LETTER TO THE EDITOR

Establishing Artificial Intelligence and Reducing Health Care System Costs in Response to COVID-19

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The application of artificial intelligence (AI) and machine learning (ML) digital software has become part of our everyday lives, and the related algorithms are becoming part of our everyday laboratory procedures [1]. The scientists present AI and ML to find better approaches to progress clinical microbiology practice. We argue that integrating these practices into local, national, and international healthcare systems will save lives and suggest specific methods by which implementation can happen swiftly and efficiently. ML algorithms are focused on general predictions based on previous examples. The provision of larger amounts of information takes the handling of bigger issues into consideration. ML converts huge amounts of raw data into knowledge that becomes valuable for the researcher. ML can further expand the healthcare process because the data continues to increase and thereby decreases the human effort that would traditionally be required.

Diagnostic methods used for the detection of microbial communities are mostly laboratory-based procedures which are costly, time-consuming, laborious, and require highly skilled practitioners. Hence, it is necessary to design rapid, portable, real-time, low-cost, point-of-care (POC), and sensitive microbial detection tools. Rapid diagnostic platforms along with on-time appro-
appropriate treatment are indispensable to evaluate the complete cure of viral infection. The hypothetical advantages of the AI approach in real time PCR to identify closely related serotypes are twofold - increased speed and lower cost, when compared to alternative existing methods. While this vignette is an attractive one, there are still challenges to overcome before this approach can be implemented in the clinical microbiology laboratory. Healthcare settings are in urgent need for decision-making technologies to handle SARS-CoV-2 and to help them receive the right proposals in real-time to avoid its spread [2]. The ongoing development in AI and ML try to work skillfully to mimic human intelligence. It may also play an important role in understanding and proposing the development of the medication, prediction, screening, contact tracing, forecasting, and drug/vaccine for the Covid-19 pandemic and reduce human intervention in medical practice. Feature selection (FS) is the process of selecting the most important features and forming a subset that will be the most valuable for analysis and prediction [3]. The target is to find a subset of features that perform as well (or better) than the original set. FS reduces the amount of data that needs to be analyzed in turn reducing run-time and storage. This pre-processing step may cost you time at first, but will ultimately improve results and performance. This is especially true when dealing with large amounts of information. Also, with the implementation of FS it can be predicted that algorithms will learn more quickly, and accuracy will be improved because irrelevant features have been reduced or completely eliminated. It should be noted that training of AI is labor and computationally intensive. Training in image-based infectious disease diagnostics relies on image data sets curated with great effort through manual interpretation of images by skilled clinical microbiologists. After training, accuracy and robustness must be extensively verified under real-world conditions in comparison to diagnostic interpretation by trained microbiologists. However, after this resource-intensive training, validation, and implementation, AI-based diagnosis is essentially free, and image analysis can be performed on lower-end computers that already exist in most microbiology laboratories. It is also evident that AI-assisted image analysis can be performed at a distance, only requiring that the remote site have a microscope and a way to transmit images to the AI using the internet or cellular service (i.e., telemicrobiology) [4]. Therefore, AI-based image analysis in infectious disease diagnostics will likely find its niche by providing answers in healthcare systems both large and small where other techniques are not cost-effective, immediate or comprehensive.

**References:**


**Declaration of Interest:**
The authors declare that they have no conflict of interest.