PROJECT STRUCTURE

COVID-19 outbreak has put the whole world in an unprecedented difficult situation bringing life around the world to a frightening halt and claiming thousands of lives. Due to COVID-19's spread in 212 countries and territories it remains a real threat to the public health system. This project renders a response to combat the virus through Artificial Intelligence (AI). Some Deep Learning (DL) methods have been illustrated to reach this goal, including Generative Adversarial Networks (GANs).It delineates an integrated bioinformatics approach in which different aspects of information from a continuum of structured and unstructured data sources are put together to form the user-friendly platforms for physicians and researchers. In particular, chest computed tomography (CT) has a key role in identifying the typical features of the infection. Ground-glass opacities (GGO) are one of the main CT findings, but their presence is not specific for this viral pneumonia. In fact, GGO is a radiological sign of different pathologies with both acute and subacute/chronic clinical manifestations. In the evaluation of a subject with focal or diffuse GGO, the radiologist has to know the patient's medical history to obtain a valid diagnostic hypothesis. Furthermore, there are some specific inputs for each platform, including various forms of the data, such as clinical data and medical imaging which can improve the performance of the introduced approaches toward the best responses in practical applications.

INITIALIZE THE MODEL

The rapid detection of the novel coronavirus disease, COVID-19, has a positive effect on preventing propagation and enhancing therapeutic outcomes. This article focuses on the rapid detection of COVID-19. We propose an ensemble deep learning model for novel COVID-19 detection from CT images. 2933 lung CT images from COVID-19 patients were obtained from previous publications, authoritative media

reports, and public databases. The images were preprocessed to obtain 2500 high-quality images. 2500 CT images of lung tumor and 2500 from normal lung were obtained from a hospital. Transfer learning was used to initialize model parameters and pretrain three deep convolutional neural network models: AlexNet, GoogleNet, and ResNet. These models were used for feature extraction on all images. Softmax was used as the classification algorithm of the fully connected layer. The ensemble classifier EDL-COVID was obtained via relative majority voting. Finally, the ensemble classifier was compared with three component classifiers to evaluate accuracy, sensitivity, specificity, F value, and Matthews correlation coefficient. The results showed that the overall classification performance of the ensemble model was better than that of the component classifier. The evaluation indexes were also higher. This algorithm can better meet the rapid detection requirements of the novel coronavirus disease COVID-19.