

Minimizing the Cost of Hiring Employees and Purchasing Equipment Based on Operation/Handling Qualification for a Drone Delivery System Site

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Problem Description:

A popular grocery store uses drones to deliver food, toiletries, medicine, beauty products, and other items to customers. The company uses various types/brands/sizes of drones - some cost more than others due to the need for a more technically trained employee to operate the drone, insurance costs, maintenance, etc. The more expensive drones are higher quality; therefore, they can stand more daily use. However, because the delivery service is so popular, all drones, when used appropriately, only last 3-4 months. Different time periods like holidays and seasons, and economic factors like inflation, fuel prices, and unemployment affect demand for deliveries from the grocery store. Some items cannot be delivered via drone in temperatures that are too high or too low. Assume that the drones can make deliveries in rain, snow, or other harsh weather conditions – these do not need to be considered.

When building a new location for the grocery store in the area of interest that is scheduled to open at the beginning of the year, the drone site manager needs to determine which drones to purchase at the beginning of each season, and, therefore, how many seasonal employees they will need to hire for fall, winter, spring, and summer, as well as how technically trained these employees will be as higher trained employees require higher wages.

Our goal is to provide the site manager with a user interface that allows them to enter information about the upcoming season. After entering information about the predicted average temperature of the upcoming weeks/months, selecting any weeks where a holiday or other popular event will occur, fuel prices, inflation rate, unemployment statistics, and possibly more – we will run background tasks to create an optimal solution of necessary employees hired at the beginning of the season, necessary employees scheduled on a weekly basis, and drones to purchase to meet customer demand.