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SPECIAL ISSUE ON APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

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Computers have become an integral and pervasive part of our daily life while at the same time becoming more complex. These factors bring many significant challenges for developers, with availability, correctness, usefulness and useability, security and privacy demands as imperatives. One emerging and significant dimension of computing is Computational Intelligence (CI) which refers to the ability of a computer to emulate human thinking and be able to learn a specific task from available data and experimental observations, essentially experiential learning. CI is closely related to artificial intelligence, where heuristics and metaheuristic algorithms are applied or designed to provide a better and optimal solution to a problem in a timely manner. These algorithms have been successfully applied to a variety of essential application domains such as medicine, bioinformatics, forecasting, education and crime prevention.

The objective of this special issue is to explore the new and novel aspects of computer system development which include applied computational techniques that include, *inter alia*, evolutionary algorithms, machine learning approaches, and meta-heuristic algorithms, to resolve problems, both big and small, personal and universal, faced by humanity today.

The ideas proposed, and solutions to the important problem areas addressed, in the articles included in this issue, which have been chosen from the considerable number of articles submitted to the Conference, show the willingness and ability of many computer technologists to meet those challenges in the various domains of political, social and scientific endeavour in the real world. These papers have undergone a rigorous review process by two qualified professionals, ensuring that the papers reach the high quality standard demanded by the *ICIC Express Letters* Editorial Board. Following this rigorous review process, and completion of revisions considered necessary to achieve the quality standards, fourteen articles have been selected to be published in this special issue.

The selected papers are briefly described below.

1) *Ensemble Convolutional Neural Network Architectures for Land Use Classification in Economic Crop Aerial Images* (Sangdaow Noppitak and Olarik Surinta), proposes a novel approach for land use classification based on a convolutional neural network algorithm.

2) *Test First vs Test Last: A Study of Software Quality in Action* (Wantana Sisomboon), presents a comparative code quality and productivity case study of adopting Test Last and Test First processes for inexperienced programmers.

3) *Ensemble Methods with Deep Convolutional Neural Networks for Plant Leaf Recognition* (Thipwimon Chompookham and Olarik Surinta), describes the use of an ensemble Convolutional Neural Network (CNN) method for plant leaf diseases recognition.

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4) *Course Performance Prediction and Evolutionary Optimization for Undergraduate Engineering Program towards Admission Strategic Planning* (Sorawee Yanta, Sotarat Thammaboosadee, Pornchai Chanyagorn and Rojjalak Chuckpaiwong) proposes a method for predicting student performance relevant to an admission system, and for finding the best criteria for recruiting students in each major, in each admission round for an undergraduate engineering program.

5) *Emergency Reporting System Based on Airbag Triggering* (Thongrob Auxsorn and Thanathorn Phoka), proposes a new novel method for an emergency reporting system that utilizes both hardware and software components.

6) *A Recommender System Supporting Diet Planning in Hospitals (RES-DIP)* (Chakkrit Snae Namahoot, Michael Brückner and Chayan Nuntawong), proposes a prototype system to recommend best ingredients and meals using an ingredient selection process that ensures low food wastage and high nutritional food items being included in patient menu plans.

7) *Adaptive Design of Two-Phase Quick Response Codes for Contact Tracing and Surveillance Application: A Case Study of COVID-19* (Jaruwat Pailai, Warunya Wunnasri, Siriporn Sansri and Manit Chaipayuan), presents an adaptive design of quick response codes that integrate contact tracing and surveillance, highly relevant in the pandemic being experienced worldwide. The contact tracing identifies all potential contacts with an infected person, while the surveillance is utilized to track and monitor quarantined individuals.

8) *The Forecast on the Number of Motorcycle Accidents in Chonburi* (Supaporn Bundasak and Kaiwan Hiangha), creates predictive statistics and probabilities of the number of accidents that may occur in the future in Chonburi province, Thailand.

9) *Comparative Study of SIFT and SURF Algorithm for Traditional Thai Painting Recognition* (Wisrut Kwankhoom, Jirarat Ieamsaard and Natradee Anupong), discusses methods for recognizing Thai traditional painting patterns, comparing Scale-Invariant Feature Transform (SIFT) and Speeded Up Robust Features (SURF) for classification of five Thai painting patterns.

10) *A Recurrent Neural Network Model for Detecting Fishing Gear Patterns* (Worawut Srisukkham, Luepol Pipanmaekaporn and Suwatchai Kamonsantiroj), proposes a novel approach that recognizes a VMS trajectory corresponding to fishing gear types by encoding sequences of VMS points with Recurrent Neural Networks (RNNs).

11) *A Guideline of Designing Gamification in the Classroom and Its Case Study* (Witchaya Towongpaichayont), identifies some common mistakes that gamification designers succumb to when designing gamification in the classroom. The article proposes guidelines for designing classroom gamification.

12) *Application of Deep Convolutional Neural Networks for Mangosteen Ripeness Classification* (Saowalak Arampongsanuwat and Orawan Chaowalit), describes the use of a Deep Convolutional Neural Network (Deep CNN) to classify the ripeness of mangosteens to meet the requirements of the market.

13) *Virtual Puppet Storytelling for Improving Learning Achievement in an Elementary School* (Chaknarin Kongcharoen and Athit Singnakrong), describes the implementation of virtual puppet storytelling (VPST) in the classroom for enhancing elementary school students' learning outcomes and perception.

14) *Enhancement of Plant Leaf Disease Classification Based on Snapshot Ensemble Convolutional Neural Network* (Thararat Puangsuwan and Olarik Surinta), describes a high-accuracy classification approach for plant leaf disease images.

Our hope is that this special issue motivates and inspires researchers to further explore the theory and practices of computational intelligence and expand this invaluable area of computation in the future.

Finally, we sincerely thank the authors who contributed their ideas and developments, with special thanks to the reviewers for their dedicated efforts in ensuring the high quality of accepted papers. We also greatly appreciate the hard work of the Editor-in-Chief of *ICIC Express Letters*, Professor Yan Shi, which made this special issue possible.