Special Section Guest Editorial: Recent Advances in Multimedia Information Security

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Recently, multimedia content, such as images, text, audio, video, and graphics, stands as one of the most demanding and exciting aspects of the information era. Due to new developments in science and technology, different methods are used to copy, recreate, distribute, and store these contents easily for many real-world applications. The applications include smart healthcare, secure multimedia content on social networks, secure e-voting systems, automotive industries, military, digital forensics, digital cinema, education, insurance companies, driver licenses, and passports, as well as many other potential applications. Multimedia information over open channels using information and communication technology has proved an indispensible and cost effective technique for dissemination and distribution of media files. However, various criminal offenses such as identity theft, copyright violation, misuse of personal and medical information, authenticity and confidentiality happen every day in our daily lives and result in financial loss. Therefore, addressing these challenges has been an interesting problem for researchers in the field.

The guest editors hope that the articles included in this special section contribute to state-of-the-art security solutions of multimedia data for real-world applications. Five articles cover several core issues related to security, and two others showcase multiple applications for which image classification and object detection are important.

The development of artificial intelligence, especially the application and development of deep learning, brings not only great convenience to people but also some challenges. Some face forgery techniques can confuse the false with the true in deep learning. Motivated by this, Yang et al. develop an effective face forgery method to enrich the face antispoofing datasets. The method uses the identity feature replacement module to edit the latent codes in the latent space and finally generate the images with photo-realistic results with the help of the powerful generation ability of StyleGAN. The face forgery method further expands the face antispoofing dataset to ensure security in preserving portrait privacy. Cloud computing relies heavily on security and traffic management. Because data must be transferred from a local computer to a remote computer when using a cloud computing service, data protection is becoming an increasingly important security problem. In this direction, Gagged and Murugaiyan propose an improved secure dynamic bit standard technique for a private cloud platform to address security challenges. The proposed algorithm's testing results have shown a noticeable improvement in cipher size and execution time compared with other commonly used cloud computing. Anomaly detection is one of the most researched topics in computer vision and machine learning. Roka et al. present a detail survey to highlight the various tasks performed in abnormal behaviour detection. Descriptions along with the pros and cons of various machine-learning and non-machine-learning techniques are discussed in depth. Similarly, more concentration is given to the generation adversarial network, and a comprehensive description of its design for achieving a better abnormality detection rate is provided. Moreover, a comparison of various state-of-the-art approaches on the basis of their methodologies, advantages, and disadvantages is given. Copyright protection of medical data is a big concern recently. Awasthi et al. present a transform

domain digital image watermarking technique using bacterial foraging optimization for telemedicine applications. The proposed technique shows a significant improvement in robustness and imperceptibility compared with other existing techniques. The computational complexity of the proposed work is also less. Wang and Zhang proposed a new 3D CV paradigm-based framework for facial recognition and reconstruction. In this setup, deep neural networks are used to distinguish between mapped and unmapped pixels during a 2D-to-3D or 3D-to-2D transformation. The suggested framework minimizes the false rate and error, and increases the recognition accuracy up to the mark.

Skin cancer is one of the world's most common cancers. Among different skin cancer types, melanoma is very dangerous. Motivated by this, Shaheen and Singh developed a method using particle swarm optimization with the ensemble of pretrained convolutional neural network architecture for skin disease classification with information security. The result shows that this work has achieved comparable classification accuracy. It helps in achieving better performance for all classes of multi-class classification. Presently, detection and localization of removed objects from an image has always been a challenging problem. Hence, Kumar and Meenpal described a convolutional neural network-based model for the detection of inpainted regions in an image. A hybrid encoder–decoder-based architecture is proposed, where a segment of DenseNet-121 architecture is adopted as an encoder. The primary goal of this architecture is to use spatial maps to explore the distinguishing features between inpainted and uninpainted regions. Experimental results show that the proposed model outperformed existing methods for a variety of inpainted images.