

**INFORMATICS INSTITUTE OF TECHNOLOGY**

**In Collaboration with**

**UNIVERSITY OF WESTMINSTER**

**AutoMolecularTest**

(Automated Molecular test using x-ray images)

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## **Abstract**

During the past year, COVID-19 cases have been increasing tenfold, and the healthcare systems around the world are striving to catch up. Hospitals are lagging due to the limited number of testing facilities and the long period it takes for a conventional COVID-19 test to give results. Usually, a PCR takes longer than convenient. However, chest X-Rays might come to the rescue. Considering that it's now a norm for a healthcare facility to have an X-RAY machine, these can be utilized to make the process much faster and simpler. Since most of the X-RAY systems that are used nowadays are digitized, the time it takes for the conventional blood samples to travel doesn't have any effect here.

With the help of AI, AutoMolecular is capable of eliminating the problem. The system analyzes the X-RAY images of the patient's chests and decides whether they are infected with COVID or not. The system is automated and doesn't require a trained radiologist by its side. This would come very handy in situations where there is no trained radiologist or the situation is very dire and patients have to be tested quickly. Also, this will get rid of the wards being filled with patients waiting for the test results to return, and also help the healthcare facility to decide which patients to isolate and which ones don't have to be. Where this system might be a boon is when it helps to ignore a false positive of a healthy patient and when the conventional test returns a false negative of a highly COVID-19 infected patient.

This autoMolecular system has proven to be highly accurate. Even more accurate than the conventional tests used to diagnose COVID-19. In a world where the number of people who are getting vaccinated is increasing daily, it's a much better idea to use a testing method with higher accuracy, to prevent false assumptions about the vaccine's capabilities and widespread panic. This model was first evaluated on an image set with 1102 images of chest X-RAYs, and not surprisingly it returned very accurate results. According to the results, diagnostic accuracy is at a whopping 99.33% and recall accuracy is 100%. The results were way better than similar systems and much more reliable. Compared to them, this one has better higher classification accuracy and efficient diagnostic performance. There are already methods that contain detection of COVID-19 with the help of radiology. And needless to say, autoMolecular further advances such methods. This tool

would be of great help to those in the clinical and healthcare sector and help them further mitigate errors and false negatives.

**Keywords:** Convolutional Neural Network, Parallel 2D Convolutional Neural Network, COVID-19 Detection, Chest X-Ray

