



UNIVERSITÀ  
POLITECNICA  
DELLE MARCHE

## RESEARCH AREA: HEALTH

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**TITLE:** Unlocking the potential of images to fight COVID-19

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**UNIVPM Research Group:** VRAI Vision, Robotics & Artificial Intelligence @ DII - TIN @ SALESI Hospital

**Research activity description:** Activity 1: Since the beginning of the COVID-19 outbreak, the health emergency has been involving Neonatal Intensive Care Units (NICUs) healthcare professionals, which are on the front line for the monitoring and treatment of COVID-19 positive newborns. From the research activities of the VRAI group, an innovative system for supporting these professionals in performing treatment and monitoring, while reducing risk exposure due to close contacts, was developed. The system consists of a newly designed smart crib, which is equipped with standard clinical sensors and an additional RGB-D camera, to monitor, in real time, physiological and movement-related parameters remotely.

Activity 2: Among the many problems that are being faced during the COVID-19 emergency, computed tomography (CT) image analysis is covering a key role to obtain rapid diagnosis, in order to immediately isolate patients and their contacts and control the risk of infection of healthcare professionals. Currently, the World Health Organization (WHO) recognizes the most accurate means of diagnosis in the rhino-pharyngeal swab. However, the analysis of the biological material collected can only be considered in specialized laboratories, with limited diffusion on the territory, and takes a long time (up to two / three days) due to the high number of samples to be analyzed. The instrumentation for the acquisition of medical images, such as CT, has instead a widespread presence, from small to large hospitals, and the acquisition and reporting of these images required a few tens of minutes for the purchase of an outcome diagnostic. The research of the VRAI group is focusing on designing deep-learning algorithms based on convolutional neural networks

to provide healthcare professionals with diagnostic support.

**Collaborators:** Salesi Hospital, Politecnico di Milano, Università della Magna Graecia, Università della Calabria

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