Scilight

Journal of Artificial Intelligence for Automation

https://www.sciltp.com/journals/jaia

Editorial

Artificial Intelligence and Automation for Better Life of Human Beings

Meng-Chu Zhou

The Helen and John C. Hartmann Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, NJ 07102, USA; zhou@njit.edu; Tel.: +1-973-596-6282; Fax: +1-973-596-5680

Received: 24 May 2026; Accepted: 26 May 2026; Published: 28 May 2026

How To Cite: Zhou, M.-C. Artificial Intelligence and Automation for Better Life of Human Beings. *Journal of Artificial Intelligence for Automation* **2026**, *1*(1), 7. https://doi.org/10.53941/jaia.2026.100007

From the viewpoint of human evolution history, each technological invention and development promote humans to evolve and, in general, benefits humans for their better life. This is reflected from human life expectancy on average from about 10 to 20 years in earlier days till today's nearly 80 years. Its sharp increase in the past 260 years is largely owing to several industrial revolutions, related automation technologies and recently Artificial Intelligence (AI).

Industrial Revolution 1 in the late 18th century, specifically starting in 1765, used mechanical power provided by steam engines and water wheels to replace human and animal power and rapidly promoted the human society's development. It helped relieve human beings of much tedious and labor-intensive work. Slightly over 100 years from 1765, in 1870, human beings experienced Industrial Revolution 2 featured by the use of electricity, which enabled human beings to realize electric power network and manufacturing/assembly lines for massive production of products that facilitated human being's various activities, e.g., transportation. During Industrial Revolution 2, human beings developed significantly more automation technologies than those during Industrial Evolution 1, which were widely put into industrial use. After less than 100 years from 1870, in 1965, we started Industrial Revolution 3 when Internet was invented. It required such technologies as computers, communications, networking, and information storage to drastically improve human-human communications and industrial productivity. About 40 years later, we entered the era of Industrial Revolution 4 by internetworking all sensors, devices, machines, vehicles, robots, and human beings. AI, machine learning, and big data analytic technologies are required to materialize the vision of Industrial Revolution 4, i.e., automating various systems and services. While Industrial Revolution 4 is on-going, researchers have recently proposed Industrial Revolution 5 featured by more advanced AI technologies such that large language models and powerful AI agents, Internet of Behaviors, digital twins, and human-cyber-physical systems [1–5]. Fully adopting AI into human daily life remains a rapidly evolving field. This is true for AI to be fully used for advancing automation technology.

Among many technologies since Industrial Evolution 1, automation stands out as one of the most important ones to benefit human kind. Artificial Intelligence (AI) has recently played a great role as well and may well exceed many other technologies in history in benefiting human kind and continuing to promote human life expectancy. While it is under hot debate whether AI would eventually terminate human beings, optimistic human beings tend to answer no since all these AI models and tools are developed by human beings and should remain under the control of human beings instead or out of control. As a whole, human beings remain the most capable regardless how powerful and strong AI machines like robots and such models as ChatGPT, Gemini, DeepSeek and Claude have become owing to the human beings' remarkable creativity, imagination ability, and realization capability. Human brains are definitely the most efficient decision making systems in terms of energy consumption, which cannot be exceeded by any robots or AI systems for an extremely long, if not infinitely long, time. This editorial article intends to review the basic concepts of AI and automation, states the need for a new journal in the areas of AI and automation, and discusses the scope of this journal.

1. Definition of Artificial Intelligence (AI)

Human beings have evolved for numerous years to gain intelligence that includes knowledge and various abilities to (a) learn from their actions, e.g., doing and observing, and existing knowledge expressed in such media as languages, pictures, videos, and drawings; (b) adapt to new conditions and situations; (c) understand abstract concepts, theory and methods; (d) utilize knowledge and experience to solve problems; (e) find and predict new problems and solve them; (f) memorize, accumulate, refresh and forget certain knowledge; and (g) creatively think and imagine some new ideas, theory, and things that are never in existence. AI has been created to achieve and sometimes exceed the mentioned human intelligence in multiple aspects. The related AI tools, especially recently developed ones exemplified by GPT, Claude, Gemini, Llama, Grok, DeepSeek, Mistral, and Qwen have well exceeded human intelligence in such aspects as information/knowledge extraction, multi-language processing, reasoning, planning, and computer program development [6]. Let us examine some definitions of AI we can easily find:

(a) From Cambridge Dictionary [7], AI is "the use or study of computer systems or machines that have some of the qualities that the human brain has, such as the ability to interpret and produce language in a way that seems human, recognize or create images, solve problems, and learn from data supplied to them".

