THE OPTIMAL RFID READER DEPLOYMENT IN 3-DIMENSIONAL SPACE BASED ON THE META-HEURISTIC ALGORITHM

ZHI-PING LIN, HER-SHING WANG & YU-JEN CHIU

Department of Industrial Engineering and Management, National Taipei University of Technology, 1, Sec.3, Zhongxiao E. Rd., Taipei, Taiwan

ABSTRACT

With the development and application of RFID technology, a number of issues and conflicts often accompany RFID network planning. Such issues are critical parts of the entire system. A lot of past literature sought best solutions to RFID network planning in a 2D space. Nevertheless, in reality, the vertical height of the interior space ought to be taken into consideration. Hence, two distinct 3D scenarios will be constructed in this research, making reference to multi-objective mathematical models previously constructed, while taking into account signal coverage rate, signal overlap ratio and the number of readers. The research uses non-dominated solutions sorting genetic algorithm and obtains the optimal parameters via Taguchi experimental design so as to acquire the optimization model. The result of the RFID deployment is analyzed not only to provide users with multiple sets of optimal RFID network deployment coordinates, but also to utilize optimal coordinates to present RFID deployment in 3D space, and signal coverage to enable the decision maker to make the selection based on what's required.

KEYWORDS: 3D Space, Non-Dominated Sorting Generic Algorithm-II, RFID Network Planning Problems

Received: Jul 22, 2016; Accepted: Aug 18, 2016; Published: Aug 23, 2016; Paper Id.: IJCNWMOCT20161