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Infrared technology for healthcare diagnosis and monitoring

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Infrared (IR) technology has well-established applications in industry and is an emerging harmless tool in healthcare. It facilitates highly accurate measurement and analysis of skin temperature. Physiological effects that cause skin temperature changes could be monitored and investigated using IR. This presentation gives an overview of some healthcare applications of IR explored by our team that are very briefly outlined next. Respiration rate is an important indicator of health deterioration in critically ill patients. Respiration rate could be measured accurately in a noncontact manner using IR. A possible sign of rheumatoid arthritis (RA) is an increase in skin temperature at the affected joint. IR has been shown to be valuable in assisting clinicians assessing and diagnosing RA. X-ray radiograph is the current gold standard for diagnosing bone fracture. A significant proportion of x-ray scans indicate the bone is not broken thus unnecessarily exposing the patient to x-ray radiation and incurring financial cost. A study involving IR applied to wrist injuries has shown that wrist temperature in wrist fracture cases is significantly higher than that of wrist sprain cases. Therefore IR

could have potential in screening patients for wrist fracture. IR has also allowed differentiation of fractured vertebrae from healthy vertebrae in osteogenesis imperfecta patients. IR has been used to detect inflammatory intra-abdominal pathology in infants. IR detected early growth of bacteria before they are detectable by other microbiology-based methods. The associated temperature change is due to the cells being viable and metabolically active.

Biography

Reza Saatchi is a Professor of Electronics at Sheffield Hallam University, U.K. He has published about 200 refereed articles, primarily in [medical engineering](#) field. He has supervised about 50 PhDs and acted as guest editor of journals and chaired [international research](#) conferences. He has worked extensively in developing [infrared imaging](#) as a monitoring and diagnostic tool for [healthcare](#).

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