# ABSTRACT

The increasing interest in traveling makes it a necessity for people. Tourism is also one of the primary commodities for the government in generating foreign exchange. Nowadays, most people travel to new destinations (which tourists are unfamiliar with) and allocate more than one day for their vacations. Therefore, they require knowledge about places to explore during their few days' stay there. This paper uses the phrase "$N$-days of visit" to refer to travel within a few days. Many studies have developed recommendations for $N$-days tourist visits by analogizing the Traveling Salesman Problem (TSP). However, the solution is not optimal due to the truncation of daily paths based on time constraints. To address this issue, we adopt the Vehicle Routing Problem (VRP) analogy, precisely Vehicle Routing Problem with Time Windows (VRPTW), to recommend routes. In addition, we propose the Improved Artificial Bee Colony Algorithm based on reverse learning Harris Hawks Optimization (HABC) as a method to optimize routes in VRPTW. Multi-Attribute Utility Theory (MAUT) is used as an objective function to evaluate the extent to which criteria match the user's preference. The MAUT value is then utilized to calculate the fitness value. Experimental results show that HABC-VRP not only outperforms HABC-TSP but also several other algorithms, such as Artificial Bee Colony (ABC), Ant Colony System (ACS), Cuckoo Search Optimization (CSO), and Simulated Annealing (SA) in solving VRP, by achieving an average fitness value of 0.7495. In addition, HABC-VRP showed better performance in four other metrics: total travel duration, total cost, average rating, and number of POIs included. In terms of running time, HABC-VRP produces optimal routes with faster computational time. Based on these findings, our proposed model effectively finds the optimal $N$-days route by solving the VRP.

**Keywords:** recommender system, vehicle routing problem, artificial bee colony, harris hawks optimization, multi-attribute utility theory.