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EDITORIAL

Special Issue Editorial on "The Innovative Use of Data Science to Transform How We Work and Live"

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We are delighted to present this special issue of Data Science and Engineering (DSE), which contains a collection of five papers. Specifically, there are three extended papers from the 20th Australasian Data Mining Conference 2022 (AusDM22) and two papers from the pool of open call for submissions.

With big data being an integral element that spans across various industry sectors, the synergic relationship of big data and Data Science has created many opportunities and challenges in both theoretical and practical aspects. As we are perpetually instrumented with various gadgets such as smart phones, smart watches and electronic devices, Data Science has been innovatively applied to analyse data we generated to drive changes and create values. In fact, the applications of Data Science are limitless. It has significantly transformed almost every industry sector and permeated all walks of life.

The 20th Australasian Data Mining Conference (AusDM22) was held on December 12–15, 2022, in Western Sydney, Australia. AusDM has established itself as the premier Australasian meeting that facilitates cross-disciplinary exchange of ideas, experience and potential research directions in the field of data mining/ data science and machine learning in academia and industry. To marks its 20th Anniversary, this special issue as well as AusDM Festival which include a variety of special sessions such as Women in Data Mining/Artificial Intelligence Breakfast Panel, Industry and Government Day, Student Showcase and a co-located event with International Federation for Information Processing (IFIP) were organised. AusDM22 received 44 submissions, and 17 papers for both research and application tracks were accepted and published in conference proceedings (Park et al., [1]).

Three of the AusDM22 accepted papers were selected in which the authors were asked to extend and revise their conference papers for journal publication in accordance with customary practice of adding more than 30% new content. Subsequently, these extended papers and two papers from the open call for submissions went through the rigorous review process in accordance with DSE guidelines prior to the final presentation to the readers. The collection of five papers in this special issue cover a variety of topics related to Data Science including its innovative uses.

In the first paper, "*A Reinduction-Based Approach for Efficient High Utility Itemset Mining from Incremental Datasets*", Sra and Chand [2] propose a novel method – the Scented Utility Miner (SUM) algorithm for addressing the challenges of high utility itemset mining when data is updated over time. The proposed algorithm introduces a reinduction strategy to track the recency of itemset occurrences and mine itemsets incrementally. The second paper entitled "*Joint Representation Learning with Generative Adversarial Imputation Network for Improved Classification of Longitudinal Data*", by authors Pingi et al. [3], presents a novel method namely fusion-aided imputer-classifier GAN (FaIC-GAN) which simultaneously leverages partially observed temporal data and static features to enhance imputation and classification learning. An authentic use case of Data Science is presented in the third paper, "*Anomaly Detection with Sub-Extreme Values: Health Provider Billing*", in which Muspratt and Mammadov [4] have collaborated with an Australian state government-owned organisation and demonstrated their modified version of an anomaly detection algorithm in the context of healthcare billing by enacting refined targeting capability based on the identification of sub-extreme anomalies. In the fourth paper

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– "*AIoT-CitySense: AI and IoT-Driven City-Scale Sensing for Roadside Infrastructure Maintenance*", Forkan et al. [5] have presented a tailored AI and IoT driven solution to address the unique requirements of roadside infrastructure maintenance within an Australian local government municipality and therefore contributing to the transformation of cities into smarter and more efficient environments. In "*Uncovering Flat and Hierarchical Topics by Community Discovery on Word Co-Occurrence Network*", authors Austin et al. [6] propose Community Topic – a novel algorithm that exploits word co-occurrence networks for mining communities in collections of text documents in different languages and enabling quick identifications of flat topics and topic hierarchy, facilitating the on-demand exploration of sub- and super-topics.

We hope that the readers have an enjoyable and fruitful reading experience with this special issue. In addition, we would like to express our appreciation to all the authors for contributing their papers to this special issue and also their patience in going through the rigorous review processes. A special acknowledgement to all the reviewers for providing their time and expert comments voluntarily and ensuring timely reviews. Finally, this special issue was made possible by the support and guidance provided throughout the entire process by the DSE editor in chief – Professor Bin Cui and the publishing and editorial team including Chloe Huang and Sankara Narayanan.

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