AI-enabled remote monitoring of vital signs for COVID-19: methods, prospects and challenges

Honnesh Rohmetra[1] · Navaneeth Raghunath[1] · Pratik Narang[1] ·
Vinay Chamola[4] · Mohsen Guizani[5] · Naga Rajiv Lakkaniga[2,3]

Abstract

The COVID-19 pandemic has overwhelmed the existing healthcare infrastructure in many parts of the world. Healthcare professionals are not only over-burdened but also at a high risk of nosocomial transmission from COVID-19 patients. Screening and monitoring the health of a large number of susceptible or infected individuals is a challenging task. Although professional medical attention and hospitalization are necessary for high-risk COVID-19 patients, home isolation is an effective strategy for low and medium risk patients as well as for those who are at risk of infection and have been quarantined. However, this necessitates effective techniques for remotely monitoring the patients' symptoms. Recent advances in Machine Learning (ML) and Deep Learning (DL) have strengthened the power of imaging techniques and can be used to remotely perform several tasks that previously required the physical presence of a medical professional. In this work, we study the prospects of vital signs monitoring for COVID-19 infected as well as quarantined individuals by using DL and image/signal-processing techniques, many of which can be deployed using simple cameras and sensors available on a smartphone or a personal computer, without the need of specialized equipment. We demonstrate the potential of ML-enabled workflows for several vital signs such as heart and respiratory rates, cough, blood pressure, and oxygen saturation. We also discuss the challenges involved in implementing ML-enabled techniques.

1 Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 virus) belonging to the family

---

Extended author information available on the last page of the article