

Fusion of moment invariant method and deep learning algorithm for COVID-19 classification

ABSTRACT

The COVID-19 pandemic has resulted in a global health crisis. The rapid spread of the virus has led to the infection of a significant population and millions of deaths worldwide. Therefore, the world is in urgent need of a fast and accurate COVID-19 screening. Numerous researchers have performed exceptionally well to design pioneering deep learning (DL) models for the automatic screening of COVID-19 based on computerised tomography (CT) scans; however, there is still a concern regarding the performance stability affected by tiny perturbations and structural changes in CT images. This paper proposes a fusion of a moment invariant (MI) method and a DL algorithm for feature extraction to address the instabilities in the existing COVID-19 classification models. The proposed method incorporates the MI-based features into the DL models using the cascade fusion method. It was found that the fusion of MI features with DL features has the potential to improve the sensitivity and accuracy of the COVID-19 classification. Based on the evaluation using the SARS-CoV-2 dataset, the fusion of VGG16 and Hu moments shows the best result with 90% sensitivity and 93% accuracy.