Response to Reviewer 1 Comments

Point 1: Nevertheless we have any idea of the efficacy in real clinical condition and the performance of the device in ICU context with intubation, profound destination shock and sepsis.

Response 1:

Thank you for your comment.

The revised conclusions:

6. Conclusions

This paper implemented a low-cost system for non-contact blood oxygen saturation measurement using a commercially available webcam to detect facial features and measure physiological parameters. This system assists users in measuring their blood oxygen saturation in real-time, saving the cost of purchasing a blood oxygen testing machine and providing convenience to the user.

To prove the accuracy of this system, the research methodology and system design were tested at distances of 30 cm, 50 cm, 125 cm, and 190 cm, and under different lighting conditions such as light levels below 250 lumens, between 250 and 650 lumens, and above 650 lumens. To supplement the limited experimental data, this paper used the daily blood oxygen values of six test subjects for data expansion. The results of this experiment confirmed that the values in the region of interest on the forehead, after signal processing and blood oxygen calculation formula, had an average absolute error of 0.62%.

Compared to Bhattacharjee's research , which cannot measure blood oxygen values below 97%, and has an experimental error of 1.4%, this paper's blood oxygen calculation formula and error are more accurate. Compared to Al-Naji's research , which has an average absolute error of 3.02%, this paper took only 30 seconds to measure blood oxygen saturation values, which is faster and has better accuracy.

With the popularization of smart devices, the algorithm can be written as an app or API and installed on devices with cameras, such as smartphones, tablets, or laptops, allowing people to monitor their physical condition at any time. However, since it has not yet been approved by the FDA for use in real clinical situations, it cannot be applied in medical institutions. Nonetheless, it can be applied in home care, community care, remote health care and other fields, and can also improve the quality of care for COVID-19 patients and reduce the burden on health care.