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INFO-H-414 - SWARM INTELLIGENCE

Swarm Robotics Project : Diffusion

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Report Outline

A report of 4-6 pages structured as follows:

- Main idea of your approach [1 page]
- Structure of your solution (the state machine) [2 pages]
- Analysis of the results [1-3 pages]

Basic idea

State machine

Conclusions

To summarize the results from the previous analysis:

- On this set of instances, the Simulated Annealing algorithm performs generally better than Ant Colony Optimization.
- Simulated Annealing is able to generate an higher percentage of feasible and high quality solutions.
- I believe that the strong limitation of computation times, with respect to VND, has a strong impact on the performance of the algorithms as the generally low probability of finding high quality solutions shows, for ACO in particular.
- Further improvement on the ACO algorithm could be made by implementing the original $\mathcal{MAX} - \mathcal{MIN}$ system and using an heuristic which could make a better use of the locally available information and guide the algorithm towards feasible solutions.
- While the performances of the ACO system are comparable, if not slightly worse than the best VND algorithm implemented in the previous implementation exercise, SA has considerably low run-times required to find high-quality solution and higher percentages of feasible solutions, thus outperforming both the aforementioned algorithms.
- The usage of average statistics as metrics to measure the quality of the algorithms is strongly biased by the presence of outliers (penalization, in this case).

References