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SCIENTIFIC EVALUATION OF POLYCLINIC OPERATING STRATEGIES WITH DISCRETE-EVENT SIMULATION

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Abstract
A subsidized primary care clinic in Singapore wanted to evaluate the impact of different patient appointment apportionment and patient-doctor allocation strategies on the cycle time that their patients need to spend during their clinic visits. To the best of the authors' knowledge, there is limited literature on such studies. This paper aims to fill this research gap via scientific evaluation of these operating strategies. Based on simulation model projections, two key inferences are made. First, appointment system is a good patient classification strategy that reduces median and 95th percentile cycle times of appointment patients. But the magnitude of these reductions in median and 95th percentile cycle times diminish as the proportion of appointment patients in a patient population increases. Second, exclusive allocation of walk-in patients seeking consultation for their non-chronic conditions to selected doctors is not effective relative to appointment systems in reducing overall median and 95th percentile cycle times. 12 refs.
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Key Words: *Cycle Time, Discrete-Event Simulation, Appointment Scheduling, Walk-in Patients*

Pages 177-190

OPTIMUM STABLE GAIT PLANNING FOR AN 8 LINK BIPED ROBOT USING SIMULATED ANNEALING

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Abstract
Biped or humanoid robots should have a higher level of autonomy to achieve different tasks in service and manufacturing sectors. Biped locomotion is a complex dynamical task because of the intermittent interaction with its environment and the ground through its feet. Most of the previous gait planning efforts were made by complex and time consuming algorithms with maximum one limb in the upper body for controlling the gaits. This work presents the kinematic and dynamic modelling and simulation of 8 link biped robot walking with two limbs in the upper body. Optimum cycloidal gait trajectory is simulated and compared between the static and dynamic walking cases. Easy and comparatively less time consuming simulated annealing algorithm is used for the optimization. Zero Moment Point criteria is used for the stability analysis. 13 refs.
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Key Words: *Gait Planning, Sagittal Plane, Zero Moment Point, Simulated Annealing, Degrees of Freedom*

Pages 191-203

A SIMULATION METAMODELLING BASED NEURAL NETWORKS FOR LOT-SIZING PROBLEM IN MTO SECTOR

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Abstract
Simulation is essentially a trial-and-error approach, and is therefore, time-consuming and does not provide a method for optimization. Metamodelling techniques have been recently pursued in order to tackle these drawbacks. The main objective has been to provide robust, fast decision support aids to enhance the overall effectiveness of decision-making processes. This paper proposes an application of simulation metamodelling through artificial neural networks (ANNs). The building of the appropriate ANN model over second-order linear regression model and the reverse simulation metamodelling as simulation-optimization are assisted by the Neuro® Software. To validate the proposed approach, a case study which is adopted from literature, deals with a lot sizing problem in make-to-order supply chain. The optimal solution is to determine the fixed lot size for each manufacturing product type that will ensure order mean flow time target. The comparative results with others metamodels techniques; illustrate the efficiency and effectiveness of the proposed approach. 19 refs.
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Key Words: *Simulation Based Metamodel, Neural Network, Multiple Criteria Optimization, Lot-Sizing Problem, MTO, Supply Chain Management, Case Study*

Pages 204-212

THE TRAVELLING OF FORKLIFTS IN WAREHOUSES

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Abstract
Around 75 % of warehouses retrieve products manually. In these warehouses forklifts are the most expensive machines. The study pays special attention to the travelling of these machines. In order to determine potential travel distance savings, a simulation model is created. The experiments demonstrate that the travel distance of forklifts can be reduced by 27-37 % when RF-based process is implemented comparing with travel distance when paper is used in the process. Research provided herein also defines how to optimize travelling by implementing multiple-tasks approach in WMS. The presented results show that the travel distance of forklifts can be also reduced by 9 % when multiple-tasks approach is used. In addition, it is identified, how stock accuracy affects the travel distance of forklifts. The correlation between the travel distance of forklifts and stock accuracy is presented herein. 19 refs.
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Key Words: *RF, Forklifts, Travel Distance, Accuracy, Multiple-Tasks*