

## Blood Oxygen Levels Can Be Measured at Home Using a Smartphone



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Researchers from the University of Washington and University of California San Diego have shown that smartphones are capable of detecting blood oxygen saturation levels down to 70%. According to the U.S. Food and Drug Administration, this is the lowest value that pulse oximeters should be able to measure.

Six participants aged from 20 to 34 were recruited. Researchers had each participant wear a pulse oximeter on one finger and position their other finger on the same hand over the camera and flash of a smartphone, which uses a deep-learning algorithm to estimate the level of blood oxygen.

The camera records how much of the blood absorbs the light from the flash in each of the three colour channels in measures, including red, green and blue. Researchers then feed those intensity measurements into their deep learning model.

To test the accuracy of the smartphone's predictions, the team supplied a controlled mixture of nitrogen and oxygen to six subjects to gradually reduce their blood oxygen levels, and proceeded to use a smartphone to demonstrate whether it can correctly predict their blood oxygen levels.

Data from four of the participants was used to train a deep learning algorithm to draw out the blood oxygen levels. Remaining data was used to validate the method and then tested to show how well it performed on new participants.

Co-lead author, Jason Hoffman, a UW doctoral student of Computer Science and Engineering reinforced, "With our test, we're able to gather 15 minutes of data from each subject. Our data shows that smartphones could work well right in the critical threshold range".

In an ideal world, this kind of information can be easily transmitted to a clinician in order for them to quickly determine whether a patient needs to visit the emergency, whether it is safe for the patient to remain home, or whether to make an appointment with their primary care provider.

Senior author Edward Wang, an assistant professor at UC San Diego's Design Lab and the Department of Electrical and Computer Engineering, stated that, "computer science research is still just starting to dig its teeth into using machine learning for biomedical device development and we're all still learning. By forcing ourselves to be rigorous, we're forcing ourselves to learn how to do things right".

Source: [University of Washington](#)

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