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A Gesture-based Tool for Sterile Browsing of Radiology Images

LITERATURE SURVEY

Wachs JP (2008) proposed that the hand gesture system for MRI manipulation in an EMR image database called "*Gestix*" was tested during a brain biopsy surgery. This system is a real-time hand-tracking recognition technique based on color and motion fusion. In an in vivo experiment, this type of interface prevented surgeon's focus shift and change of location while achieving, rapid intuitive interaction with an EMR image database. In addition to allowing sterile interaction with EMRs, the "*Gestix*" hand gesture interface provides: (i) ease of use—the system allows the surgeon to use his/her hands, their natural work tool; (ii) rapid reaction—nonverbal instructions by hand gesture commands are intuitive and fast (In practice, the "Gestix" system can process images and track hands at a frame-rate of 150 Hz, thus, responding to the surgeon's gesture commands in real-time), (iii) an unencumbered interface—the proposed system does not require the surgeon to attach a microphone, use head-mounted (body-contact) sensing devices or to use foot pedals, and (iv) distance control—the hand gestures can be performed up to 5 meters from the camera and still be recognized accurately. The results of two usability tests (contextual and individual interviews) and a satisfaction questionnaire indicated that the "*Gestix*" system provided a versatile method that can be used in the OR to manipulate medical images in real-time and in a sterile manner.

Mithun George Jacob (2012) proposed that the gestural interface was designed for browsing MRI images in the OR. The results of this study evaluate the relative importance of hand gestures alone versus hand gestures combined with environmental context. The main finding is that it is possible to accurately recognize the user's (or a surgeon's in an OR) intention to perform a gesture by observing environmental cues (context) with high accuracy.In comparison with prior work, which gauged intent by checking if gestures were performed in a predefined three-dimensional workspace, our work uses environmental cues to determine intent allowing the user to perform gestures anywhere in the field of view of the sensor.

Justin H. Tan (2013) proposed that the Review of prior and real-time patient images is critical during an interventional radiology procedure; however, it often poses the challenge of efficiently reviewing images while maintaining a sterile field. Although interventional radiologists can "scrub out" of the procedure, use sterile console covers, or verbally relay directions to an assistant, the ability of the interventionalist to directly control the images without having to touch the console could offer potential gains in terms of sterility, procedure efficiency, and radiation reduction. The authors investigated a potential solution with a low-cost, touch-free motion-tracking device that was originally designed as a video game controller. The device tracks a person's skeletal frame and its motions, a capacity that was adapted to allow manipulation of medical images by means of hand gestures. A custom software program called the Touchless Radiology Imaging Control System translates motion information obtained with the motion-tracking device into commands to review images on a workstation.