Covmatic
Executive Summary and System Overview

Covmatic is an open-source, high throughput robotic system for COVID-19 testing. It is developed by a team of volunteers and partner organizations in Italy. It was first deployed in the province of Bergamo – one of the hardest hit locations in the pandemic.

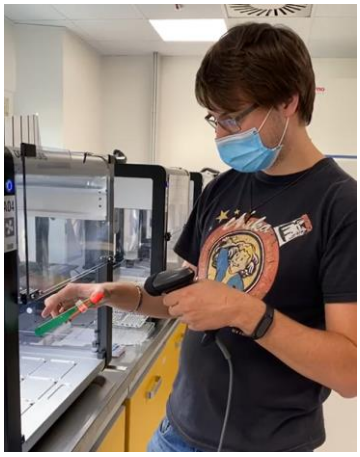
Traditional coronavirus testing processes are slow and unreliable – human operators repeat the same tasks thousands of times, and have to manually type their results into outdated forms. This severely limits the throughput of traditional testing systems. Covmatic is an open-source, automated system to perform diagnostic Coronavirus tests. Covmatic has been designed to significantly increase the speed and efficiency of COVID-19 testing, enabling labs and health authorities to track the pandemic.

Covmatic increases the speed and efficiency of the traditional testing process by using

1) advanced robots to perform process tasks, and
2) cloud software to digitally track patient samples.

From the hardware point of view, the basic version of system consists of 10 liquid handling robots and 3 PCR machines. Each liquid handling robot and PCR machine constitutes a "Station", and is equipped with a laptop and a barcode scanner enabling lab operators to oversee the process. From the software point of view, the system consists of a local user interface (enabling lab operators to track and manage the testing process) and of a cloud-based control software (coordinating all the Stations, and storing the digital records associated with each sample).





Left: liquid handling robots. Center: PCR machines. Right: engineer demonstrating a barcode scanner.

The Covmatic project is entirely run and developed by volunteers. Our goal is to help every lab in the world to dramatically increase COVID-19 testing throughput. Covmatic is freely available (MIT license) to all the labs in the world who need to efficiently scale testing. All its components and procedures are open-source and available for free through our website: www.covmatic.org

We welcome the contributions of volunteers from all over the world – biologists, software engineers, roboticists, and all those who want to help! Feel free to contacts us with questions and ideas!