Using Multi-Objective Genetic Algorithm for Food Delivery Service to Optimize Safety And Mileage

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In recent years, the popularity of food delivery services has significantly increased. However, this growth has given rise to traffic issues that expose delivery workers to a higher risk of accidents. Also, business navigation apps, such as google maps, only plan the shortest or fastest route without considering safety. This study aims to provide the safest way for delivery workers to have the lowest risk. For each O-D link in the traffic network, the risk is generated from accident data and minimized to plan the safest route. Yet, the safest route is not feasible for excessive mileage. Hence, this study introduces a hybrid route considering both safety and mileage. Multi-objective genetic algorithm is used to determine the hybrid route. Compared to the shortest route, the safest route's average risk reduces by 69% while the average mileage increased by 145%. By contrast, the hybrid route reduces the average risk by 59%, and the average mileage increased by 47% only. In the future, this study can be used to design food delivery service platforms to prevent delivery workers from accidents.

Keywords: Delivery Crash; Accidental Data; Shortest Path; Multi-objective Genetic Algorithm (MOGA)