

# Manipulating Medical Images: A Hands-Off Approach

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## INTRODUCTION

According to the U.S. Census Bureau, there are approximately 7,600 hospitals and roughly another 25,750 health clinics in the United States alone (U.S. Census Bureau, 2002). This does not include the tens of thousands of clinics and hospitals worldwide. In a 2007 report, the CDC stated that there were approximately 1.7 million healthcare-associated infections (HAIs) and over 99,000 deaths. Of those deaths, the CDC estimates that 75% of the deaths were preventable. Cited as the main causes were, “unsanitary facilities, germ-laden instruments and unwashed hands...” (Klevens, Edwards, Richards, Horan, Gaynes, Pollack, and Cardo, 2007)

In hospitals and clinics around the world, the current best answer to maintaining sanitary conditions and removing germs is through the use of disinfection wipes, germ killing anti-bacterial solutions, and the washing of hands. The answer to reducing the amount of deaths related to unsanitary conditions in many of these instances is to reduce the amount of necessary physical contact with extraneous instruments doctors must have, whether in the operating room or in a patient’s room. Additionally, in emergency surgery situations, every minute counts as doctors fight to save the patient’s life. Decreasing the amount of time saved by eliminating the need to wipe down equipment and scrub up after each physical contact with equipment decreases the delay in saving the patient. Reduced time also directly and indirectly reduces associated costs to both patients and medical facilities. In a report for the CDC in 2009, the direct cost of HAIs to U.S. hospitals ranges from \$28.4 to \$33.8 billion annually (Scott, 2009).

## PROPOSED SOLUTION

This paper will present the design of a new application developed to turn the Kinect into a form of medical equipment that will eliminate the need to break the sterile field by allowing medical personnel to manipulate medical images using voice and hand-gesture commands rather than having to touch keyboards, mice, and x-ray films. Physically Kinected, a student team participating in Microsoft Imagine Cup, aims to reduce the need for physically touching extraneous devices when it comes to medical imaging manipulation. Physically Kinected has created a software solution for the Kinect that will perform the following benefits in manipulating medical images:

- Easy-to-use and intuitive interface that allows for voice commands and physically hands-free operation
- Reduction of the time it takes for medical professionals to manipulate medical images

- Reduction of the amount of unsanitary working conditions by eliminating the need to touch extraneous equipment
- Increased security of patient information by using biometrics to identify medical professionals
- Reduce costs associated with maintaining a sterile environment

To a medical professional, time is life and money. Reduction by 20 seconds, the amount of time needed to simply login to a medical imaging system at a regional hospital, has been estimated by the radiologists to save \$125,000 per radiologist annually.

## **CONCLUSION**

This paper will present the design of a new application developed to turn the Kinect into a form of medical equipment that will eliminate the need to break the sterile field by allowing medical personnel to manipulate medical images using voice and hand-gesture commands rather than having to touch keyboards, mice, and x-ray films. Data from user trials of the beta application will also be presented.

## **REFERENCES**

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