Operational Intelligence Engineering

Integrated Systems for Smart Service and Production Sectors

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Operational Intelligence Engineering: Integrated Systems for Smart Service and Production Sectors

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Preface

Operational Intelligence Engineering stands at the intersection of data, systems thinking, and decision science transforming how organizations perceive, analyze, and act in real time. As industries navigate rapid digital transformation, the ability to convert operational data into actionable intelligence has become not merely advantageous, but essential. This book, *Operational Intelligence Engineering: Integrated Systems for Smart Service and Production Sectors*, is written to guide readers through the principles, architectures, and applications that enable intelligent, adaptive operations.

Across both service and production environments, modern enterprises face unprecedented complexity. Distributed supply chains, cyber-physical systems, IoT-enabled infrastructure, AI-driven analytics, and customer-centric service models demand integrated frameworks capable of continuous sensing, learning, and optimization. Operational intelligence engineering responds to this challenge by combining systems engineering, data analytics, automation, and strategic management into cohesive, scalable solutions.

This text presents a structured approach to designing and implementing intelligent operational ecosystems. It bridges theory and practice—linking foundational concepts such as real-time analytics, predictive modeling, digital twins, and process automation with practical applications in manufacturing, logistics, healthcare, energy, finance, and smart services. Emphasis is placed not only on technological integration but also on governance, resilience, cybersecurity, and ethical deployment.

Designed for engineers, researchers, practitioners, and graduate students, this book offers both conceptual clarity and implementation insight. Case studies, system architectures, and methodological frameworks provide readers with tools to engineer operational intelligence systems that are robust, adaptive, and value-driven.

Ultimately, this work envisions organizations that are not merely automated, but aware—capable of learning from data streams, anticipating disruptions, and continuously improving performance. By integrating intelligence into operations, we move toward smarter industries, sustainable production, and responsive service ecosystems prepared for the demands of an increasingly dynamic world.

This book is an invitation to engineers in the future.

Uday Surendra Yandamuri

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