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Efficient Industrial Robot Scheduling with Heuristic-Based AIS Algorithm Approach

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Abstract: *Scheduling industrial robots is a highly important optimization problem that has a direct influence on the productivity of manufacturing, energy usage, and cost of operation. The modern robotic manufacturing setting is dynamic, multi-objective, and NP-hard, which makes traditional scheduling approaches incapable of addressing the requirements of such an environment. In this paper, I shall suggest an Efficient Industrial Robot Scheduling model based on an Artificial Immune System (AIS) algorithm developed by Heuristic definition. The AIS framework, based on the biological immune system, is a combination of rules that are heuristic and clonal selection, mutation, and immune memory to allocate tasks and sequence tasks optimally. A mathematical formulation of the scheduling problem is developed in which the makespan, and robot utilization and energy consumption are used as objective functions. The results of the simulation prove that the given approach is much more efficient than the traditional heuristic and genetic algorithms in the speed of convergence, scheduling effectiveness, and the robustness of solutions.*

Keywords: Industrial Robots, Scheduling Optimization, Artificial Immune System, Heuristic Algorithms, Manufacturing Systems

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