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Adaptive Intelligence in Smart Manufacturing via Value-Oriented IoT Systems

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Abstract: *The integration of AI into smart production environments has emerged as a revolutionary strategy for improving decision-making and streamlining operations. This research demonstrates a VOIS, or Value-Oriented Internet of Things System, which automatically enhances company operations through the use of real-time data analysis and adaptive learning. The suggested approach facilitates real-time bug detection and dynamic feature extraction utilizing deep learning models, particularly YOLOv9-Nano, with a precision rate of 0.94 and an F1-score of 0.93. With respect to energy efficiency (16.7%), decision accuracy (20%), and adaptability (32%), the quantitative evaluation reveals significant gains over conventional IoT systems. The VOIS can cut human intervention by 41% when self-calibrating control and continuous learning optimization are applied. Industrial apps have greatly improved energy management, workflow optimization, and adaptive maintenance. Because it creates effective, scalable, and people-centric automation solutions, value-oriented adaptive intelligence is essential for the next generation of smart manufacturing, according to the results.*

Keywords: Adaptive Intelligence, Smart Manufacturing, Internet of Things (IoT), Value-Oriented Systems, Deep Learning, YOLOv9-Nano, Industrial Automation, Real-Time Decision Making, Energy Optimization, Self-Learning Framework