
Optimal Locations for Ambulance Service Stations – A Case Study in Galle District

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“1990 - Suwaseriya” is a pre-hospital emergency ambulance service that has been introduced in 2016 in Sri Lanka to provide pre-hospital emergency care and transportation to hospitals for free of charge. According to the statistics, 297 ambulances have been deployed in police stations covering all of Sri Lanka to provide the fastest pre-hospital medical services upon the arrivals of 1990 phone calls. But, there is a reasonable doubt, whether the ambulances are located in optimal locations in service areas to provide a faster service. Since the ambulance locations might not be centralized to the demand areas, the actual response time might be higher than the expected response time of the emergency service requesters. The consequence of this delay can be led to loss of lives of many individuals in critical conditions. The aim of this work is to propose an optimized solution for the ambulance location-allocation problem in order to provide an efficient pre-hospital emergency care to the public. Here, the main objective is to minimize the service response time for 1990 phone calls. The problem is formulated as a location optimization problem with the population and distance weighted cost function. Here, Ant Colony Optimization (ACO) algorithm is used to solve the optimization problem. ACO is an optimization algorithm inspired by the natural behaviour of depositing pheromone by ants while directing each other to resources. In this study, Galle district which get the service of 18 ambulances for 96 cities is selected as the case study area . The results show that the existing locations of the ambulances must be revised in order to provide efficient pre-hospital emergency care service. Although this research is limited to Galle district, given the importance of the ambulance service in saving lives, optimization of the service covering the whole country is highly recommended.

Keywords: Ant colony optimization (ACO), Emergency ambulance service, 1990 – Suwaseriya