(b) From Wikipedia [8], AI is "the capability of computational systems to perform tasks typically associated with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making. It is a field of research in computer science that develops and studies methods and software that enable machines to perceive their environment and use learning and intelligence to take actions that maximize their chances of achieving defined goals".

(c) From ChatGPT, AI is "about making machines behave intelligently—that is, they can learn, reason, recognize patterns, and make decisions, similar to humans. In simple terms, AI lets machines "think" or "learn" from data". It further cites some AI's key characteristics, i.e., (1) Learning from data (not just fixed rules); (2) Being able to improve over time; (3) Handling uncertainty and complexity; and (4) Often mimicking human abilities.

(d) From Gemini, AI is "technology enabling computers to perform tasks requiring human intelligence, like learning, reasoning, problem-solving, and perception, by analyzing data to recognize patterns and make decisions. It is an umbrella field including Machine Learning (learning from data), Deep Learning (brain-like pattern recognition), Natural Language Processing (understanding language), and Generative AI (creating content). AI powers everyday tools like search engines, virtual assistants (Siri and Alexa), recommendation systems (Netflix), and autonomous vehicles, allowing machines to act intelligently and autonomously". Instead of ChatGPT's citing AI's key characteristics, Gemini cites four key AI concepts, i.e., (1) Learning: AI systems learn from vast amounts of data to improve performance over time, rather than being explicitly programmed for every scenario; (2) Reasoning & Problem-Solving: AI can analyze complex problems and find optimal solutions, from playing strategy games to diagnosing diseases; (3) Perception: It enables machines to interpret sensory input, such as recognizing faces or understanding spoken language (speech recognition); and (4) Decision-Making: AI algorithms make predictions and recommendations, guiding actions in various applications.

Based on the above definitions, we can clearly understand that AI can be a machine, algorithm, system or capability that performs like human beings and can thus be useful to human beings. A danger exists, i.e., (1) AI may potentially evolve and harm human beings; and (2) some human beings use AI to harm others. All AI researchers, builders and users must be aware of both and do their best to avoid them from happening. Despite AI's increasingly strong power, human beings must keep a clear mind that AI must be constrained such that it benefits human beings and makes the latter have a better and longer quality life.

2. Definition of Automation

Automation has played a significant role since Industrial Revolution 1. While Industrial Revolutions 1–4 aim to design machines and systems to replace human beings, Industrial Revolution 5 aims to achieve a synergistic cooperation/collaboration between human beings and its physical and virtual worlds including all machines, AI agents, various services, and various autonomous systems. We emphasize human-centric automation such that Safety, Security, Sustainability, Sensitivity, Service, and Smartness [9] can be realized. We develop and deploy automation to have the better, human-friendly, and smarter industry to meet the human needs. We examine a few concepts of automation next.

(a) From Cambridge Dictionary [5], automation is "the use of machines and computers that can operate without needing human control".

(b) https://en.wikipedia.org/wiki/Automation (accessed on 20 May 2026) describes automation but fails to define it.

(c) From ChatGPT, automation is "about making machines or software perform tasks automatically without human intervention. In simple terms, automation lets machines "do" tasks automatically". ChapGPT further lists its four key characteristics, i.e., (1) Following predefined rules or scripts; (2) Repeating tasks consistently, (3) Does not learn by itself; and (4) Focusing on efficiency and reliability.

(d) Gemini, when asked "What is automation?", tells us "At its core, automation is the use of technology to perform tasks with minimal human intervention. Instead of a person manually doing a repetitive step, a system, software, or machine is set up to do it automatically". It further tells the modern shift toward Intelligent Automation, i.e., "Traditionally, automation was rigid—it could only follow strict, "if-this-then-that" rules. If something unexpected happened, the system crashed. Today, we are in the era of Intelligent Automation. By combining traditional automation with Artificial Intelligence (AI) and Machine Learning, systems can now adapt to new data, make complex decisions, and learn from their mistakes. For example, an AI automated customer service bot doesn't just give canned responses; it understands the context of a customer's unique frustration and solves the problem dynamically".

Intelligent automation is indeed what we seek today. It is clear that various AI and machine learning technologies are required to advance traditional automation to intelligent automation. We envision that every machine and system can work at their optimal condition and respond optimally to any unexpected case. We can accurately predict when we must do maintenance before its performance is down or its components/modules break down.

