Implementation of Body Sensor Systems in Healthcare Practice

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Body sensor systems continue to evolve at a rapid pace. Their adoption into healthcare infrastructure is now beginning to parallel their speed of innovation. While most commercial systems have traditionally been consumer facing and centered around health and wellness, the COVID-19 pandemic has focused attention on the ability of these sensor systems to provide important health data in a new paradigm of medical care that emphasizes remote care.

While the intention of this minitrack has always been to explore the integration and infrastructure required to deploy such body sensor systems in healthcare, these efforts have taken on a special emphasis in the setting of COVID-19. Pathways to adoption of health IT measures that may support many body sensor systems have been simplified, and there is increased interest even among traditionally conservative healthcare systems to pilot and adopt remote care systems. For example, to encourage remote care and maintain social distance in preventative healthcare visits, the United States Department of Health and Human Services issued a notice of enforcement discretion for telehealth remote communications during COVID-19 which has allowed healthcare providers to waive certain information security integration aspects of telehealth.

The ultimate goal of this minitrack is to explore theoretical frameworks, formative qualitative work and demonstration projects that illustrate the integration of body sensors or health information technologies into clinical practice. Last year's minitrack explored such deployments in innovative spaces to understand the contextual basis of activity and discover opportunities for academic engagement among secondary school students, as well as utilize a radar system adapted to locate and measure respiratory rate among patients in an emergency department. Both papers considered not only the design of such systems but also the multidisciplinary nature of teams required to bring such sensor systems into use.

This year's minitrack features three innovative papers that continue to describe the application of body sensor systems or information architecture to clinical care. While work in these papers was completed prior to pandemic spread of SARS-CoV-2, the findings around deployment of such systems and the application of machine learning algorithms is ever important and applicable to a new healthcare landscape focused on remote patient care.

In our first paper, the authors present the construction of a probabilistic logic network trained on a portion of a typical medical toxicology practice to help diagnose common poisonings. Our second paper describes the use of a wearable biosensor to gather data around opioid use and the development of a machine learning algorithm that helps identify withdrawal from opioids. Finally, our third paper describes the technical deployment of a wearable sensor system to collect contactless vital signs in an emergency department observation unit. Overall, these three papers describe clinical applications of new technologies into healthcare. They all address specific aspects of implementation—training and development of artificial intelligence systems, identification of specific physiologic changes associated with medical conditions, and infrastructure requirements needed to isolate and discover technical challenges in the deployment of sensor systems.

While we will miss the personal interactions and connections of HICSS this year, we hope that this minitrack continues to foster new ideas and pathways through which other researchers may consider developing body sensor systems. We look forward to fruitful discussion of the featured papers in this year's minitrack and lively conversation around body sensor systems. We hope to re-convene in-person at HICSS-55!

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