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Editorial

Special Issue: Intelligent Healthcare and Biometric Applications using Deep Learning

Biometric applications and healthcare systems are increasing day by day, but these applications and systems need to be more autonomous to cope with the increasing challenges of the medical world. For developing autonomous systems and applications, there is a need for the development of applications that can act like the human brain that gets input and then responds accordingly. This special issue is about biometric applications and intelligent healthcare systems in which there is a need to have autonomous applications. This requirement can be fulfilled by using various deep-learning and machine-learning approaches of many classification and detection algorithms. Techniques of machine learning and deep learning play a vital role in developing autonomous applications in the medical field.

A Modified Classical-Quantum Model for Diabetic Foot Ulcer Classification: Javeria Amin et al. developed a modified quantum model for the classification of diabetic foot ulcers at the initial stages to a reduced amputation rate of foot and increased survival rates of patients. A separate quantum model is also developed for fast and speedy detection of various types of infection of the foot. The classification results are gathered in two ways: deep features are extracted from a pre-trained model ResNet-50 and then provided to the Softmax layer to classify the data. Secondly, features are extracted from ResNet-50 and then provided as input to the quantum model. **As this paper was submitted early on and in order not to delay its publication, it was decided to include it in IDT 16(1): https://content.iospress.com/articles/intelligent-decision-technologies/idt210017**

Eye-Referenced Dynamic Bounding Box for Face Recognition using Light Convolutional Neural Network: Manish N. Kapse et al. has used a Convolutional Neural Network in which multiple aligned images of faces are used for the purpose of training. These images are aligned on the basis of face landmark detection. The landmarks of the face are used so that the area of the face that should be processed further can be selected easily. These landmarks are used by covering all features of the face and based on two methods for creating bounding boxes around regions of interest. In the first method, bounding boxes are created around landmarks of the face by using maximum and minimum coordinates in the x and y planes. This method is known as Min Max-based ROI Bounding Box. The second method that works as the reference coordinates for bounding box creation is the eye landmark. This method is known as Eye referenced ROI. **As this paper was submitted early on and in order not to delay its publication, it was decided to include it in IDT 16(2): https://content.iospress.com/articles/intelligent-decision-technologies/idt210127**

A Performance Evaluation of Convolution Neural Networks for Kinship Discernment: An Application in Digital Forensics: Harisha A et al. proposed a network for kinship discernment named as Deep Siamese Network. The feature vector of images is created and then the difference of values on the basis of elements is calculated and given as an input to the Convolutional Neural Network for the task of classification. The dataset contains images of different families and instances are generated for people who had no kin relation and they belong to different families. About 3350 samples of instance generation are created. The images are resized to the size 224 $\times$ 224 by depth 3. Due to shortage of images, many new images are generated by already available images. These images are fed to Convolutional

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Neural Network and after getting results these are passed to the replica of CNN to have twin CNN results. A feature map of 2622 features is created, and a similarity score is calculated. **As this paper was submitted early on and in order not to delay its publication, it was decided to include it in IDT 16(2): https://content.iospress.com/articles/intelligent-decision-technologies/idt210132**

Optimal Multi-Kernel SVM Classifier with Rotation, Illumination, and Scale Invariant Hybrid DWT Shearlet-based GLCM Feature Descriptor and its Applications to Face Recognition: Sachin Kumar Veerashetty used feature-based method to efficiently detect the features of the face. For the purpose of face feature recognition, he focused on the domain of transformation and GLCM features. While working on the domain of transformation, directional representations and multi-scale representations are used in order to have intrinsic structures of geometry like smooth contours in images. Shearlet transformation is used for performing high localization of frequency.

Analysis of Fuzzy Based Intelligent Health Care Application System for the Diagnosis of Mental Health in the Women with Ovarian Cancer Using Computational Models: Ashwini Kodipalli et al. developed methods for the prediction of psychological distress, especially for people who are at risk of having ovarian cancer. They used deep learning and machine learning methods along with Fuzzy Inference Systems. A prediction model is developed for women with ovarian cancer to have mental health. Only women with ovarian cancer are included in this research, women with other cancer and pregnant women are excluded. The data of the focused patients are collected, approval of authority is taken, and a questionnaire is prepared. The patients are taken to the psychiatrist and questions are asked. The patients are interviewed and the questionnaires are documented. The recorded questionnaires are analyzed by machine learning methods.

Deep Neural Networks and Gradient Weighted Class Activation Mapping to Classify and Analyze EEG: Elakkat D. Gireesh et al. developed methods for analyzing EEG signals. For this purpose, the brain signals of 10 patients having epilepsy are taken such that these patients would have surgical evaluations of epilepsy as well. The reading of the brain signals is recorded by intracranial electrodes via the software Nihon Kohden for a period of seven days and these signals are taken in the bipolar montage and by using the format of EDF, data is exported. A batch of 200 samples has been made and fed to the model for training and testing. The data of range between 60 hz–600 hz is considered in this study. All the collected data is fed to the dense network and CNN network for training and testing and results are evaluated.

Facial Skin Disease Prediction using StarGAN v2 and Transfer Learning: Kristen Holmes et al. Sharma proposed a GAN model for the image generation of the facial skin by using the method of StarGAN v2. The results are verified by using transfer learning classification methods for detecting diseases of the skin and then the new data is classified by having a link with the original data. The image generation and the classification of diseases are performed by means of autonomous methods of diagnosis. The used GAN model is a mixture of two neural networks: a discriminator and a generator. In transfer learning phase, ImageNet (a pre-trained model) is used for the classification of skin diseases.

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