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EDITORIAL

Special issue on deep learning methods for cyberbullying detection in multimodal social data

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The prevalence and global reach of social multimedia have led to people finding unlawful and unethical ways to use socially connected virtual groups. Cyberbullying, where people find novel ways to bully one another online, is one of its most serious side effects. Cyberbullying is defined formally as any conduct whereby people or groups frequently convey hostile or aggressive messages with the intention of causing injury, embarrassment, or distress to others. It has developed into a social danger that has a detrimental impact on both the victim and the bully's mentality. The social networking sites are a more pervasive form of bullying that can ultimately cause the victim's psychological and emotional collapse with feelings of low self-esteem, melancholy, stress, rage, sadness, deteriorating health, loneliness, and suicides, among other things.

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Typographic and infographic visual content has recently grown in importance as GIFs and memes have taken over social media feeds. As a result, cyberbullying through a variety of material forms is widespread. Bullying behavior includes posting pornographic photographs or images with vulgar, sexist, or other offensive comments on a person's page. Researchers from all across the world are working to create fresh approaches to identify, control, and lessen the prevalence of online bullying. Additionally, text-based analytics has been the focus of the majority of studies on online cyber-aggression, harassment detection, and toxicity. To effectively process, analyze, and model such bitter, taunting, abusive, or negative information in photos, memes, or text messages, advanced analytical approaches and computer models are essential. The present barriers to identifying online bullying posts are social media specialization, topic reliance, and variability in hand-crafted features. On some specific language challenges, deep learning techniques are providing state-of-the-art results thanks to their hierarchical learning capabilities and generalization. Relevant works describe how to identify bullying content by assessing textual, picture-based, and user data using deep learning models like CNN, RNN, and semantic image features.

This special issue brings the latest theoretical and technical advancements of deep learning to bullying image and text data analysis. It presents a collection of articles describing intelligent solutions, methods, and applications that leverage deep learning for automated bully content processing and understanding, including deep learning models for content-based, user-based, emotion-based, and social-network feature-based cyberbullying detection, transfer learning and multi-task learning for cyberbullying detection, and social media multi-modalities for representation learning for cyberbullying detection, to name a few. This special issue will give readers a birds-eye view of cyber-bullying detection in multimodal social media and add knowledge in this newly emerged area into literature.

An innovative ParaCap model has been proposed by Drs. Rachna Jain, Abhishek Kathuria, Anubhav Singh, et al., from Bharati Vidyapeeth's College of Engineering, India, in the article "ParaCap: Paraphrase Detection Model using Capsule Network". ParaCap model outperforms many state-of-art methods and proves to be comparable and optimal than the other techniques.

It is shown that a straightforward classification model using BERT can achieve the state-of-the-art results across three real-world corpora. This is the finding revealed in the article "CyberBERT: BERT for Cyberbullying identification" contributed by Dr. Sriparna Saha, Indian Institute of Technology Patna, India. The author demonstrated that their proposed model achieves significant improvements over existing works.

Drs. Muhammad Hassan Zaib, Faisal Bashir, Kashif Naseer Qureshi, et al., from Bahria University, Pakistan, revealed that the one-layer architectures of deep learning models give better results than two-layer architectures in their article "Deep Learning based Cyber Bullying Early Detection Using Distributed Denial of Service Flow".

In the article "Abusive Language Detection from Social Media Comments using Conventional Machine Learning and Deep Learning Approaches", composed by Drs. Muhammad Pervez Akhter, Zheng Jiangbin, Irfan Raza Naqvi, et al., from Northwestern Polytechnical University China, various methods of data mining have been studied for the detection of anomalies to provide a better assessment that can facilitate the understanding of this area.

The ALBERT model designed by Drs. Jatin Karthik Tripathy, S. Sibi Chakkaravarthy, Suresh Chandra Satapathy, et al., from VIT-AP University, India, showcases high scores in multiple benchmarks such as the GLUE, and SQuAD showing that high levels of contextual understanding are inherently present and thus fine-tuning for the specific case of cyberbullying has been depicted. Please check this out in their article "ALBERT based Fine-Tuning model for Cyberbullying Analysis".

Drs. Kirti Kumari and Jyoti Prakash Singh at the National Institute of Technology Patna, India, have collectively described how image and text features are combined to get a hybrid feature set which is further optimized using a binary firefly optimization algorithm in their article "Multi-modal Cyber-aggression detection with feature optimization by Firefly algorithm".

Drs. Areej Al-hassan and Hmood Al-Dossari King Saud University, Saudi Arabia, reported in their article "Detection of Hate-Speech in Arabic Tweets Using Deep Learning" that the deep learning models outperformed the SVM model in detecting hateful tweets. While the SVM achieves an overall recall of 74%, the deep learning models have an average recall of 75%.

In their article "A Hybrid Algorithm for Underwater Image Restoration Based on Color Correction and Image Sharpening", the research team consisting of Haiyang Meng, Yongjie Yan, Chengtao Cai, et al., from Harbin Engineering University, China, employed a sharpening process based on Maximum a Posteriori (MAP) method when color correction has finished to enhance the sharpness of an underwater image. Their validation has proven that the proposed method has a better performance than the state-of-the-art methods.

