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Wireless signals and AI to monitor COVID-19 patients remotely

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MIT wireless device can detect vital signs, sleep patterns and movement from a distance to reduce the risk of contagion



As the coronavirus pandemic continues, hospitals are working to prevent overcrowding and keep healthcare workers safe. According to the CDC, more than 9,000 healthcare workers across the US have contracted COVID-19, and at least 27 have died. To address this, a team from MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) developed a wireless monitor that lets doctors monitor patients from a distance.

The device, called Emerald, is similar to a large WiFi router and is mounted on a wall. It emits wireless signals, which reflect off of patients. The system then uses AI to analyze those patterns and infer a persons' breathing rate, sleep patterns and movement. Emerald is sensitive enough to detect chest motion (which translates into breathing rate) and to distinguish between multiple people. It can tell when a patient is having trouble breathing, and all of that info can be accessed by a doctor remotely.

The CSAIL team has already put Emerald to use at an assisted living facility, where they used it to remotely monitor a COVID-19 patient in Boston. As the patient recovered, the system detected that her breathing rate decreased from 23 to 18 breaths per minute, her sleep improved and she was walking more quickly around her apartment.

"Given how Emerald can generate important health data without any patient contact, it could minimize the risk that doctors and nurses will catch the disease from their patients," says Dr. Ipsit Vahia, an assistant professor of psychiatry at Harvard Medical School. That could be especially helpful in places like skilled nursing and assisted living facilities, where so many patients are at high risk for contracting COVID-19.

As the number of COVID-19 cases spike, Emerald could allow less severe patients to stay at home but remain under the supervision of healthcare providers. In the future, Emerald could be used to monitor other conditions, like anxiety, insomnia and sleep apnea. And along with telehealth, it could spur the shift toward tech-driven remote care.