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Capacitive sensor for respiratory monitoring

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Continuous patient vital sign monitoring is prevalent in hospitals nowadays. It helps to significantly reduce caregiver's work load. Out of all the vital signs, respiratory rate is seldom continuously monitored. Nurses usually manually estimate the respiratory rate from counting within 30 seconds. This could lead to both inaccuracy and discontinuity of monitoring. Even if respiratory rate is captured in some cases, what is used in hospital nowadays is bulky and invasive devices which brings discomfort to patients. Clinically speaking, respiratory rate is equally important as compared to other vital signs. Respiration monitoring can help to predict health crises, more specifically, failures in many organ systems. Therefore, there is an emerging clinical need to provide better respiratory monitoring solution. This presentation will present an idea that provides cost-effective and non-contact solution that is well-suited for patients who have a difficulty or uneasiness to use the contact RR monitoring devices. Patient's cintinously tracked RR data can be sent wirelessly to the caregivers or integrated to hospital's EMR system. Hill-Rom has in-house, developed a capacitive sensor that can be placed underneath a foam or air-filled mattress. The sensor is able to sense patient position, pressure inside the air bladders. Besides, the same sensor can be used to calculate patient's respiratory rate by sensing the incremental body displacements caused by breathing. A sophisticated algorithm has been developed to overcome the lower SNR issue. 96% accuracy rate (±2 bpm) has been achieved in our preliminary test study for various use cases on five human subjects.

Biography

Victoria Wang Yue has completed her PhD from National University of Singapore. She is a Mechanical Engineer of Hill-Rom, a leading provider of medical technologies for the health care industry including hospital beds, patient lifts, and non-invasive therapeutic products. She has published more than 6 papers in reputed journals or books. She also achieved first prize in project competition in Stanford-Singapore Biodesign Program focused on Medtech innovation.

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