

SSK16-02

Can Gaming Consoles Be Used to Improve X-Ray Imaging? A Feasibility Study

Wednesday 10:40-10:50 AM | SSK16-02 | NA

#### PURPOSE

<p>To test the feasibility of using gaming console technology to improve the quality of X-ray projection imaging by automatically measuring body part thickness and mitigating the causes of repeat examinations.</p>

#### METHOD AND MATERIALS

Proprietary software was developed for the Microsoft Kinect 1.0 for Windows using C#. Both the optical camera and infrared sensor outputs were recorded and tested with a mock-up wall stand. The software was designed to control radiation dose variation by measuring body-part thickness. It also was designed to reduce common reasons for repeating images including wrong body part, motion, positioning, and clipped anatomy.

#### RESULTS

The system recognized body part and left/right side of the body to reduce taking the wrong body part. Thickness measurements were automatically displayed with a precision of 1 mm at the central ray, defined body part, or at a user-specified point. The system identified the relationship of the patient's ordered anatomy with respect to the location of automatic exposure chambers (AECs) and image receptor. The software was designed to highlight the body part in red when it was not overlying the AECs, yellow when partially on a specified AEC, and green when completely covering that AEC. Motion was tracked graphically over time displayed with red indicating gross motion, yellow as slight motion, and green as no motion. Clipped anatomy was displayed with an overlay of the collimated light field. Positioning was confirmed with the optical camera. The display output included a stylized body with highlighted body part, optical visualization of the patient, thickness measurement, and motion over time displayed graphically as shown in the figure (shown: left hand centered over the center AEC, recent but no current motion, and 19 mm thick in the AP projection at the central ray).

#### CONCLUSION

This feasibility study shows that body-part thickness can be measured automatically and can aid in setting technique based on patient thickness without physical contact measurement (e.g. calipers). The system can reduce repeat rates by confirmation of the correct body part, and checking for motion, positioning, and collimation immediately before the radiograph.

#### CLINICAL RELEVANCE/APPLICATION

<p>This feasibility study indicates that technology can be adapted from mass-produced gaming consoles to control radiation dose and reduce repeat rates. This device can help the radiology community adhere to the ALARA principle.</p>

FIGURE (OPTIONAL)

[http://abstract.rsna.org/uploads/2015/15005764/15005764\\_x5ly.jpg](http://abstract.rsna.org/uploads/2015/15005764/15005764_x5ly.jpg)