U-Learn

A training model for Breast Ultrasound Imaging

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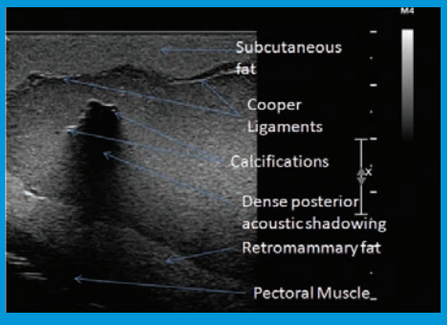

A training model for Breast Ultrasound Imaging

U-learn is a training and learning model for radiographers and registrars for training in breast ultrasound imaging.

The U-Learn model is currently being used in a manual format, but may be adapted for use as an e-learning tool. It is designed to work alongside another DIT technology, an anthropomorphic breast imaging phantom.

The model assesses the performance of a trainee registrar before, during, and after training using the ultrasound imaging phantom which is a realistic representation of the breast. The phantom contains pathologies, cysts and tumours and the goal is that registrars / sonographers new to the field of breast ultrasound imaging can learn how to identify these targets prior to practicing in a live patient environment.

The proposed eLearning tool will comprise an on-line registration scheme giving users access to a variety of learning resources as well as the option to be benchmarked against the aggregate.

Users scan three phantoms, each containing differing numbers, locations and types of pathologies, and record what they find at the start of, during, and at the end of their training cycle. Their scores are calculated using both positive and negative marking.

Other resources available to users of the e-learning version would include notes on the use of the device, scanning techniques, pros & cons of new technologies and how to use them in the best way, and lecture videos on imaging techniques.

Applications

The principal application for this technology is as a learning model for trainee radiographers, sonographers, radiologists and clinicians.

Existing training methods are text book exercises, which transition quickly into training in a live environment. There are no training models or devices which bridge the gap between text book and patient.

The aim of this technology is to be developed as a stand-alone e-learning tool which can be used in tandem with or separate to the anthropomorphic breast imaging phantom. Initially, it is hoped that the e-learning tool will be sold alongside the phantoms in order to make best use of them and to provide quality assessments of learners.

The eLearning tool will also contain a database of scores from all users of the tool worldwide, so that individuals can compare their performance with others in their institution or country. This system would be anonymous.

Opportunity

The number of national breast ultrasound screening programs worldwide is growing, and with this, the demand for highly trained breast-specialist radiologists.

Ultrasound examinations are highly dependent on the knowledge, skill and experience of operators, and unlike other imaging modalities, ultrasound is a real-time, hands-on imaging technique. The need for training of multi-disciplinary breast care teams is acute.

Crucially over-diagnosis in Ultrasound examinations is a huge problem, which leads to unnecessary treatment for patients and unnecessary costs for hospitals. Research shows that for every one patient whose life is saved by breast cancer screening, up to 10 patients will undergo unnecessary treatment.

Although the market for this training tool is relatively small in Ireland, there are approximately 450-500 medical radiology schools across Europe and the US alone where diagnostic ultrasound training is carried out.

With an increasing number of diagnostic and therapeutic applications for ultrasound technology, the need for more advanced training methodologies will only increase.

Advantages

U-learn has a number of unique characteristics:

- Novelty – Knowledge of pathologies is crucial in Ultrasound imaging but this cannot be tested on a patient. Scanning an anatomically-realistic phantom with known pathologies is novel and will aid more experienced users to learn about new imaging modes in a rapidly developing field, without distress to possible patients.
- Academically rigorous – The scoring system uses both positive and negative marking for pathologies detected and their classification. This is an excellent way to track the progress of a student.

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- Multi-level – The inclusion of different levels of teaching material will facilitate learning for diverse groups (i.e. students, lecturers, doctors) who wish to keep up-to-date with technology developments.
- Best practice – At present, training in this field is carried out on the patient. The ability to train on an inanimate object will give users space and time to build their confidence and ability. This can also contribute to improved patient care and reduce the problem of misdiagnoses in hospitals.

Stage of Development

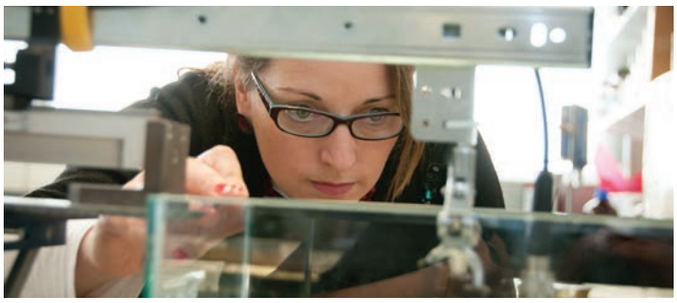
U-Learn has been developed in the Medical Ultrasound Physics and Technology Group in DIT kevin St., supported by funding from Enterprise Ireland.

The technology is capable of demonstration in a lab-bench environment but requires further commercial development to productise, and in particular, would benefit from software development and a GUI.

The methodology is protected as confidential know-how.

The system has been successfully trialled with registrars in St James Hospital with the support of the Centre for Advanced Medical Imaging (CAMI).

DIT is currently seeking expressions of interest from potential business partners interested in developing the technology, in particular, software development experts interested in developing the e-learning model under licence.



Above: Dr. Jacinta Browne, Medical Ultrasound Physics and Technology Group, DIT

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