MODIFIED SPIDER MONKEY OPTIMIZATION FOR TRAVELING SALESMAN PROBLEM

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Traveling Salesman Problem (TSP) is the problem faced by a salesman who starts from a specific city and travels all the other cities in the shortest conceivable path. TSP is the most popular combinatorial optimization as many real-world problems can be formulated as an instance of the TSP. Nearly every year, new methods for solving various problems (e.g., engineering, optimization) are verified on the TSP considering it as a standard test bench. Recently, Spider Monkey Optimization (SMO) is developed for numerical optimization inspired by the intelligent foraging behavior of spider monkeys. This thesis investigates a new effective optimization method to solve TSP based on the social behavior of spider monkeys. The proposed Modified SMO (MSMO) tackles the challenges of developing a novel method for TSP updating features of SMO as well as introducing the required features. In MSMO, every spider monkey represents a TSP solution; and Swap Sequence (SS) and Swap Operator (SO) based operations are employed for interaction among monkeys to obtain the optimal TSP solution. The SOs are generated using the experience of a specific spider monkey as well as the experience of other members (local leader, global leader, or randomly selected spider monkey) of the group. MSMO follows self-organization as well as separation of labor properties for finding intelligent operations for TSP. When the Global leader divides the groups into subgroups, it implies the divisions of labor property. Due to multiple sources consideration of SOs calculation, diverse solutions are brought in at different iterations and hence easy to find a better solution of a TSP problem. The proposed method has been examined on a large number of benchmark TSPs. MSMO shows 44 and 37 best result out of 45 benchmark TSP problem compare to Ant Colony Optimization and Velocity Tentative PSO respectively. Multiple interaction stages might be beneficial to get better outcomes with respect to other existing methods. Experimental results demonstrate the effectiveness of the proposed MSMO to solve TSP. Solving different scheduling and routing problems extending conceiving ideas from MSMO might be interesting and remained as a future study.

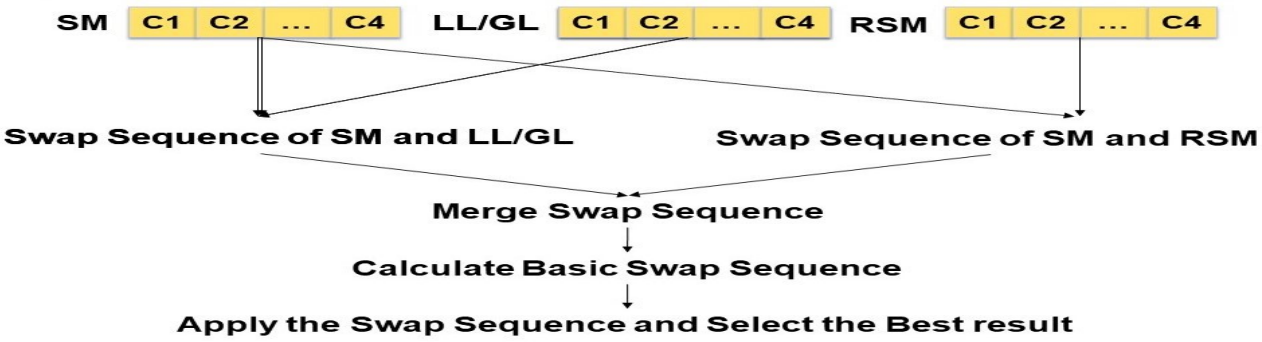

Figure: Updating a Spider Monkey Solution