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# Introduction to the ICWE 2022 Special Issue

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## Abstract

The International Conference on Web Engineering (ICWE) is the premier annual conference on Web engineering and associated technologies. ICWE aims to bring together researchers and practitioners from various disciplines in academia and industry to tackle the emerging challenges in the engineering of Web applications, the problems with its associated technologies, and the impact of those technologies on society and culture. ICWE 2022 took place in Bari, Italy on 5–8 July 2022. All sessions of the conference were also offered to online participants. This special issue includes extended articles of the best papers presented at ICWE 2022.

**Keywords:** International Conference on Web Engineering, ICWE 2022, invited papers, Web engineering, compression, efficiency, machine learning, security, sentiment classification, feature selection.

## 1 Introduction

The Web has evolved as a platform in which diverse content and services are exchanged and integrated to produce new values for people. The International Conference on Web Engineering (ICWE) is the premier annual conference on Web Engineering and associated technologies. ICWE aims to bring together researchers and practitioners from various disciplines in academia and industry to tackle the emerging challenges in the engineering of

Web applications, the problems of its associated technologies, and the impact of those technologies on society and culture.

ICWE 2022 took place in Bari, Italy on 5–8 July 2022. All sessions of the conference were also offered to online participants. This special issue of the *Journal of Web Engineering* includes extended articles of the six papers that were selected as best papers among 28 research papers presented at ICWE 2022.

## 2 Selected Papers

The article titled “Dynamic Scale-free Graph Embedding via Self-attention”, Dingyang Duan et al. introduces a dynamic network in hyperbolic space via self-attention (DynHAT), which leverages both the hyperbolic geometry and attention mechanism to learn node representations in complex graphs. By conducting experiments using real-world datasets, they demonstrated the performance improvement made by DynHAT in link prediction and showed the effectiveness of adequately capturing the evolution of nodes using DynHAT compared to the existing approaches of modeling dynamic graphs in Euclidean space.

The article titled “Disclosure: Improving Performance and Security of Web App Migration in Liquid Computing” written by Jae-Yun Kim and Soo-Mook Moon proposes a new instrumentation-based technique called Disclosure, which moves the declarations of closure variables to a managed data structure and replaces the closure variables with the corresponding references to the data structure to improve runtime performance and enhance the security of web app migration. Unlike existing instrumentation-based approaches, Disclosure can migrate a whole execution state of a web app, including JavaScript code and DOM tree. In addition, Disclosure can hide the snapshot data of a web app from being exposed during the migration process.

Efficient processing of big web stream data is becoming an important issue as the number of mobile devices that are connected to the web is increasing rapidly. The article titled “Towards Adaptive Continuous Trajectory Clustering over a Distributed Web Data Stream”, Yang Wu et al. proposes an adaptive continuous trajectory clustering framework (ACTOR) to achieve accurate and efficient continuous clustering of web stream data in an incremental manner. They conducted empirical studies on real-world data to prove the effectiveness of improving performance over state-of-the-art approaches.

Another article targeting efficiency in web data transmission is “The Case for Cross-entity Delta Encoding in Web Compression”, in which Benjamin Wollmer et al. address the problem that delta encoding and Shared Dictionary Compression (SDC) are barely adopted in practice due to their complexity and lack of browser support. To increase compression efficiency and reduce complexity, the authors propose a variant of cross-entity delta encoding that leverages cached assets from the user’s browser history instead of a precompiled shared dictionary. A comparison among several compression algorithms shows that entity delta encoding yields an efficiency boost for text-based resources, in comparison to current industry standards for compression.

Transparency and explainability of machine learning models, in particular based on neural networks, has also become an important research topic in the area of web engineering. In their article titled “Diagnostic Classifiers for Explaining a Neural Model with Hierarchical Attention for Aspect-based Sentiment Classification”, Kunal Geed et al. investigate the information encoded in each layer of the LCR-Rot-hop++ model, the state-of-the-art aspect-based sentiment classification (ABSC) method, which is often applied to web content. The authors adopt diagnostic classifiers, measuring the accuracy of different parts of the network for the tasks of part-of-speech tagging, mention tagging, aspect relation classification, word sentiment classification, and target-related sentiment classification. An empirical study conducted on a dataset of restaurant reviews (annotated as negative, neutral, and positive sentiment) revealed that LCR-Rot-hop++ is able to predict the word sentiment and structure of the sentence in the early layers, while complex details such as which words are related to the target (and the sentiment of these words) are learnt in deeper layers.

In machine learning, feature selection plays an important role and therefore using the most effective feature selection algorithm is essential. However, identifying the best feature selection algorithm that helps to remove irrelevant and redundant features is a complex task. The article titled “Data Quality Assessment and Recommendation of Feature Selection Algorithms: An Ontological Approach” by Aparna Nayak et al. proposes a novel approach to recommending the best feature selection algorithm based on the meta-features of a dataset. They model the dataset meta-features in a domain ontology and a set of semantic Web rule language (SWRL) predictive rules. To prove the usefulness and effectiveness of the proposed approach they conduct an experiment using popular classification datasets.

### **3 Conclusion**

The selection of papers included in this Special Issue shows the quality and topical diversity of the ICWE community, exemplified by extended works presented at ICWE 2022. Given the significant research reported in these articles, we are looking forward to new exciting research to come.