Editorial

Lorna Uden*

School of Computing,
University of Staffordshire College Road,
Mellor Building, Stoke-on-Trent,
ST4 2DE, UK
Email: L.uden@staffs.ac.uk
*Corresponding author

Iraklis Varlamis

Department of Informatics and Telematics,
Harokopio University of Athens,
No. 9, Omirou Street, 17778,
Tavros, Athens, Greece
Email: varlamis@hua.gr

Biographical notes: Lorna Uden is Professor Emeritus of IT Systems in the Faculty of Computing, Engineering and Technology at Staffordshire University. Her research interests include artificial intelligence, technology learning, HCI, activity theory, big data, user experience, knowledge management, web engineering, multimedia, e-business, service science and innovation, mobile computing, cloud computing, neuroscience, social media, intelligent transport systems, health care, internet of things, problem-based learning and GAI.

Iraklis Varlamis is a Professor of Data Management in the Department of Informatics and Telematics at Harokopio University of Athens, Greece. He holds a PhD from the Athens University of Economics and Business, Greece, and an MSc in Information Systems Engineering from UMIST, UK. His research interests vary from data mining and the use of semantics in web mining to social network analytics and knowledge extraction from social media and the news. He collaborates with several start-ups, companies, and government bodies as a technology mentor. He is the scientific coordinator in several H2020 and Erasmus+ projects.

Welcome to V20 N4 issue of *IJWET*. This collection features five papers that showcase diverse and forward-looking applications of advanced computational methods and machine learning (ML) in addressing contemporary challenges across business, public safety, and design. The contributions range from developing highly accurate sentiment analysis systems that integrate deep learning to enhance e-commerce product recommendations and market strategy, to applying sophisticated ML ensemble models to proactively predict and mitigate road accident severity. Further work includes optimising personalised graphic design interfaces with a novel K-means clustering and time-decay collaborative filtering algorithm, and constructing robust, scalable parallel mining algorithms to quantify and enhance user intimacy in social networks. Together, these

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studies highlight the transformative role of artificial intelligence, clustering, and data mining in driving practical innovation and delivering precise, data-driven solutions across multiple disciplines.

The first article, 'Sentiment analysis using deep learning algorithms based on chat records and product reviews' by Haili Lu and Lin He, tackles the critical business need for understanding consumer sentiment expressed across vast amounts of online feedback. The research proposes a novel hybrid model that intelligently integrates a support vector machine (SVM) classifier with a bidirectional long short-term memory (BiLSTM) network and an attention mechanism to enhance processing of complex semantic data. Demonstrated on the LAmazon and Yelp datasets, the SVM-BiLSTM approach achieved classification accuracies exceeding 90% and recorded a superior fit of 99.7% compared to traditional SVM, LSTM, and RNN algorithms. Furthermore, the model's ability to analyse emotional weight across product features revealed that consumers prioritise price and functionality. This work offers a highly accurate and practical methodology for enterprises to distil actionable insights from user-generated content, significantly improving market decision-making and product optimisation strategies in the digital age.

The second article, 'Assessment of efficient machine learning algorithms for enhancing road safety and predicting accident severity' by Akshi Bharadwaj, Sudesh Kumar and Pawan Singh, addresses the critical public safety issue of predicting road accident severity using data-driven methods. The study applies a range of ML algorithms, including XGBoost, balanced bagging, and random forest, to a dataset covering driver behaviour and road conditions in Addis Ababa. The soft voting classifier – an ensemble combining XGBoost, balanced bagging, and gradient boosting – was identified as the top-performing model, achieving high accuracy in classifying accident severity. Crucially, the analysis revealed that the 'Service_year_of_vehicle' was the most influential feature in prediction. This research offers valuable, actionable insights for transportation authorities, enabling the shift from reactive to proactive intervention strategies to mitigate severe traffic accidents and foster safer urban mobility.

The third article, 'The application of k-means based user feature clustering algorithm in graphic design interface' by Xiaohui Jia and Yiyi Zhao, addresses the challenge of delivering personalised content in graphic design interfaces, a crucial requirement in the era of information overload. The authors introduce a novel collaborative filtering (CF) algorithm optimised by K-means user feature clustering to mitigate the common problems of cold start and data sparsity. This enhanced model analyses user attributes and interest preferences separately, and innovatively incorporates a time-decay function based on the Ebbinghaus curve to reflect changing user interests. The experimental results validate the model's superior performance, demonstrating an exceptional accuracy in personalised recommendations, and an average improvement of over 7% across key metrics compared to several deep learning and classification models. This research provides a highly effective and precise recommendation system that significantly elevates the user experience in personalised graphic design environments.

The fourth article, 'Intelligent recommendation of e-commerce products combining topic features and attention mechanisms', by Xingchang Yang, proposes a sophisticated solution to enhance product recommendation quality on e-commerce platforms using large-scale text review data. The core innovation is an intelligent recommendation system that integrates robust data extraction – using a keyword-weighted Shark-PageRank algorithm and a template-based extraction method – with a hybrid attention mechanism model (Bi-LSTM+) for calculating comment sentiment. By combining product topic

features with user sentiment tendency, the system achieves a high average real-time score of 9.9 and an overall lag percentage of less than 1%. This dual-focus approach on accurate web crawling and sentiment-based classification demonstrates superior real-time performance and stability, providing crucial technological guidance for improving service quality and security in dynamic e-commerce environments.

The last article, 'Enhancing user intimacy: a parallel mining algorithm utilising UISFW' by Ruiping Kong and Ruimin Pan, tackles the challenge of accurately quantifying the complex emotional bonds and interactions between users, which is essential for strategic marketing and enhanced user experience. The authors introduce a parallel mining approach for user intimacy utilising the user intimacy strength algorithm based on features (UISFW). The method employs a genetic algorithm (GA) for adaptive feature weight assignment, optimising factors like similarity, interaction, and trust, and leverages MapReduce to construct a parallel mining model capable of efficiently processing large-scale social network data. Experimental validation across two datasets demonstrated superior performance, achieving high average accuracy (P@n) values of over 90% and normalised discounted cumulative gain (NDCG) values of over 82%, while exhibiting lower runtime compared to traditional methods. This research offers a robust, scalable, and highly accurate foundation for mining user relationships in big data environments.