

Studies in Computational Intelligence

Volume 811

Series editor

Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland
e-mail: kacprzyk@ibspan.waw.pl

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Seyedali Mirjalili · Jin Song Dong ·
Andrew Lewis
Editors

Nature-Inspired Optimizers

Theories, Literature Reviews and Applications

 Springer

Editors

Seyedali Mirjalili
Institute for Integrated
and Intelligent Systems
Griffith University
Brisbane, QLD, Australia

Andrew Lewis
Institute for Integrated
and Intelligent Systems
Griffith University
Brisbane, QLD, Australia

Jin Song Dong
Institute for Integrated
and Intelligent Systems
Griffith University
Brisbane, QLD, Australia

Department of Computer Science
School of Computing
National University of Singapore
Singapore, Singapore

ISSN 1860-949X

ISSN 1860-9503 (electronic)

Studies in Computational Intelligence

ISBN 978-3-030-12126-6

ISBN 978-3-030-12127-3 (eBook)

<https://doi.org/10.1007/978-3-030-12127-3>

Library of Congress Control Number: 2018968101

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This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

To our parents

Preface

One of the fastest growing sub-fields of Computational Intelligence and Soft Computing is Evolutionary Computation. This field includes different optimization algorithms that are suitable for solving NP-hard problems for which exact methods are not efficient. Such algorithms mostly use stochastic operators and are gradient-free, which makes them suitable for solving nonlinear problems, particularly those for which objectives are noisy, multi-modal, or expensive to evaluate.

The main purpose of this book is to cover the conventional and most recent theories and applications in the area of Evolutionary Algorithms, Swarm Intelligence, and Meta-heuristics. The chapters of this book are organized based on different algorithms in these three classes as follows:

- Ant Colony Optimizer
- Ant Lion Optimizer
- Dragonfly Algorithm
- Genetic Algorithm
- Grey Wolf Optimizer
- Grasshopper Optimization Algorithm
- Multi-Verse Optimizer
- Moth-Flame Optimization Algorithm
- Salp Swarm Algorithm
- Sine Cosine Algorithm
- Whale Optimization Algorithm

Each chapter starts by presenting the inspiration(s) and mathematical model(s) of the algorithm investigated. The performance of each algorithm is then analyzed on several benchmark case studies. The chapters also solve different challenging problems to showcase the application of such techniques in a wide range of fields. The problems solved are in the following areas:

- Path planning
- Training neural networks
- Feature selection

- Image processing
- Computational fluid dynamics
- Hand gesture detection
- Data clustering
- Optimal nonlinear feedback control design
- Machine learning
- Photonics

Brisbane, Australia
August 2018

Dr. Seyedali Mirjalili
Prof. Jin Song Dong
Dr. Andrew Lewis

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Contributors

Ibrahim Aljarah King Abdullah II School for Information Technology, The University of Jordan, Amman, Jordan

Jin Song Dong Institute for Integrated and Intelligent Systems, Griffith University, Nathan, Brisbane, QLD, Australia;
Department of Computer Science, School of Computing, National University of Singapore, Singapore, Singapore

Hossam Faris King Abdullah II School for Information Technology, The University of Jordan, Amman, Jordan

Ali Asghar Heidari School of Surveying and Geospatial Engineering, University of Tehran, Tehran, Iran

Andrew Lewis Institute for Integrated and Intelligent Systems, Griffith University, Nathan, Brisbane, QLD, Australia

Majdi Mafarja Department of Computer Science, Faculty of Engineering and Technology, Birzeit University, Birzeit, Palestine

Seyed Hamed Hashemi Mehne Aerospace Research Institute, Tehran, Iran

Seyedali Mirjalili Institute for Integrated and Intelligent Systems, Griffith University, Nathan, Brisbane, QLD, Australia

Seyed Mohammad Mirjalili Department of Electrical and Computer Engineering, Concordia University, Montreal, QC, Canada

Seyedali Mirjalili Institute of Integrated and Intelligent Systems, Griffith University, Nathan, Brisbane, QLD, Australia;
School of Information and Communication Technology, Griffith University, Brisbane, QLD, Australia

Seyedeh Zahra Mirjalili School of Electrical Engineering and Computing, University of Newcastle, Callaghan, NSW, Australia

Ali Safa Sadiq School of Information Technology, Monash University, Bandar Sunway, Malaysia

Shahrzad Saremi Institute for Integrated and Intelligent Systems, Griffith University, Brisbane, QLD, Australia