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Big Data in Intelligent Information Systems

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Editorial

Big data paradigm is an interdisciplinary field bringing together computer science, mathematics, statistics, and information theory to analyze data for interpretation and prediction. Big data research is characterized by voluminous and incremental datasets and complex data methods. The machine learning methods used in algorithm development are iterative and parallel. These methods can be scaled to handle big data using distributed and parallel computing technologies. Intelligent and Information Systems provide numerous opportunities for digital transformations including AI, IoT, machine learning, big data, and business intelligence. The amount of data available and its handling has become a center point for new developments and technologies. Combining AI and machine learning provides organizations with the ability to analyses massive datasets much more reliably and noticeably faster. Big data and its introduction into all areas of business and key industries need a primary way of conducting, and data intelligence provides exactly that. With big data and the volume of information needed to be consumed for different types of investigation and analysis, data intelligence is an extension to the traditional way in which we see and digest data efficiently and extracting the most useful information.

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This special issue addresses the issues and challenges posed by several big data problems and gives an overview of the state of the art and the future research opportunities. This issue features six selected papers with high quality. The first article, "Trustworthy Scan design and testability Using Obfuscation and logic locking Scheme for Wireless Network Application", presented secure mechanism to protect the scan chain from the side-channel attack using the obfuscation technique and logic locking Scheme. The proposed methodology provides direct access of internal data to the authorized and security synthesis. The Security synthesis creates a controllable confusion between the reverse-engineered netlist and the original design. The main contribution of the paper is a structural modification of the scan chain with structural impact on the circuit performance, enhances immunity against reverse engineering attempts by shuffling of the test vector and low transition probability. The authors introduce a solution to deal with controllability-based attack, brute force attack and hamming distance-based attack by shuffling the test vector and scan out data to the intruder. The result shows that the proposed scheme offers low overhead in area, power and test time increases the circuits' overall performance. This scheme provides a higher level of security without comprising the testability.

The second article, "New Generalized 'Useful' Entropies using Weighted Quasi- linear Mean for Efficient Networking", proposed new generalized 'useful' entropies for weighted networks with utility distribution associated with edges or links. This research analysis of weighted networks with generalized 'useful' entropies utility distribution along with the probability distribution for evaluating the uncertainty of the given system. Authors discussed Supra- extensive entropy with quasi- linear mean of generalized information methodology for network distribution. A new concept of weighted quasi- linear mean with utility has been proposed and explored to derive existing and new generalized 'useful' entropies. The result formulates the generalized 'useful' information measure corresponding to any generalized information measure which can be seen as a quasi- linear

mean of elementary or generalized information with network distribution.

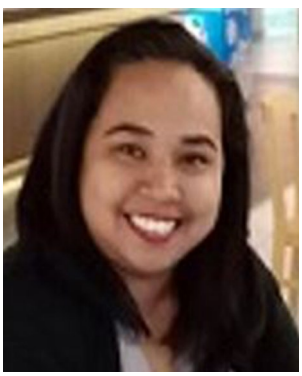
The third article, "Bio-Inspired Multilevel Security Protocol for Data Aggregation and Routing in IoT WSNs", discussed trust-based secure data aggregation method and an Energy-efficient Secure Routing protocol for a multi-hop environment. Authors proposed a protocol ANTPSOAODV to achieve the secure data aggregation by detecting nodes' behavior in the network. The calculating the nodes' trust value and data gathering methodology used for assessing above measures. The proposed XOR-based secret sharing technique is efficient and secure in energy and network attacks. The contribution of the proposed protocol provides an influence on the wireless channel and unreliable observing regions. It also presents a data routing technique in a secure and improved network strength in a multi-hop environment in case of malicious attacks.

The fourth article, "Smart Edge Computing for 5G/6G Satellite IoT for Reducing Inter Transmission Delay", in this work smart edge computing is designed for satellite IoT using SDN/NFV and deep convolutional neural network (DCNN) with logical ring construction. The task uses SDN/NFV model to choose edge node, cloud node in the smart edge computing. The proposed smart architecture helps to increase the performance, scalability, reliability of satellite edge computing model. The above architecture works with machine learning model and helps to improve the future satellite speed on data processing. The performance of the proposed result is compared with existing Ground 5G and evaluated shows the embedded satellite outperforms in data communication with less delay.

The fifth article, "Deep Belief Neural Network for 5G Diabetes Monitoring in Big Data on Edge IoT", proposed early-stage diabetes using smart sensor devices with help of Big Data on Edge IoT. The collective data are processed using intelligent data sharing and analysis in the 5G network. The 5G diabetes testing model is built using cloud in the 5G network. The research implements two important technologies, first is enhancing the 5G technology-based communication network where infrastructure is built with high quality. Secondly detection of diabetes at early stage using intelligent algorithms with less cost, less time, sensitivity, precision, and specificity. The results prove accessing the data through the edge node are faster than access the data through cloud data. The accuracy of the proposed algorithm is analyzed and improved.

The last paper titled "Evaluation of DB-IEKF Algorithm using Optimization Methods for Underwater Passive Target Tracking", presented DB-IEKF algorithm with three optimization methods to overcome the deficiencies of the DBEKF. The algorithm (DB-IEKF) correctly predicts the mean and covariance and reduces the errors to achieve solution convergence as early as possible with the LS optimization method for underwater target tracking. The DBEKF motivates the application of optimization methods to the cost function and three DB-IEKF variations with different optimization methods are derived. The results DB-IEKF (LS) algorithm gives a better solution to convergence times while compared with DB-IEKF (LM), DB-IEKF (QN), and DBEKF algorithms for medium ATB scenarios in underwater target tracking.

