# 2019 India International Congress on Computational Intelligence

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Welcome to this TC of the 2019 Edition of India International Congress on Computational Intelligence (IICCI). It presents the extended versions of carefully selected manuscripts presented and appeared in the proceedings of the twin annual conferences of IICCI: 2019 6th International Conference on Soft Computing and Machine Intelligence and 2019 3rd International Conference on Intelligent Systems, Metaheuristics and Swarm Intelligence held in Johannesburg (South Africa) and Male (Maldives) respectively.

Till 2019, the term "COVID" was unheard of and both the above events, similar to the previous ones, were held in conventional on-site formats, involving meeting and delegate greeting. Overall, things were going hunky-dory for IICCI as we prepared to usher in 2020. By following the footsteps of previous years, the guest editors were also getting ready to examine and shortlist a subset of the 2019 conference papers for possible considerations and publications for this TC of the NCAA journal.

Unfortunately, the pandemic had pushed the entire human civilization into uncharted territory and professionals of all categories who started facing headwinds. The R&D community was no exception. The lockdowns as declared by all the respective federal governments led to the separations of researchers from their peers as well as students coupled with irregular access to laboratories. Naturally, we turned apprehensive and presumed lukewarm responses from the authors of the shortlisted manuscripts, vis-a-vis widening of their conference findings and submissions for this TC.

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Contrary to our premonitions, it was heartening to note that, instead of resorting to knee-jerk reactions and pressing the panic buttons, the global scientific community showed remarkable grit and determination. They clearly remained committed and continued with their relentless R&D pursuit despite encountering unprecedented adversity. No doubt, the resulting progress and setbacks went hand in hand but their resilient performance and efforts during such trying times were indeed praiseworthy. Along with the Frontline workers, the scientific investigators, who continued with their investigations with such great gusto, facing immense hardships and sacrifices amidst lockdowns, should surely be categorized as Unsung Heroes of the pandemic.

For this TC, a total of 38 manuscripts were shortlisted; the theme of which were found interesting and technically promising with sufficient scope for carrying out further extension (at least, 50% of the conference proceedings version).

The authors of those 38 papers were intimated accordingly and invited to extend and submit their respective conference papers, after carrying out the necessary extensions (at least, 50%). After submissions, all the papers were sent for reviewing to at least 2 independent domain experts. Based on their findings and following the identical process of reviewing, as carried out for papers submitted for general issues of the NCAA journal, ultimately 10 research findings were accepted for publications and today we are pleased to showcase the same in this TC. We would now like to share a snapshot of those contributions.

Ganguli et al. have proposed a nonparametric method for topic identification with granularity concept and graph-based modeling. In particular, they have proposed the granularity-based word grouping (GBWG) algorithm by associating the words at different granularity levels, capturing not only the words but also its semantic meanings. After that, they have also proposed the Louvain graph clustering algorithm to identify the topics across different benchmark datasets. The experiment results supported the proposed approach in a statistically significant manner.

Aliyu and Lim have proposed a recurrent neural network approach (i.e. long short-term memory (LSTM)) for the

selection of optimal wavelet features for epileptic EEG signal classifications. Specifically, Aliyu and Lim proposed to process the EEG signals with discrete wavelet transform, resulting in 20 eigenvalue features. Those features are then filtered by correlation and *p*-value analysis. An LSTM classifier is fed by the resultant features and found to outperform the other classifiers.

Doorsamy and Rameshar have proposed an investigation study on the uses of PCA as the compression pre-processing tool for X-ray image classifications. In particular, they have investigated the impacts of PCA on the downstream X-ray classification accuracies. Different levels of compression are also examined with ANFIS, SVM, and ANN classifiers. The overall results indicated that there is a potentially feasible compression range which can strike a good balance between compression levels and classification accuracies.

Chiba et al. have proposed a fully automated many-objective evolutionary design optimization system for the geometric design problem of flyback booster. The proposed system has been validated across different scenarios of the design solutions. Overall, the authors have brought new perspectives on the uses of many-objective evolutionary optimization in a refreshing perspective. It provides us a good example of multi-disciplinary problem solving across numerical optimization and transportation engineering.

Doush et al. have investigated a fundamentally important problem in evolutionary multi-objective optimization (EMO). Different stopping criteria have been examined and benchmarked across different settings. Four stopping criteria have been traversed across six different EMO algorithms. The experiments include the ZDT, DTLZ, CEC2009, Tanaka and Srivana test functions. Based on the experimental results, different guidelines are discussed and given for the proper stopping criterion settings across different EMO algorithms.

Sadr et al. have proposed a data science framework for anomaly detection via dimensionality reduction (DRAMA). Its main feature lies in its flexibility and generalization capability across a wide range of simulated and real datasets up to 3000 dimensions. Its performance is especially pronounced at the high dimensions. In addition, the DRAMA method naturally provides outlier clustering which is convenient for downstream data science tasks such as active learning on unbalanced data.

Manaskasemsak et al. have proposed a graph-based approach for detecting fake reviewers and their associations in the context of commercial product/service reviews. Technically, the proposed approach relies on annotated known fake reviewers as the starting points. The points are then propagated to the surrounding to expand the fake reviewer pool based on the similarities from word embedding and lexicon-based emotion indicators evaluated on the review sentences, with sound verifications on two real datasets from Yelp.

Aider et al. have proposed a cooperative evolutionary approach for solving the bi-objective quadratic multiple knapsack problem (NP-Hard). In particular, there are two stages. In the first stage, approximate Pareto front is generated by the constrained operator-based approach. In the second stage, an iterative refinement method is proposed to refine the Pareto front iteratively until convergence. The proposed method has been compared with the other methods for performance insights.

Kanazaki et al. applied CNSGA-II to the multi-objective design problems in time-series landing flight path and control optimization of supersonic transport. Specifically, they have carefully written and formulated the problems. Solid visualization techniques have also been heavily utilized for clear demonstration on the application in a multi-disciplinary manner.

Machesa et al. have proposed a soft computing approach to address the performance issues of the Stirling engine with different techniques such as artificial neural network, fuzzy Mamdani model (FMM), adaptive neuro-fuzzy inference system (ANFIS), and artificial neural network with particle swarm optimization (ANN-PSO). Their results reflect that FMM shows the best performance for power while FMM and ANN-PSO show the best performance for torque in Stirling engine system.

These 10 papers will shed light on the widening of the scopes of the corresponding conference manuscripts. Researchers could enjoy reading those articles and find those useful for furthering their investigations.

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