

WOODHEAD PUBLISHING REVIEWS: MECHANICAL ENGINEERING SERIES



# MACHINE INTELLIGENCE IN MECHANICAL ENGINEERING



Edited by  
**K. PALANIKUMAR**  
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# Machine Intelligence in Mechanical Engineering

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Mechanical Engineering Series

# Machine Intelligence in Mechanical Engineering

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# Preface

Artificial intelligence, machine learning (ML), and deep learning are utilized in almost all entities of the current world. These technologies are applied in every part of business, human life, services, and engineering production. Indeed, ML can transform any engineering landscape, providing data-driven insights to recognize complex phenomena in the field of research and derive more accurate results and analysis in a short time. Machine intelligence is a key and essential element in industrial automation toward Industry 4.0. It prepares the machine to be more sophisticated in solving complex engineering tasks in a smart production line. It can assist the industries in implementing the design of evolution in shorter time and increasing the productivity. It can avoid machine downtime by using a smart preventive maintenance or smart monitoring system. It can monitor and control the workflow easily with less human intervention.

Integration of machine intelligence flips the current simple automation into smart production that results in more profit. However, the following question arises: why is the application of machine intelligence limited to production itself and why can it not be applied in other areas of mechanical engineering? The implementation of ML requires preprocessing of datasets, feature extraction, knowledge of statistics, implementation of algorithms, verification, and validation of ML models. As the datasets in all engineering fields are not with the same features, implementation of ML algorithms in each field of expertise is different and varying. Hence, there must be some guidance to the engineering practitioners, novice researchers, and students to understand the issues in implementation of ML.

This book aims to foster the application of machine intelligence in different divisions of mechanical engineering and provide the insight of data-driven decision-making in different applications in mechanical engineering. This book presents different case studies authored by researchers from different countries. Machine intelligence is a smart investment for the future; hence, this book aims to attract the mechanical engineers toward Industry 4.0.

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