3. AI for Automation

The creating of this journal: *Journal of Artificial Intelligence for Automation* aims to help move our traditional automation into Intelligent Automation. The latter can much better serve human beings with proper and right service by understanding human intention via Internet of Behavior [4]. For instance, our smart home controller can switch our home's Heating, ventilation, and air conditioning system on to cool our home under Summer's hot weather when we would go home to stay long; but act nothing if we just go home to get a forgotten item. To realize true Intelligent Automation, we need to develop many advanced theory, methods and technologies. Our new journal intends to focus on them. We can list the following areas in which this journal is particularly interested:

(1) Machine learning paradigms that answer how machines or models learn from data (labeled or unlabeled ones) [10–16]. They have many variants:
   (a) Supervised Learning: Machines or models learn from labeled data whose data samples include both inputs and known outputs (also called ground-truth values or answers). The learned ones can map inputs (old or new) to outputs.
   (b) Unsupervised Learning: Machines or models learn from unlabeled data whose data samples include input only. Since the true outputs are unknown, the learned machines or models are only able to identify hidden patterns, structures, outliers, or anomalies.
   (c) Semi-Supervised Learning: Given both labeled data (often a small portion) and unlabeled data (often a huge portion), it enables machines or models to learn to tell outputs when supplied with inputs.
   (d) Self-Supervised Learning: Machines or models teach themselves to understand unlabeled data by generating and using its own "pseudo-labels" directly from such data.
   (e) Reinforcement Learning (Learning Automata): Machines or models learn the optimal actions at a state by interacting with an environment such that a reward function is optimized.
   (f) Incremental Learning (continual learning): Machines or models continuously update their knowledge by using new data without forgetting previously learned knowledge.
   (g) Transfer learning: Machines or models trained on one dataset (often labeled one) are reused for another dataset (often unlabeled one).
   (h) Knowledge distillation: "Student" machines or models (lightweight, i.e., with relatively much fewer model parameters) are trained to reproduce the behavior, performance, and generalized knowledge of large/powerful pre-trained "teacher" models. The former can be used at resource-constrained devices, e.g., smartphones or edge devices (computing devices near the network's edge, often near data sources or consumers).
   (i) Federated Learning: machines or models are trained on decentralized data where the data is distributed across multiple devices/clients, e.g., smartphones and edge devices to protect the privacy of raw data. Instead of centralizing the data and training machines or models in a single location, they are trained locally on each device, and the summarized updates are then sent to a central server or the cloud for aggregation and generating the global models.

(j) Deep Learning: It refers to the training of models with of neural networks with many layers (greater than 3 and including input, hidden and output layers). Typical neural network examples are Feedforward Neural Networks, Recurrent Neural Networks, Convolutional Neural Networks, Long Short-Term Memory Networks, Gated Recurrent Units, Spiking Neural Networks, Deep Belief Networks, Generative Adversarial Networks, Dendritic Neuron Models, Autoencoders, and Transformers.

The journal aims to cover all areas of automation where the applications of AI and machine learning to automation makes it "intelligent": Manufacturing, Logistics, Healthcare, Navigation, Agriculture, Energy, Building, Home, City, Infrastructure, Environment, Life Science, Aerospace, Cyber-physical systems, Service, Fog/Edge/Cloud computing, Cybersecurity, Digital Twins and Robotics/Mechatronics [1,2,5,17–20].

The journal also welcomes the papers that describe datasets for the studies of AI for automation and review/survey papers that summarize the recent developments of a particular field. The papers about how to make AI and automation under human control and use them to make human beings have better life are also welcomed.

4. Concluding Remarks

AI for automation is a rapidly evolving area. Many studies in many areas of automation are being performed and the automation related technologies and products are being developed and deployed. This editorial article discusses the concepts of AI, machine learning paradigms, automation, and intelligent automation. Their developments should benefit the human beings just like all the other important technologies in human history have done so. We indicate the need to create a new journal to convey the important progresses made in the area of AI, automation, and intelligent automation. We further indicate the papers this journal would like to publish. We hope that the papers published in this journal would focus on the theory, methodologies, applications and tools that can benefit human beings and enable them to have a better life. Human beings must make every effort to make AI and automation under human control such that they can serve human beings better and better.

Conflicts of Interest

The author declares no conflict of interest.

Use of AI and AI-assisted Technologies

No AI tools were utilized for this paper.

