Amir Hossein Gandomi

Professor of Data Science

Faculty of Engineering and Information Technology

Amir Hoseein Gandomi is a Professor of Data Science at the Faculty of Engineering & Information Technology, University of Technology Sydney. Prior to joining UTS, Prof. Gandomi was an Assistant Professor at the School of Business, Stevens Institute of Technology, NJ and a distinguished research fellow in BEACON center, Michigan State University. Prof. Gandomi has published over one hundred and sixty journal papers and five books which collectively have been cited more than 12,500 times (H-index = 55). He has been named as Highly Cited Researcher (top 1%) for three consecutive years, 2017 to 2019, and ranked 19th in GP bibliography among more than 12,000 researchers. He has also served as associate editor, editor and guest editor in several prestigious journals and has delivered several keynote/invited talks. His research interests are global optimization and (big) data mining using machine learning and evolutionary computations in particular.

Evolutionary Computation: Concepts and Real-World Applications

Evolutionary computation (EC) techniques are a subset of artificial intelligence, but they are slightly different from the classical methods in the sense that the intelligence of EC comes from biological systems or nature in general. The efficiency of EC is due to their significant ability to imitate the best features of nature which have evolved by natural selection over millions of years. The main theme of this presentation is about EC techniques and their application to real-world problems. On this basis, the presentation is divided into two separate sections including (big) data mining, and global optimization. First, applied evolutionary computing in data mining field will be presented, and then their new advances will be mentioned such as big data mining. Here, some of my studies on big data mining and modelling using EC and genetic programming, in particular, will be presented. As case studies, EC application in some real-world problems will be introduced. And then, application of EC for response modelling of a complex engineering system under stochastic loads will be explained in detail to demonstrate the applicability of these algorithms on a complex real-world problem. In the second section, the evolutionary optimization algorithms and their key applications in the optimization of complex and nonlinear systems will be discussed. It will also be explained how such algorithms have been adopted to real-world problems and how their advantages over the classical optimization problems are used in action. Optimization results of large-scale systems using EC will be presented which show the applicability of EC. Some heuristics will be explained which are adaptable with EC and they can significantly improve their results.