Lecture Notes in Mechanical Engineering

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Michimasa Uchidate *Editors*

Intelligent Manufacturing and Mechatronics

Proceedings of SIMM 2024

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Lecture Notes in Mechanical Engineering

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Preface

We are delighted to present the compilation of papers presented in the 6th Symposium on Intelligent Manufacturing and Mechatronics (SIMM 2024), which showcases the remarkable diversity and cutting-edge nature of contemporary engineering and technological research. The collection of papers featured in this volume reflects the interdisciplinary character of modern scientific inquiry, where traditional engineering disciplines increasingly merging with artificial intelligence, sustainability initiatives, and human-centered design.

This issue presents several notable trends in current research. We see significant advances in intelligent systems, with contributions ranging from visual SLAM algorithms and robotics to innovative applications of machine learning in malware detection and manufacturing optimization. The integration of artificial intelligence extends into unexpected domains, including educational technology and materials science, demonstrating the pervasive influence of AI across disciplines.

Furthermore, sustainability emerges as another key theme, with research addressing green manufacturing, renewable energy, and environmental impact assessment. Particularly noteworthy are studies on electric vehicle infrastructure, waste material utilization, and eco-friendly manufacturing processes. These papers reflect our field's growing commitment to environmental responsibility and sustainable development.

Human-centered technology features prominently, with research spanning ergonomics, virtual reality training systems, and human-robot collaboration. These studies emphasize the importance of designing technology that serves human needs while considering safety, usability, and accessibility. As we navigate the fourth industrial revolution, this collection of research represents the dynamic evolution of engineering and technology. From fundamental materials science to advanced digital twins, from traditional manufacturing processes to cutting-edge AI applications, these papers collectively paint a picture of a field in transformation. We would like to thank all contributors for their rigorous research and valuable insights. Their work not only advances our understanding but also paves the way for practical applications that will shape the future of technology and engineering.

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