INDUSTRY-STANDARD EC APPLICATIONS: SUCCESSES AND CHALLENGES

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Evolutionary Computation (EC) methods have been suggested and applied for more than three decades by now. From their basic suggested methods involving binary encodings leading to a simple genetic algorithm, many new and advanced evolutionary algorithms are proposed. They have been applied to many difficult problems in practice, commercialized with dedicated softwares, and proliferated to a number of different fields including software engineering, manufacturing, design, bioinformatics, service industries, games, artificial intelligence and machine learning problems. While the development of new and advanced methods will continue to get more and more attention from academic researchers, it is somewhat worrisome that EC methods are not yet fully embraced to any reasonable extent by industries in their routine day-to-day tasks. It is in this background we propose to arrange a special session during the upcoming CEC-2017 conference focussing on the success and challenges of EC methodologies in addressing real-world problems from industries.

The first organizer has 29 years of experience in developing generic EC methods, some of which are now used as default in single and multi-criterion optimization, and has 25 years of experience working with industries in applying EC methods in various industrial problems. The second and third organizers come from a leading automotive industry and have many years of research experience in design optimization, manufacturing and project executional aspects. They all are well connected with other leading industries who are either already using EC methods or are finding EC methods to be potential for an adoption. Besides academic researchers, the organizers plan to pursue and motivate various industrial researchers to submit papers related to the success of their EC adoption and discuss challenges offered by their problems to existing search and optimization algorithms. This special session will provide a platform for industrial researchers to showcase their EC success and simultaneously discuss challenges they exhibit requiring special research efforts. Thus, this special session plans to bring together researchers and practitioners (hopefully, in equal proportion) working on any aspects of practicalities observed in routine real-world problems.

Since the special session focuses on real-world problem solving, a good balance of academic and industrial participation will be maintained. While successful EC case studies will provide valuable information to the participants, challenging unsolved problems should

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also give academic researchers new areas to venture. The special session will also include a panel discussion between authors, participants and a few invited experts summarizing current status and future efforts needed to motivate more industrial adoption of EC methods.

Topics

- Large-scale (variables, constraints, and objectives) search and optimization problems
- Miniscule feasible search space
- Mixed discrete-continuous search space
- Expensive evaluation procedure
- Uncertainty in variables and parameters
- Noise in objective and constraint evaluations
- Deep linkage among variables
- Limited computational budget