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IIT Kgp develops affordable diagnostic device for COPD

10 September 2020 | News

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Researchers at the Indian Institute of Technology, Kharagpur (IIT Kgp) have developed an affordable diagnostic intervention for Chronic Obstructive Pulmonary Disease (COPD) based on the internet-of-things medical devices (IoT-MD) integrated with AI.

At the Organic Electronics Laboratory (ORELA), Department of Physics, IIT Kgp Prof. Dipak Kumar Goswami and his research team have developed SenFlex.T, a smart mask synced with an android monitoring app through Bluetooth, that can continuously monitor breathing patterns, rate, heart rate, oxygen saturation level in blood. The app is connected to a cloud computing server, where artificial intelligence (AI) has been implemented to predict the severity of COPD through machine learning (ML).

"SenFlex.T can be used at home by patients without having to visit diagnostic centres as against the current practice. This will also address the critical issue of addressing COPD at an early stage and by means of advanced healthcare technology, a boon for both patients and the overall healthcare system," explained Prof. Goswami.

SenFlex.T smart mask contains a highly sensitive, flexible temperature sensor along with a Bluetooth based measuring electronics. The sensor system can continuously monitor the temperature changes of inhaled and exhaled air during breathing and record the breathing pattern. The temperature sensor has a resolution of 4.3 mK and about 25 ms response time. Further, a commercially available pulse oximeter has been integrated with the sensor system to monitor the oxygen saturation level during breathing. The patient data is uploaded automatically to the cloud server through the mobile app (SenFlex), where it is processed by means of AIML, and reports made available on the app and for doctors' consultation.

The innovation has been reported in the international journal ACS Applied Materials & Interfaces. The researchers have also filed a patent for the innovation and are ready for commercialization. The product cost has been estimated at about Rs 2,500.