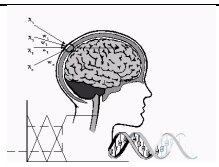
International
Innovation in Knowledge Based and Intelligent Engineering Systems



INVITED SESSION SUMMARY

Title of Session:

Computational learning theory and advances from Heuristics to Hyperheuristics : new trends and applications in hard optimization, in constraint reasoning and in real life problems

Name, Title and Affiliation of Chair:

Pr. Sadok BOUAMAMA, Higher Colleges of Technology, DMC, Dubai, UAE
Dr. Moez HAMMAMI, University of Tunis, Tunisia

Details of Session (including aim and scope):

Application of exhaustive search for hard optimization problems is thwarted by the huge computational cost, which is, generally, impossible to realize in a bearable time. For these reasons, heuristic and metaheuristics have been widely applied to tackle this type of problems. However, their application to specific problems requires problem-specific coding and parameter adjusting to produce good results. Hyperheuristics are new optimization approaches having a higher level of abstraction than metaheuristics. The strength of hyperheuristics is that they perform on a search space of low-level problem-specific heuristics rather than directly on the search space of solutions, as it is the case with metaheuristic approaches. Hyperheuristics takes advantages from machine learning techniques to decide when and where to apply each single low-level heuristic. Then, hyperheuristics could be easier to adapt for any specific optimization problem. Moreover, graph theory, machine learning and social behaviour could inspire the latter. Nowadays this branch of artificial intelligence dealing with the design and analysis of new algorithms to infer and/or discover and/or learn patterns to solve problems based on sample data is called computational learning theory. This special session focuses on, but not limited to, new works showing original computational algorithms and proving their efficiency on well-known problems.

This special session is, mainly, expected to invite recent original researches on the following topics:

- Genetic algorithms
- Particle swarm
- Honey bee optimization
- Ant colony
- Mimetic algorithms
- Firework algorithms
- cockroach algorithms
- Local search
- Distributed hyperheuristics
- Distributed metaheuristics
- Parallel metaheuristics
- Parallel hyperheuristics
- Constraint reasoning
- New heuristics
- New metaheuristics
- New hyperheuristics
- Machine learning strategies
- Graph theory inspired solutions
- Computational learning theory application in real life

Main Contributing Researchers / Research Centres (tentative, if known at this stage):

- Hajer BEN OTHMAN, American University of Sharjah, UAE.
- Sadok BOUAMAMA, Higher College of Technology, DMC, Dubai, UAE
- Maurice CLERC, Independent Consultant, France
- Russell EBERHART, Purdue School of Engineering and Technology, Indianapolis, USA
- David E. GOLDBERG, University of Illinois Urbana-Champaign, Illinois, USA

- Moez HAMMAMI, ISG Tunis, University of Tunis, Tunisia
- James KENNEDY, US Bureau of Labor Statistics, Washington DC, USA
- Ouajdi KORBAA, ISIT'COM, University of Sousse, Tunisia
- Patrick SIARRY, University of Paris 12, France
- Moncef TAGINA, COSMOS, ENSI, University of Manouba, Tunisia
- Elgazali TALBI, INRIA DOLPHIN, Polytech'Lille, University of Lille 1, France

Submission and important dates:

- Paper submission: **07 May 2021**
- Notification of acceptance: **20 May 2021**
- Final paper publication files to be received by: **28 May 2021**

Website URL of Call for Papers (if any):

http://kes2021.kesinternational.org/cmsISdisplay.php

Email & Contact Details:

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