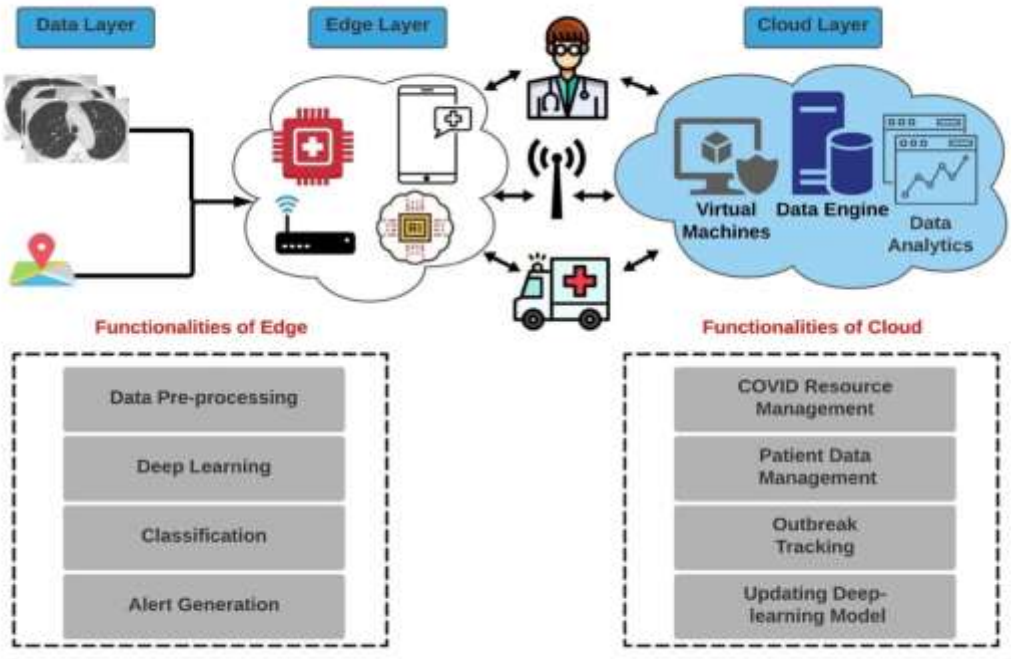
Deep learning empowered COVID-19 diagnosis using chest CT scan images for collaborative edge-cloud computing platform

Authors: Vipul Kumar Singh and Dr Maheshkumar H Kolekar, EE Dept, IIT Patna

The novel coronavirus outbreak has spread worldwide, causing respiratory infections in humans, leading to a huge global pandemic COVID-19. According to World Health Organization, the only way to curb this spread is by increasing the testing and isolating the infected. Meanwhile, the clinical testing currently being followed is not easily accessible and requires much time to give the results. In this scenario, remote diagnostic systems could become a handy solution. Some existing studies leverage the deep learning approach to provide an effective alternative to clinical diagnostic techniques. However, it is difficult to use such complex networks in resource constraint environments. To address this problem, we developed a fine-tuned deep learning model inspired by the architecture of the MobileNet V2 model. Moreover, the developed model is further optimized in terms of its size and complexity to make it compatible with mobile and edge devices. The results of extensive experimentation performed on a real-world dataset consisting of 2482 chest Computerized Tomography scan images strongly suggest the superiority of the developed fine-tuned deep learning model in terms of high accuracy and faster diagnosis time. The proposed model achieved a classification accuracy of 96.40%, with approximately ten times shorter response time than prevailing deep learning models. Further, McNemar's statistical test results also prove the efficacy of the proposed model.



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