

# Demo: Mobile Audible AR Experience for Medical Learning Murmurs Simulation

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## Abstract

This demonstration presents the development of a mobile augmented reality (AR) murmur simulator that can be used for clinical teaching for medical trainees. Medical training often requires educators and trainees to work with vast amount of experience-based knowledge, hearing and recognizing murmurs is part of the fundamental training for medical students. In this study, we propose a wearable clothing system that is developed to work with mobile audible AR that provides heart murmurs simulation for facilitating medical learning experience.

**Keywords:** Augmented Reality, Virtual Reality, Medical Data, Education Technology.

**CCS Concepts:** • Human-centered computing~Mixed / Augmented Reality

## 1 Introduction and Background

The medical field is continuously exploring new and accessible education technology to improve the medical learning experience. Research have been conducted for AR on cloth (Bradley et al, 2009). Recent technological advances have allowed AR experience to be possible on palm-sized or eye-wear personal mobile devices. From the perspective of medical training, murmurs are the sounds of breathing and flow of blood into the heart. This project focuses on the development of a low cost and low footprint audible mobile AR heart murmur simulation system for medical trainees. This system uses a cloth with imprinted AR markers, so that heart murmurs can be heard using an electronic stethoscope with medical grade audio data.

## 2 Approach and Implications

A mobile audible AR system is being proposed in our study for the medical learning. This system can be operated using a mobile phone paired with an AL-60 electronic stethoscope outside a laboratory environment. Figure 1 shows the workflow of the proposed system. The system requires two persons during the AR operation, a user putting on the cloth imprinted with numbers of small AR markers and another user using the mobile audible AR application.

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Mobile audible AR users would hear different types of murmurs when pointing the application in different areas of the cloth at the heart region. All AR tracking is being processed from the server for different audio data to be presented to the users. This audible AR system would allow trainees to experience murmur simulation to work with a real human body instead of costly laboratory equipment, namely SAM and HARVEY simulators. Figure 2 shows a group of medical students testing on the proposed system.

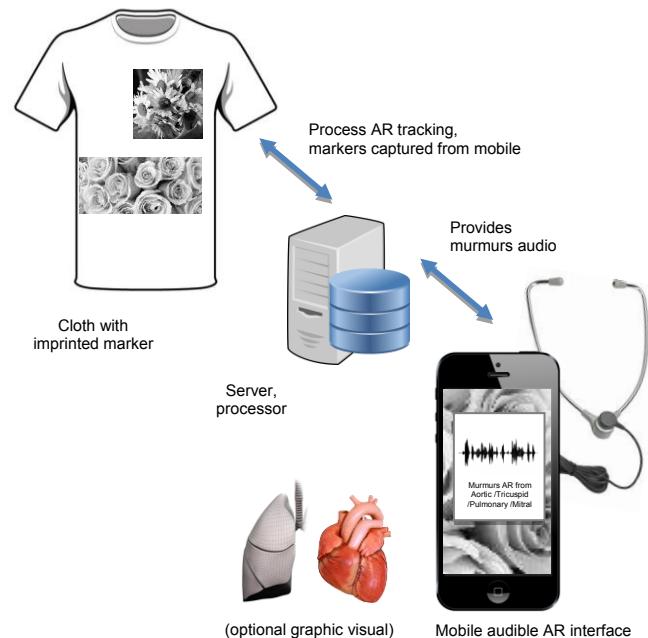


Figure 1: Proposed system, cloth works with mobile audible AR.



Figure 2: participants testing the proposed system.

During the demonstration, mobile audible AR allows the users to be able to hear uncommon heart murmurs that rarely occur during a diagnosis of a real patient. In future, we aim to explore other AR solutions suitable for unisex wearers and hybrid approaches that combine multiple AR tracking method.

## Reference

BRADLEY, D., ROTH, G., AND BOSE, P. 2009. Augmented reality on cloth with realistic illumination. *Machine Vision and Applications* February 2009, vol. 20, Issue 2, 85-92