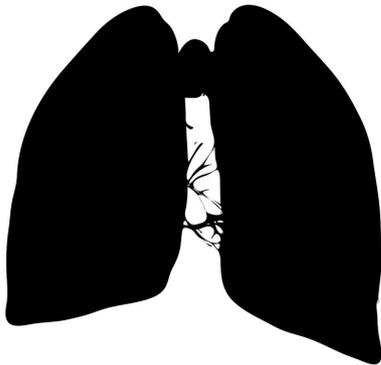# Researchers use machine learning to develop more accurate COVID-19 diagnostic tool

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Credit: CC0 Public Domain

Researchers at the University of Maryland, Baltimore County (UMBC) have developed a method of generating high-quality chest X-ray images that can be used to diagnose COVID-19 more accurately than current methods. The research team, led by Sumeet Menon, a Ph.D. student in computer science at UMBC, will publish its findings in the proceedings of the IEEE Big Data 2020 Conference to be held virtually in December.

"The availability of data is one of the most important aspects of machine learning and our research has taken an incremental theoretical step towards generating data using the MTT-GAN," explains Menon.

The need for rapid and accurate COVID-19 testing

is high, including testing that can determine if COVID-19 is impacting a patient's respiratory system. Many clinicians use X-ray technology to classify images of possible cases of COVID-19, but the limited data available makes it more challenging to classify those images accurately.

Menon and his collaborators developed their tool as an extension of generative adversarial networks (GANs)—machine learning frameworks that can quickly generate new data based on statistics from a training set. The team's more advanced method uses what they call Mean Teacher + Transfer Generative Adversarial Networks (MTT-GAN). The MTT-GANs, explains Menon, are superior to GANs because the images they generate are much more similar to authentic images generated by X-ray machines.

The MTT-GAN classification system has the potential to help improve the accuracy of COVID-19 classifiers, making it an important diagnostic tool physicians who are still working to understand the range of ways this complex disease presents in patients. "This paper mainly focuses on generating more COVID-19 X-rays using the MTT-GAN, which could be widely used to train machine learning models and could have many applications, including classification of CT-scans and segmentation."

More information: Sumeet Menon et al, Generating Realistic COVID19 X-rays with a Mean Teacher + Transfer Learning GAN, Submitted to IEEE BigData 2020 conference, arXiv:2009.12478v1 [cs.LG]
arxiv.org/abs/2009.12478

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