Anandakumar Haldorai , Professor (Associate) and Research Head in Department of Computer Science and Engineering, Sri Eshwar College of Engineering, Coimbatore, Tamil Nadu, India. He has received his Master's in Software Engineering and PhD in Information and Communication Engineering from PSG College of Technology under, Anna University, Chennai. His research areas include Big Data, Cognitive Radio Networks, Mobile Communications and Networking Protocols. He has authored more than 128 research papers in reputed International Journals and IEEE conferences. He has authored 11 books and many book chapters with reputed publishers such as Springer and IGI. He is Editor in Chief of KeAi – Elsevier IJIN and served as a reviewer for IEEE, IET, Springer, Inderscience and Elsevier journals. He is also the guest editor of many journals with Elsevier, Springer, Inderscience, etc. He has been the General Chair, Session Chair, and Panelist in several conferences. He is senior member of IEEE, IET, ACM and Fellow member of EAI research group.



Sri Devi Ravana Completed Bachelor of Information Technology (Information Science) in 2000 at Universiti Kebangsaan Malaysia (National University of Malaya), and my Master of Software Engineering in 2001 at University Malaya. Completed PhD at the Department of Computer Science and Software Engineering, The University of Melbourne in 2011. Currently, heading the Department of Information Systems, Faculty of Computer Science and Information Technology, University Malaya, Malaysia. Her research interest is in Information Retrieval Evaluation, Text Retrieval and Heuristics, Data Science, Data Mining and Machine Learning. She has won a couple of Best Paper Awards at International conferences. She actively delivers keynotes and guest lectures at International and National conferences and Research Seminars. She is also very active in having research collaboration with International

researchers from well-established Universities. Some of the universities she has collaborated with are Hong Kong University, The Chinese University of Hong Kong (HK), University fo Auckland (NZ), University of Melbourne (Aus), University of Leeds (UK), Alagappa University (India), Amity University (India), Akshaya College of Engineering and Technology (India), Shiraz University (Iran), Mulungushi University (Zambia) and National University of Science and Technology (Pakistan), University of Gunma (Japan). At National level, she is active in the Society of Information Retrieval and Knowledge Management (PECAMP) and has been appointed as committee member. She has also served as the Secretary for the conference (Fourth International Conference on Information Retrieval and Knowledge Management) organized by PECAMP in 2018. Sri Devi Ravana is also actively involved in community services. She has served as the Vice Chairman (Women Wings) for the Telugu Association of Malaysia (TAM).

Joan Lu is in the Department of Computer Science and is the research group leader of Information and System Engineering (ISE) in the Centre of High Intelligent Computing (CHIC), having previously been team leader in the IT department of Charlesworth Group publishing company. She successfully led and completed two research projects in the area of XML database systems and document processing in collaboration with Beijing University. Both systems were deployed as part of company commercial productions. Professor Lu has published seven academic books and more than 200 peer reviewed academic papers. Her research publications have 1388 reads and 185 citations by international colleagues, according to incomplete statistics from the ResearchGate. Professor Lu has acted as the founder and a program chair for the International XML Technology Workshop for 11 years and serves as Chair of various international conferences. She is the founder and Editor in Chief of International Journal of Information Retrieval Research and serves as a BCS examiner of Database and Advanced Database Management Systems and is an FHEA. She has been the UOH principle investigator is in the Department of Computer Science and is the research group leader of Information and System Engineering (ISE) in the Centre of High Intelligent Computing (CHIC), having previously been team leader in the IT department of Charlesworth Group publishing company. She successfully led and completed two research projects in the area of XML database systems and document processing in collaboration with Beijing University. Both systems were deployed as part of company commercial productions. Professor Lu has published seven academic books and more than 200 peer reviewed academic papers. Her research publications have 1388 reads and 185 citations by international colleagues, according to incomplete statistics from the ResearchGate. Professor Lu has acted as the founder and a program chair for the International XML Technology Workshop for 11 years and serves as Chair of various international conferences. She is the founder and Editor in Chief of International Journal of Information Retrieval Research and serves as a BCS examiner of Database and Advanced Database Management Systems and is an FHEA. She has been the UOH principle investigator for four recent EU interdisciplinary (computer science and psychology) projects: Edumecca (student responses system) (143545-LLP-NO-KA3-KA3MP), DO-IT (multilingual student response system) used by more than 15 EU countries (2009-1-NO1-LEO05-01046), and DONE-IT (mobile exam system) (511485-LLP-1-2010-NO-KA3-KA3MP), HRLAW2016 – 3090 / 001 – 001.

Arulmurugan Ramu is a Professor, Presidency University, Bangalore, India. His research focuses on the automatic interpretation of images and related problems in machine learning and optimization. His main research interest is in vision, particularly high-level visual recognition. He has authored more than 35 papers in major computer vision and machine learning conferences and journals. He is the recipient of Ph.D. degrees in Information and Communication Engineering from the Anna University at Chennai, M.Tech in Information Technology Anna University of Technology and B.Tech degree in Information Technology. He is guided many Ph.D. research scholar under the area of Image Processing using Machine Learning. He is an Associate Editor of Inderscience IJISC journal. He is awarded as Best Young Faculty Award 2018 and nominated for Best Young Researcher Award (Male) by International Academic and Research Excellence Awards (IARE-2019).