# Future Research Opportunities for Artificial Intelligence in Industry 4.0 and 5.0



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**Citation:** Rane, J., Mallick, S. K., Kaya, O., & Rane, N. L. (2024). *Future research opportunities for artificial intelligence in industry 4.0 and 5.0*. Deep Science Publishing. https://doi.org/10.70593/978-81-981271-0-5

# Preface

Artificial intelligence (AI), machine learning (ML) and other emerging technologies such as cloud, edge and quantum computing are converging to rewrite the landscape of modern industries and society as a whole. Comprehensive in scope, the book offers a detailed account of these inter-related domains current trends and future possibilities. Chapter 1: We begin by setting the stage with an overview on various trends, problems proposed to solve and road ahead provided by AI, Machine Learning and Deep learning from cloud, edge and quantum computing perspectives. The same is a comprehensive summary to provide perspective on the implications as one continuous stream of technology. It then discusses scalable and adaptive deep learning algorithms, which work in modern machine learning systems where there is a deluge of data. These algorithms sufficiently prepare AI technologies to face the challenges of increasing data as well as expansion of computational capabilities. Chapter three is Federated learning for Edge AI further makes privacy / personalization and security stronger. The amalgamation of blockchain emphasizes the robust and distributed nature of edge intelligence in modern IoT ecosystems. One of the most pressing issues in today's ethical landscape is that of Explainable Artificial Intelligence (XAI), and so the fourth chapter deals with some recent advances in explaining black-box models, providing a way to better understand -and thus potentially trust- AI-driven decision-making processes. This study explores the application of Automated Machine Learning (AutoML) in the contexts of Industry 4.0 and Society 5.0 giving insights on how automation can bring efficiency and innovation in different sectors. It also presents information on the challenges and opportunities that AutoML faces. In conclusion, the book discusses Artificial General Intelligence (AGI),

which is a new topic that presents an ambitious view of what AI may be capable of in the future and some points to digest over how the concept might relate to our understanding on what industry may look like in the next stage of human evolution. Individually, these chapters offer a slice of the overall picture of where AI technologies are headed to keep pace with an advancing world.

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