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"Workforce Management in Delivery Operations

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Abstract

Service quality and driver efficiency in the delivery industry may be enhanced by increasing the regularity with which a driver visits the same set of customers. However, effectively managing a workforce of drivers may increase travel distance, a traditional metric of the vehicle routing problem (VRP). This research evaluates the effect that workforce management has on routing costs, providing insight for managerial decision making. The analysis is presented in the context of the period vehicle routing problem (PVRP), an extension of the VRP with vehicle routes constructed to service customers according to preset visit frequencies over an established period of time. We develop models to apply workforce management principles. Through a computational study with standard PVRP test cases and real-world delivery data, we show that multi-objective PVRP models can achieve a balance between workforce management and travel distance goals. With the proper parameters in place, workforce management principles may be successfully applied without sacrificing other operational objectives.