Executive Summary

Optimization of Vehicle Routing for Systems in Non-Profit Organizations

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One of the most significant effects of agriculture on climate change is the problem of global food waste. Due to the rising number of people suffering from hunger since 2014, as reported by the UN, reducing food waste is crucial. Additionally, one of the biggest contributions to landfills is thought to be food waste. Food is wasted across the whole food supply chain, from farmer fields to food processing plants to merchants and caterers, and finally to consumers. This essay suggests a strategy for dealing with the vehicle routing issues (VRP) that charitable organizations encounter. The methodology comprises of four consecutive methods to enhance functionality and performance: greedy, intraroute, interroute, and tabu search. The VRP, sometimes referred to as route optimization, entails a fleet of vehicles with various capacities and a depot that serves multiple customers, considering several routes to determine the least expensive way to fulfil the various demands. In the VRP, there are various routes that begin and end at the depot, and a single truck handles each request. By figuring out the quickest routes and monitoring each vehicle, a VRP system's main goal is to boost the fleet vehicle's transportation efficiency. This study's main goal was to cut down on the number of vehicles and overall travel time to save money on transportation. Services are offered by nonprofit organizations in accordance with charitable beliefs. Such businesses require solutions to operate successfully. A non-profit organization called Ekram was utilized as a case study in this study to enhance the processes of gathering and distributing food to individuals. The vehicle routing problem (VRP) was a significant issue for Ekram. Additionally, when serving several customers by delivering or collecting meals, it's critical to identify a variety of efficient routes that not only meet their needs but also help Ekram save money and time.

In this study, greedy, intraroute, interroute, and tabu search algorithms were used to discover the best route for food collection and delivery. A smartphone application was also created to streamline the procedure. The proposed algorithms considerably enhanced Ekram's operational procedure, according to the results. The proposed method performed better than the most recent way, according to the results. Utilizing the suggested system for VRPs hence improves the level of service and financial effectiveness for such firms.

Source: [Information](#)

KEYWORDS
Surplus food; routing; optimization; vehicle