# A Densely Interconnected Convolutional Neural Network-Based Approach to Identify COVID-19 from Chest X-ray Images

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**Abstract.** The novel Corona Virus (COVID-19) has spread so rapidly that cause a devastating effect on public well-being and create an emergency around the world. Hence, the rapid identification of COVID-19 has become a challenging work within a short period. Clinical trials of patients with COVID-19 have shown that most of the patients affected by COVID-19 experience lung infection that can cause inflammation in the lung after virus-contiguity. It can damage the cells and tissue that is inside the lung. However, pneumonia is also a lung infection that can cause inflammation in the air sacs inside the lung. Chest X-rays and CT scans perform an essential role in the detection of lung-related illnesses. Therefore, concerning the diagnosis of COVID-19, radiography and chest CT are considered as fundamental imaging approaches. This study presents a densely interconnected convolutional neural network-based approach to identify COVID-19, Pneumonia and Normal patients from chest X-ray images. To experiment with the proposed methodology, a new dataset is generated by combining two different datasets from Kaggle named COVID-19 Radiography Database and Chest X-ray (COVID-19 & Pneumonia). The dataset comprises of 500 X-ray images of COVID-19 affected people, 2600 X-ray images of Normal people, and 3418 X-ray images of pneumonia affected people. The proposed densely interconnected convolutional neural network model produces 99% testing accuracy for COVID-19, 98% testing accuracy for Pneumonia and 98% testing accuracy for Normal people without the application of any augmentation techniques.

**Keywords:** COVID-19 · Convolutional neural network · Chest X-ray · DenseNet

## 1 Introduction

The Coronavirus has caused disastrous consequences on the people's lifestyle, the world economy and public health. Since Coronavirus is contagious and every country started to face the consequences of the spread of the virus, the World Health Organization (WHO) has declared the circumstance as a global pandemic. In the east Asian country China, CT scan imaging technique is used as the primary procedure to