

Automatic Identification of the “Start of Anesthesia Care” using Indoor Positioning System (IPS) Derived Spatial-Temporal Association

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Introduction: The time recorded as “start of anesthesia care” (SAC) has broad medicolegal importance. It is generally agreed that the SAC occurs when clinician and patient begin their professional interaction prior to the start of surgery. As with all manually recorded events in a high workload environment, there is the possibility of significant error in the recording of SAC. An Indoor Positioning System (IPS) typically uses stationary wall-mounted receivers to spatially locate small portable wearable emitter tags. Server-based algorithms map the tag movement in real-time. We investigated the ability an IPS to automatically identify the SAC through spatial-temporal association of patient and clinician IPS tags in the induction room.

Methods: A Radianse, Inc. IPS was integrated into the CIMIT/MGH* Operating Room of the Future (ORF) to facilitate outcomes research. The IPS automatically records clinician and patient movement throughout the perioperative environment, including the induction, operating, and emergence rooms of the ORF suite. Wall-mounted networked receivers track the position and ID number of the RF+IR emitting tags at 10-20 sec intervals. A trained observer manually recorded SAC(manual), and the IPS server automatically identified SAC(IPS), after the anesthesiologist and patient spent > 1 minute together (“dwell time”) in the induction room prior to the induction of anesthesia.

Results: 15 patients were studied from 8/22/03 to 9/22/03. SAC(IPS) – SAC(manual) was 35 sec (range 1 – 85 sec) when SAC(IPS) was calculated with an anesthesiologist-patient dwell time of 1 minute. Generating SAC(IPS) with dwell time range of 2 and 3 minutes did not alter the identification of the start of the anesthetist-patient interaction.

Discussion: In this pilot study, the IPS performed well in automatically identifying the SAC. As IPS are more widely installed in hospitals to optimize patient, clinician, and equipment throughput, administrators can use the temporal and spatial association of tags to automatically identify and timestamp key associations.

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