
Vehicle Routing for a Food Service Marketplace

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Abstract

With e-commerce revolutionising the Food and Beverages industry, there has been a surge of online food marketplaces world around, which allow customers to place orders from third party restaurants by listing their menus on its website, and offer logistics support to the restaurants. The success of such a marketplace depends on how it manages its delivery lead time and the total cost incurred to operate the fleet.

We demonstrate a vehicle routing problem with time windows and multiple pickups and deliveries at a food service marketplace using an illustrative case of a food technology start-up, considering the case of an aggregator cum restaurant with third party restaurants registered to it. The supply network offers a set of specialty products. The aggregator offers logistic support on behalf of the restaurants.

We consider a given set of open orders from different demand locations, delivery time windows, and current vehicle availability. The aggregator tries to minimise the total cost (and fleet travel duration) incurred to fulfil the orders within the time windows. We deploy Constraint programming to solve the multi-product, heterogeneous vehicle routing problem with time windows, pickups and deliveries.

The model helps decide the number of vehicles to be used, and the pickup and delivery schedules. It also accommodates for the traffic conditions in the routes.

To the best of our knowledge, this is the first paper that deals with vehicle routing problem at an online food service marketplace.

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