Drs. Saurabh Raj Sangwan and M. P. S. Bhatia from the Netaji Subhas University of Technology, India, proposed D-BullyRumbler method in the article "D-BullyRumbler: a safety rumble strip to resolve online denigration bullying using a hybrid filter-wrapper approach". Their study leads to a model that facilitates timely intervention by buzzing an alarm to the moderators and further forming a rumble safety strip to inhibit the production and dissemination of inappropriate content to protect the victims.

Drs. Chuanye Tang, Xinwen Zhao,·and Jianfeng Chen, et. al., from Automotive Engineering Research Institute, Jiangsu University, China, in their article "Fast stereo visual odometry based on LK optical flow and ORB-SLAM2", has developed the LK-ORB-SLAM2 method, in which the operation of optical flow tracking is introduced to adjust the intensive and time-consuming operation of feature matching and the proposed method gives higher accuracy.

Drs. Peng Wang, Jiao Wu, and Haiyan Wang, et al., from School of Marine Science and Technology, Northwestern polytechnical University, China, in their article "Low-light-level image enhancement algorithm based on integrated networks", has proposed Low-light-level image enhancement method, which is superior to traditional methods in terms of both subjective and objective evaluation, and the peak signal–noise ratio and improved structural similarity are 31.64 dB and 91.2%, respectively.

Drs. Akshi Kumar, and Nitin Sachdeva, from Delhi Technological University, India, in their article "Multi-input integrative learning using deep neural networks and transfer learning for cyberbullying detection in real-time code-mix data", have proposed an Automatic detection of cyberbullying in social media content using natural language. Experimental evaluation reveals that MIIL-DNN achieves superlative performance in terms of AUC-ROC curve on both datasets.

In their second article entitled "Multimodal cyberbullying detection using capsule network with dynamic routing and deep convolutional neural network", the same authors emphasize detecting cyberbullying using information technology networks by individuals' to humiliate, tease, embarrass, taunt, defame and disparage a target without any face-to-face contact and they propose a method that achieves a superlative performance with the AUC–ROC of 0.98.

Food image classification and image retrieval have been proposed by Drs. Pengcheng Wei and Bo Wang, from the Chongqing University of Education, China. In their article "Food image classification and image retrieval based on visual features and machine learning", they selected food image sets from the visual gene database to fine-tune the Faster R-CNN network to ensure the accuracy of Faster R-CNN food area detection, and experimented on the Dish-233 food dataset, which was a subset of the dish dataset, including 233 dishes and 49,168 images. The proposed method proves that compared with other methods, the proposed method has more discriminative visual features, and its performance has been improved in food image retrieval and classification tasks.

Semantic image segmentation in computer networks is designed by Drs. Defu He, and Chao Xie, from Hubei University of Education, China, and presented in their article "Semantic image segmentation algorithm in a deep learning computer network". The system is designed to determine the category to which each pixel in an image belongs. The experimental results demonstrated that the accuracy of the loss function proposed in this paper, compared with that of the current mainstream cross-entropy loss function, is improved by 1% on the DeepLab model.

Drs. Mengmeng Zhang, Yuhao Wang, and Zhi Liu, et al., from the North China University of Technology, China, present an article "A fast CU partition algorithm based on the sum of region-directional dispersion for virtual reality 360° video", in which they have explained that virtual reality 360° video has an ultra-high resolution (usually 4–8 K), thus takes more coding time than traditional video. Compared with the original reference software HM16.20, the proposed algorithm can reduce the time in virtual reality video coding by 38.5%, while the BD-rate only increases by 0.40%.

Drs. Yanbing Liu, Sanjev Dhakal, and Binyao Hao, from the Institute of Tibetan Plateau Research, Chinese Academy, China write the article "Multimedia image and video retrieval based on an improved HMM", In this article, the authors explain video information is characterized by many kinds of information, complex forms, and a low degree of structure. The proposed method has obvious advantages in terms of the retrieval time and retrieval effect and provides new ideas for multimedia image and video retrieval.

Drs. Sitender, and Seema Bawa, from Thapar Institute of Engineering and Technology, India, in their article "Sanskrit to universal networking language EnConverter system based on deep learning and context-free grammar" have summarized machine translation for transforming text from one language to another with the help of computer technology. The authors proposed a system, which is evaluated on BLEU and Fluency score metrics and has reported an efficiency of 95.375%.

Drs. Shuren Zhou, Jia Qiu, and·Arun Solanki, from Changsha University of Science and Technology, China, in their article "Improved SSD using deep multi-scale attention spatial–temporal features for action recognition", elaborate on the biggest difference between video-based action recognition and image-based action recognition and point out that the former has an extra feature of the time dimension. They have proposed a method which achieved competitive performance on two commonly used datasets: UCF101 and HMDB51.

Finally, Drs. Nour El Houda Ben Chaabene, Amel Bouzeghoub, Ramzi Guetari, et al., from TELECOM Sud-Paris, France, composed "Deep learning methods for anomalies detection in Social networks using multidimensional networks and multimodal data: A survey" that taxonomizes the methods devoted to solving the problem of detecting abnormal behavior on social media, and found three different types: structural methods, behavioral methods, and hybrid methods. This survey also reviews various methods of data mining for the detection of anomalies to provide a better assessment that can facilitate the understanding of this area.