Automated COVID-19 Fever Screening with Thermal Imaging

Pratik Katte, Siva Teja Kakileti, Himanshu J. Madhu, and Geetha Manjunath
Niramai Health Analytix Pvt Ltd, Bengaluru, India

Abstract

The world was shattered with millions of deaths due to COVID-19. Even after the implementation of vaccination programmes all over the world for more than a year, the incidences and deaths are still high due to the new variants of COVID-19. Stringent screening measures such as temperature check and mask check at all public places can help in reducing the spread of COVID-19. Visual inspections to ensure these screening measures can be taxing and erroneous. Automated inspection ensures an effective and accurate screening. Traditional approaches involve identification of faces and masks from visual camera images followed by extraction of temperature values of identified faces from thermal imaging cameras. This use of visual imaging as a primary modality limits the applications of these techniques for only high illumination conditions. The use of thermal imaging alone for both face detection and mask classification can make the system invariant to illumination. However, lack of open source datasets is an issue to develop thermal face detection and thermal mask classification architectures. In this paper, we discuss a new open source dataset called NTIC and propose techniques for an effective implementation of automated COVID-19 screening with thermal images. Our results show that the use of thermal imaging is as effective as the visual imaging in the presence of high illumination. This performance stays the same for thermal images even under low lighting conditions, whereas the performance with visual trained classifiers degrades by more than 50%.