Abstract

Coronavirus disease 2019 (COVID-19) has become an unparalleled public health crisis globally. The need to rationally diagnose and manage patients has become more persuasive than ever. Machine learning (ML) methods can play pivotal roles in identifying COVID-19 patients by visually analyzing images of the COVID patients. There is a growing need of the COVID-19 image data collection COVID-19 as well as a preliminary exploration of possible use cases for the data. Currently much of the data collection visually analyzing chest x-ray images of COVID patients. Apart from chest x-ray images, abdominal manifestations in the COVID-19 patients has also been reported. Imaging analysis of the abdominal manifestation may help understand abdominal phenomena in infection COVID-19 and could further help to diagnose it better. Therefore, radiologists should be aware of abdominal imaging findings in patients with COVID-19. Within this article, we have tried to lay emphasis on the Machine learning as a tool to understand COVID-19 which should be explored globally for the early diagnosis of the COVID-19.

Keywords: COVID-19; Machine Learning (ML)

Introduction

COVID-19 is a global challenge that should be addressed by all scientific means. The landscape of COVID-19 is rapidly changing, with new data emerging at an unprecedented rate. Making sense of these large data sets and interpreting what is important is perplexing. Data is the crucial step to develop any diagnostic or management tool [1]. Emphasis should be laid to collect and organize all the images as public resource and explore machine learning (ML) as a tool to infer quick results.

Machine Learning (ML) techniques prove to be very advantageous when problem complexity is very high such involving massive combinatorial spaces or nonlinear processes and is not easily amenable to traditional approaches for a solution [2,3]. To put up in simple words, ML involves programming to optimize a performance criterion by using historical data. The performance criterion could be the accuracy provided by a predictive model or the value of a fitness or evaluation function in an optimization problem. The core of ML techniques is comprised of statistical algorithms whose performance enhances with training. The breadth and depth of ML tools including hardware and software is rapidly growing and enabling better predictive models which could be leveraged for process control.

ML has demonstrated high performance for several image processing applications such as image analysis, image classification, and image segmentation [4,5]. Since the occurrence of COVID-19, Several efforts have been utilized using machine learning approach to clas-
sify the chest x-ray images into COVID-19 patient class or normal case class [6,7]. This should be further explored with image analysis of Abdominal manifestation in COVID-19 patients.

**Future direction**

At this stage, collaboration between research institutes and technology companies are required at global scale action for developing techniques to assist COVID-19 research. There is a need to integrate and analyze large pool of data set by advanced machine learning algorithms to improve diagnostic speed and accuracy, develop novel effective therapeutic approaches.

There is a need to provide easy access to the clinical data with respect to the COVID 19. To achieve this, we need to develop cyber-infrastructure via worldwide collaboration. Countries worldwide need to promote the formations of consortia and funding opportunities. At this stage, it would be pertinent to have a centralized data pool of COVID-19 patient which can be processed using artificial intelligence and machine learning approach to develop predictive, diagnostic, and therapeutic strategies against COVID-19 and similar pandemics in future (Refer figure 1 below).

*Figure 1:* Figures summarizes the use of AI/ML as a tool to fight against COVID-19.
Dataset of patients with a novel life-threatening disease accessible to researchers so that tools can be created to aid in the care of future patients. The manner in which we collect existing public data ensures that patients are not put at risk. Image data linked with clinically relevant attributes in a public dataset that is designed for ML will enable parallel development of diagnosis and management tools and rapid local validation of models [8-10].

Furthermore, this data can be used for a variety of different tasks. Tools developed using this data and with the ideas presented can give physicians an edge and allow them to act with more confidence while they wait for the analysis of a radiologist by having a digital second opinion confirm their assessment of a patient’s condition. In addition, these tools can provide quantitative scores which can enable large scale analysis of CXR without the need for costly/time consuming manual annotations.

Conclusion

There is enough understanding of AI/ML and its role in the COVID-19 pandemic diagnosis. A centralized collection of worldwide COVID-19 patient data will be beneficial for future artificial intelligence and machine learning research to develop predictive, diagnostic, and therapeutic strategies against COVID-19 and similar pandemics in future. We need to constantly share data to fast-track the AI in order to provide timely support to COVID-19 pandemic.

Bibliography