

A Real-Time Inventory Routing Problem with Weight Strategy

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ABSTRACT

In recent years, due to the oil crisis and oil supply shortage, the price of oil repeatedly hit new record highs. Among all the business sectors, especially the transportation industry has been facing severe impacts due to its high demand of oil. Hence, while satisfying the clients' demand, reducing the total transportation costs has become the most urgent issue for the supply system of the transportation industry. Cutting costs in the supply chain can be achieved by the two aspects: (1) lowering the distribution costs on the supply side, (2) reducing the inventory and shortage costs on the demand side. We extended one commonly discussed topic in supply chain planning and management called Inventory Routing Problem (IRP) where both inventory and routing path control are monitored simultaneously. The purpose of IRP is to minimize distribution and total inventory costs by directing the delivery quantity and the shipping path in a certain transportation service region. We used IRP to model the circumstance under study. However, IRP models did not consider the difference of weights and the dynamic characteristic of the customers' demand after the vehicle departed, This study proposed a heuristic for determine delivery quantity and the shipping path for the distributor center which uses one single vehicle to serve multiple retailers by considering the weights of each retailer on a real-time basis. Through system simulation, the proposed distribution scheme was shown more cost effective than the conventional distribution schemes. The contribution of research includes taking account of dynamics of IRP and considering weights of the retailers; that can be more reflective on the real-world circumstance.

Keywords : inventory routing problem, system simulation, real-time, weight

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