

Artificial Intelligence-Based Chest X-Ray Test of COVID-19 Patients

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Abstract : The management of COVID-19 patients based on chest imaging is emerging as an essential tool for evaluating the spread of the pandemic which has gripped the global community. It has already been used to monitor the situation of COVID-19 patients who have issues in respiratory status. There has been increase to use chest imaging for medical triage of patients who are showing moderate-severe clinical COVID-19 features, this is due to the fast dispersal of the pandemic to all continents and communities. This article demonstrates the development of machine learning techniques for the test of COVID-19 patients using Chest X-Ray (CXR) images in nearly real-time, to distinguish the COVID-19 infection with a significantly high level of accuracy. The testing performance has covered a combination of different datasets of CXR images of positive COVID-19 patients, patients with viral and bacterial infections, also, people with a clear chest. The proposed AI scheme successfully distinguishes CXR scans of COVID-19 infected patients from CXR scans of viral and bacterial based pneumonia as well as normal cases with an average accuracy of 94.43%, sensitivity 95%, and specificity 93.86%. Predicted decisions would be supported by visual evidence to help clinicians speed up the initial assessment process of new suspected cases, especially in a resource-constrained environment.

Keywords : COVID-19, chest x-ray scan, artificial intelligence, texture analysis, local binary pattern transform, Gabor filter

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