Mobile Health (mHealth) and Covid-19:

THE USE OF MOBILE DEVICES FOR MEDICINE IN A PANDEMIC EVENT
Politecnico di Torino participated in an international study coordinated by the Spaulding Rehabilitation Hospital in Boston

Torino, August 31st, 2020 - Monitoring Covid-19 patients and predict the escalation of symptoms with early intervention thanks to a wearable device that collects data and transmits it to healthcare professionals. This is a real possibility, as the research conducted by an international team of 60 scientists coordinated by the Motion Analysis Laboratory at Spaulding Rehabilitation Hospital in Boston has established. Politecnico di Torino, the only Italian institute that participated in this study, contributed with the work of **Professor Danilo Demarchi** of the Department of Electronics and Telecommunications.

The study, titled "Can mHealth Technology Help Mitigate the Effects of the COVID 19 Pandemic?", was published in the latest issue of the IEEE Open Journal of Engineering in Medicine and Biology.

The aim of the study was to review the so-called mHealth technologies, that is the use of mobile devices for medicine, and explore their use to monitor and mitigate the effects of the Covid-19 pandemic. The Task Force identified technologies that could be deployed in response to the COVID-19 pandemic and would likely be suitable for future pandemics. They found that mHealth technologies are viable options to monitor COVID-19 patients and be used to predict symptom escalation for earlier intervention.

Professor **Paolo Bonato**, former Master's and PhD student at Politecnico di Torino, now Director of the Spaulding Motion Analysis Lab in Boston and professor at Harvard Medical School, he has been the coordinator of the study. *"To be able to activate a diverse group of experts with such a singular focus speaks to the commitment the entire research and science community has in addressing this pandemic. Our goal is to quickly get important findings into the hands of the clinical community so we continue to build effective interventions"*, Professor Bonato said.

The contribution of **Professor Demarchi** and some young former students of Politecnico, **Stefano Sapienza** and **Benito Pugliese**, now researchers at Harvard Medical School in Prof. Bonato's group, was mainly in the section of the study entitled *"Remote Monitoring of Patients with COVID-19 and Frontline Healthcare Workers Using Mobile Health Technologies"*.

"The use of Mobile Health technologies is one of the most interesting frontiers for future clinical applications, especially for monitoring the evolution of diseases and for the related efficacy of therapies", comments **Demarchi**: *"Very interesting scenarios are opening up for what it is called HomeCare, that is the possibility of transferring monitoring and therapies directly to the patients' homes, who can be followed continuously and in their daily lives. In particular, an intelligent use of these solutions will make it possible to avoid transfers to hospitals, thus drastically reducing healthcare costs. It will also be possible to reduce hospital congestion, which unfortunately occurred during the pandemic, thus optimizing resources and decreasing contacts, which are always particularly critical during pandemic situations"*.

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Wearable mHealth technologies provide a significant opportunity for data collection and mHealth technology could be used **to monitor patients with mild symptoms who have tested positive for COVID-19**. These patients are typically instructed to self-quarantine at home or undergo monitoring at community treatment centres. However, a portion of them eventually experience an exacerbation, namely the sudden occurrence of severe symptoms, and require hospitalization. In this context, mHealth technology could enable early detection of such exacerbations, allowing clinicians to deliver necessary interventions in a timely manner thus improving clinical outcomes.

The Task Force paper concluded that Smartphone applications enabling self-reports and wearable sensors enabling physiological data collection could be used **to monitor not only patients, but clinical personnel** too, detecting early signs of an outbreak in the hospital/healthcare settings. They also reported similarly, in the community, early detection of COVID-19 cases could be achieved by building upon prior studies which showed that by using wearable sensors to capture resting heart rate and sleep duration it is possible to predict influenza-like illness rates as well as COVID-19 epidemic trends.

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