Multi-Objective Four-Dimensional Traveling Salesman Problem in an IoT-Based Transport System

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Abstract : In this research paper, an algorithmic approach is developed to solve a novel multi-objective four-dimensional traveling salesman problem (MO4DTSP) where different paths with various numbers of conveyances are available to travel between two cities. NSGA-II and Decomposition algorithms are modified to solve MO4DTSP in an IoT-based transport system. This IoT-based transport system can be widely observed, analyzed, and controlled by an extensive distribution of traffic networks consisting of various types of sensors and actuators. Due to urbanization, most of the cities are connected using an intelligent traffic management system. Practically, for a traveler, multiple routes and vehicles are available to travel between any two cities. Thus, the classical TSP is reformulated as multi-route and multi-vehicle i.e., 4DTSP. The proposed MO4DTSP is designed with traveling cost, time, and customer satisfaction as objectives. In reality, customer satisfaction is an important parameter that depends on travel costs and time reflects in the present model.

Keywords : multi-objective four-dimensional traveling salesman problem (MO4DTSP), decomposition, NSGA-II, IoT-based transport system, customer satisfaction

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