Development of an Optimal Product Positioning System Using Genetic Algorithm: Case Study of a Retail Warehouse

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Abstract. A construction retail warehouse is normally selling variety of goods, more than 20,000 SKU. In addition, the demands of customers in terms of amount and type of products are fluctuated according to time seasons. The product placement of a case study warehouse is also arranged based on product categories without the consideration of high demand factor. These are challenged for retailers to manage the warehouses that are effective responding their customers' demands. Therefore, the purpose of this study is to develop an optimal product positioning system using genetic algorithm (GA). The optimal product locations can provide quick response to customers in term of the decease of picking distance, resulting of gaining more profits. The development of the optimal product positioning system consists of four components; adding products details, adding shelf details, analyzing the optimal product location by GA and showing the arrangement of products' locations. The factors considering in GA analysis are initial population, generations, percent crossover and percent mutation. From the GA analysis to define the optimal location of the high picking frequency group of painting products (48 SKU), it was found that the total distance from painting products locations can be decreased from 4,860 meters to 1,820 meters or 62.5% reduction compared to the previous products location.

Keywords: Warehouse design; Genetic Algorithm; Product Placement