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Augmenting Cyber-Physical Systems with AI for Smart Farming

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Abstract: *The integration of Cyber-Physical Systems (CPS) with Artificial Intelligence (AI) has revolutionized the agricultural sector, enabling smart farming solutions to enhance productivity, sustainability, and resource efficiency. This paper presents a comprehensive overview of AI-augmented CPS applications in smart farming, focusing on precision agriculture, automated monitoring, and decision-making. It discusses the challenges of implementing CPS and AI in agriculture, such as data integration, scalability, and cost barriers. The proposed system addresses these challenges by incorporating real-time sensor networks, advanced AI algorithms, and automated robotics. Future directions, including the role of big data and IoT in shaping next-generation farming systems, are also explored. This study aims to provide valuable insights into the transformative potential of AI-driven CPS in advancing agricultural practices.*

Keywords: Cyber-Physical Systems (CPS), Artificial Intelligence (AI), Smart Farming, Precision Agriculture, IoT, Machine Learning, Sustainability, Sensor Networks, Big Data Analytics, Automated Irrigation, Crop Monitoring, Yield Prediction, Agricultural Robotics, Climate Adaptation, Soil Analysis

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