References

1. Vlacic, L.; Huang, H.; Dotoli, M.; et al. Automation 5.0: The Key to Systems Intelligence and Industry 5.0. *IEEE/CAA J. Autom. Sin.* **2024**, *11*, 1723–1727.
2. Yang, J.; Dotoli, M.; Wang, Y.; et al. Automation 5.0: The Step to Systems Intelligence for a Sustainable Future. *IEEE Trans. Autom. Sci. Eng.* **2026**. https://doi.org/10.1109/TASE.2026.3668032.
3. Wang, F.-Y. Parallel Intelligence in Metaverses: Welcome to Hanoi! *IEEE Intell. Syst.* **2022**, *37*, 16–20.
4. Zhao, Q.; Li, G.; Cai, J.; et al. A Tutorial on Internet of Behaviors: Concept, Architecture, Technology, Applications, and Challenges. *IEEE Commun. Surv. Tutor.* **2023**, *25*, 1227–1260.
5. Lou, S.; Hu, Z.; Zhang, Y.; et al. Human-Cyber-Physical System for Industry 5.0: A Review From a Human-Centric Perspective. *IEEE Trans. Autom. Sci. Eng.* **2025**, *22*, 494–511.
6. Bi, J.; Wang, Z.; Yuan, H.; et al. Large AI Models and Their Applications: Classification, Limitations, and Potential Solutions. *Softw. Pract. Exp.* **2025**, *55*, 1003–1017.
7. Cambridge Dictionary. Available online: https://dictionary.cambridge.org/ (accessed on 20 May 2026).
8. Wikipedia. Artificial Intelligence. Available online: https://en.wikipedia.org/wiki/Artificial_intelligence (accessed on 20 May 2026).
9. Wang, X.; Yang, J.; Wang, Y.; et al. Steps Toward Industry 5.0: Building "6S" Parallel Industries with Cyber-Physical-Social Intelligence. *IEEE/CAA J. Autom. Sin.* **2023**, *10*, 1692–1703.
10. Zhou, M.; Qiao, Y.; Liu, B.; et al. Machine Learning for Industry 4.0. *IEEE Robot. Autom. Mag.* **2023**, *30*, 8–9.
11. Gu, J.; Zhou, M.; Guo, X.; et al. Robust Reinforcement Learning: Methods, Benchmarks and Challenges. *Artif. Intell. Sci. Eng.* **2026**, *2*, 20–35.
12. Zhang, J.; Zhou, M. *Learning Automata and Their Applications to Intelligent Systems*; Wiley-IEEE Press: Hoboken, NJ, USA, 2024.
13. Yang, S.; Yang, J.; Zhou, M.C.; et al. Learning from Human Educational Wisdom: A Student-Centered Knowledge Distillation Method. *IEEE Trans. Pattern Anal. Mach. Intell.* **2024**, *46*, 4188–4205.

14. Ren, L.; Jia, Z.; Laili, Y.; et al. Deep Learning for Time-Series Prediction in IIoT: Progress, Challenges, and Prospects. *IEEE Trans. Neural Netw. Learn. Syst.* **2024**, *35*, 15072–15091.
15. Yuan, H.; Bi, J.; Wang, Z.; et al. Multiperspective and Energy-Efficient Deep Learning in Edge Computing. *IEEE Internet Things J.* **2026**, *13*, 3988–4003.
16. Gao, S.; Zhou, M.; Wang, Y.; et al. Dendritic Neuron Model with Effective Learning Algorithms for Classification, Approximation and Prediction. *IEEE Trans. Neural Netw. Learn. Syst.* **2019**, *30*, 601–614.
17. Fu, X.; Qin, M.; Pace, P.; et al. Generative AI-Driven Digital Twin in the Manufacturing Internet of Things: A Comprehensive Survey. *IEEE Internet Things J.* **2026**, *13*, 10522–10546.
18. Yuan, H.; Bi, J.; Zhou, M.; et al. *Scheduling Tasks in Distributed Cloud and Edge Computing Systems with Evolutionary Optimizers*; Springer: Cham, Switzerland, 2026.
19. Franzè, G.; Fortino, G.; Lucia, W.; et al. (Eds.) *Constrained Control and Machine Learning: Emerging Methodologies and Applications*; Springer: Cham, Switzerland, 2026.
20. Hu, B.; Cao, Z.; Zhao, M.; et al. *Intelligent Scheduling of Tasks for Cloud-Edge-Device Computing Systems*; Wiley-IEEE Press: Hoboken, NJ, USA, 2025.