

Ultrasound imaging requires...

Medical Knowledge

Spatial Understanding

Technical Understanding

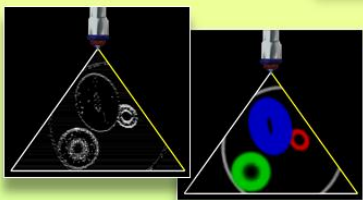
Anatomy
Physiology
Terminology
...

Ultrasound physics
limits & artifacts
...

3D object \longleftrightarrow 2D cross-sectional image

Computer-based training tool
utilizing a game controller as virtual ultrasound probe

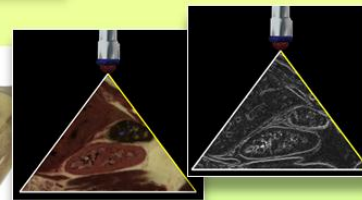
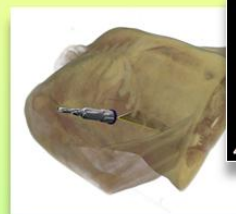
Hands-On
→ LL-INE1212



Artificial virtual objects



inexpensive
readily available
'learning by playing'



Anatomical models

Hands-On
→ LL-INE1212

PURPOSE/AIM

A crucial factor for good results in ultrasound imaging is the examiner's understanding of how 3D objects appear on 2D slice images depending on the ultrasound probe's position and orientation. This exhibit demonstrates how inexpensive game controllers and open source software can be used to create a computer-based training tool that helps acquire the necessary spatial understanding.

CONTENT ORGANIZATION

- A.** Introduction: See how a game controller can be used as a virtual ultrasound probe, creating ultrasound-like slice images from virtual 3D objects by arbitrary hand movements
- B.** Understand the spatial relationships between a 3D object and its 2D slice images by examining objects of different complexity (from simple geometric objects like tubes and ellipsoids to more complex anatomical objects)
- C.** Learning by Playing: Train and assess your sonographic skills in a game-like setting by walking through different levels of difficulty regarding geometric/anatomical complexity and given time

SUMMARY

An ultrasound simulation tool is presented that can help improve spatial understanding in sonography. Due to its implementation based on off-the-shelf gaming hardware and open source software the tool is easily available and affordable. For instance, it can be used at home by medical students or residents as complement to conventional ultrasound training.