


# Industrial Revolution 4.0 With a Focus on Food–Energy–Water Sectors



**Abichal Ghosh**

 <https://orcid.org/0000-0002-5881-0925>

*Birla Institute of Technology, Pilani, India*

**Reddi Kamesh**

 <https://orcid.org/0000-0002-1791-4656>

*CSIR-Indian Institute of Chemical Technology, India*

**Siddhartha Moulik**

 <https://orcid.org/0000-0001-7214-8088>

*CSIR-Indian Institute of Chemical Technology, India*

**Anirban Roy**

*Birla Institute of Technology, Pilani, India*

## INTRODUCTION

As the world is trying to cope up with a pandemic, it has brought to the fore the need for automation, machine based intervention and the use of Artificial Intelligence to fuel the sustainability of human civilization. Manufacturing and production took a massive plunge during the COVID-19 pandemic and this affected the world economy to a great extent. However, the major players quickly understood the need of the hour is to adopt a “human-less” operation in such a scenario and it has spurred a rally of research and development in lines of Artificial Intelligence (AI) and Machine Learning (ML).

Artificial Intelligence (AI) and Machine Learning (ML) are some of the newest fields in science and engineering with interest in these topics increasing primarily in the last half a decade, but as a field of research, these fields have existed for the last 6 decades. The most prestigious journals where cutting-edge research is being published in this field are about 5 decades old. Thus, these are not a new field of research from a holistic perspective.

The three intricately related sectors of Food, Energy and Water sectors are experiencing the need for such AI-ML interventions for (i) sustained production, (ii) optimized resource utilization, (iii) economically and financially rewarding supply chain management and (iv) wastage minimization including time and resources and (v) providing rapid solutions and automated predictive decision-making abilities.

This chapter explores the possibilities of intervention in the above 3 sectors by exploring production, processing, and distribution as this can be an expected norm during this Industrial Revolution 4.0 era. The global distribution of AI technologies and investments in farming, forestry and the marine/aquaculture sectors are illustrated in **Figure 1**.

*Journal of Management Education* 36(7) 809–824



## Background: AI-ML

2200

10 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/industrial-revolution-40-with-a-focus-on-food-energy-water-sectors/317616](http://www.igi-global.com/chapter/industrial-revolution-40-with-a-focus-on-food-energy-water-sectors/317616)

## Related Content

---

### Automatic Multiface Expression Recognition Using Convolutional Neural Network

Padmapriya K.C., Leelavathy V. and Angelin Gladston (2021). *International Journal of Artificial Intelligence and Machine Learning* (pp. 1-13).

[www.irma-international.org/article/automatic-multiface-expression-recognition-using-convolutional-neural-network/279275](http://www.irma-international.org/article/automatic-multiface-expression-recognition-using-convolutional-neural-network/279275)

### Multi-Objective Materialized View Selection Using Improved Strength Pareto Evolutionary Algorithm

Jay Prakash and T. V. Vijay Kumar (2019). *International Journal of Artificial Intelligence and Machine Learning* (pp. 1-21).

[www.irma-international.org/article/multi-objective-materialized-view-selection-using-improved-strength-pareto-evolutionary-algorithm/238125](http://www.irma-international.org/article/multi-objective-materialized-view-selection-using-improved-strength-pareto-evolutionary-algorithm/238125)

### Educational Data Mining and Learning Analytics in the 21st Century

Georgios Lampropoulos (2023). *Encyclopedia of Data Science and Machine Learning* (pp. 1642-1651).

[www.irma-international.org/chapter/educational-data-mining-and-learning-analytics-in-the-21st-century/317575](http://www.irma-international.org/chapter/educational-data-mining-and-learning-analytics-in-the-21st-century/317575)

### A Review on Time Series Motif Discovery Techniques and Application to ECG Signal Classification: ECG Signal Classification Using Time Series Motif Discovery Techniques

Ramanujam Elangovan and Padmavathi S. (2019). *International Journal of Artificial Intelligence and Machine Learning* (pp. 39-56).

[www.irma-international.org/article/a-review-on-time-series-motif-discovery-techniques-an-application-to-ecg-signal-classification/238127](http://www.irma-international.org/article/a-review-on-time-series-motif-discovery-techniques-an-application-to-ecg-signal-classification/238127)

### Recent Trends in Channel Assignment Techniques in Wireless Mesh Networks

D. Jasmine David, Jegathesan V., T. Jemima Jebaseeli, Anand Babu Ambrose and Justin David D. (2020). *Deep Learning Strategies for Security Enhancement in Wireless Sensor Networks* (pp. 155-176).

[www.irma-international.org/chapter/recent-trends-in-channel-assignment-techniques-in-wireless-mesh-networks/258891](http://www.irma-international.org/chapter/recent-trends-in-channel-assignment-techniques-in-wireless-mesh-networks/258891)