contrary, we believe that the only way to achieve true development is taking care of the environment. To achieve this, adaptation and mitigation to climate change are key”.

Upcoming COP25 in Chile addresses the following issues: oceans, Antarctica, biodiversity, forest, adaptation, cities, renewable energy, circular economy and electromobility [4]. All these topics are interrelated but addressed separately.

AI approach to problem solving and combining the recent deeplearning with knowledge-based AI may bring a significant help in deep understanding of inter-influences and finding acceptable collaborative solutions for preserving our biosphere and decelerating the Planet decline.

Paradoxically while there are many actions around the world, we got few papers for this first mini-track.

Two accepted papers address the strategic topics such as preserving our biosphere and produce food wisely.

2. Monitoring of Wildlife

This paper focusses on monitoring of wildlife maintaining sustainability of environment. With the rapidly declining populations of wildlife, its sustainable management is an important concern across the world [5].

Authors consider Wildlife Monitoring as a Cooperative Target Observation problem and propose a Multi Criteria Decision Analysis based algorithm to maximize the observation of different animal species by Unmanned Aerial Vehicles and to handle multiple target types and the multiple criteria that arise due to targets and environmental factors, during decision-making. The uncertainty in observation of moving target makes this problem challenging to develop a high quality monitoring strategy.

Such a problem cannot be consider without connections with the nature providing the food and water, hunters and poachers activities and other influencing factors such as climate change and wild animals related business.

3. AI for improvement of Agriculture Productivity and Sustainability

The authors describes their study of AI usages in agriculture. They investigates the question of how agricultural organizations globally and within the different geographical regions, use AI to create value, and address sustainability concerns. Physical and natural conditions in the natural ecosystem make risk anticipation and decision-making processes more complex. Dynamic soil, weather, and atmospheric conditions, along with a myriad of biological interactions, play a critical role in determining the effect of technology on the desired outcomes. However, these outcomes are larger than only business; healthy and wisely produced food without the soil depletion, inspired by ancient methods, is vital for the future of humanity.

The authors are motivated in acquiring knowledge about AI applications and in understanding of the AI adoption and its impacts in aim to improve the use of AI.

To answer these questions, they conducted centering resonance analysis (CRA) of archived secondary data in the form of press releases and media reports of agricultural organizations that are actively deploying or plan to deploy AI.

Their results suggest that, globally, AI is primarily applied to increase production and efficiency. During the process, technology also serves to address labor shortages and environmental issues. At a regional level, they found active AI deployment in North America and Europe with advancing efforts in Asia and Africa.

4. Conclusion

These two papers demonstrate that AI is helpful in considering sustainability and environment. The challenge for AI is still to address all fields related to sustainability. The targeted fields by COP 25 does not cover all influencing factors. Such an ambitious topic requires multidisciplinary approach and combing several ways of thinking such as global, holistic and system for better comprehension before suggesting solutions. Connecting trendy AI with knowledge-based techniques will certainly give better results.

Hoping the next mini-track will cover larger spectrum of sustainability.

5. References

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- [5] The UN Report: Nature’s Dangerous Decline ‘Unprecedented’; Species Extinction Rate ‘Accelerating’, May 2019, <https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/>