



## **RADIO-ANATOMICAL INTERACTIVE LIBRARY: A NEW PARADIGM FOR TRAINING AND TEACHING IN ANATOMY AND DISEASE**

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The study of human anatomy has been the base of medical education through the ages. While digital tools like 3D visualization platforms, VR, and AR have created new opportunities for healthcare training [1], traditional methods remain the cornerstone [2]. Modern technologies enable the production of patient specific, custom-made physical models from previously acquired medical images, enhancing case understanding and pre-surgical preparation [3,4]. The Radio Anatomical Interactive Library will set a new standard - as an innovative educational platform that enhances medical training and education by offering interactive 3D visualizations of patient-specific anatomical models out of medical imaging data. The Institute of Biomedical and Neural Engineering at Reykjavik University, in collaboration with Landspítali, provided a set of clinical cases representing various medical conditions. Once the appropriate DICOM datasets were gathered, the images were prepared for processing through cleaning, alignment, and segmentation to initiate the 3D reconstruction workflow. Following segmentation, a 3D surface mesh is gen-

erated from the outlined regions. Finally, the reconstructed model is imported into a graphics engine, which provides the algorithms and tools necessary to generate interactive 3D environments for VR/AR visualization. The RAIL project addresses traditional teaching gaps by allowing users to explore real clinical cases in an interactive and flexible way; furthermore, using real-case imaging helps students understand complex anatomical structures more effectively than simplified or idealized models. Additionally, RAIL promotes accessibility by enabling students to interact with anatomical 3D models anytime and from anywhere, overcoming the physical limitations of traditional classrooms. The platform bridges the gap between traditional educational methods and modern technologies by combining clinical imaging, patient-specific case development, and interactive educational tools within a mixed reality framework. It supports on-demand case access, real time interaction, and operates with commercially available headsets, offering both clinical relevance and educational versatility.

**Keywords:** Anatomy, 3D modeling, Medical imaging, Virtual reality, Augmented reality, Digital learning, Patient-specific.

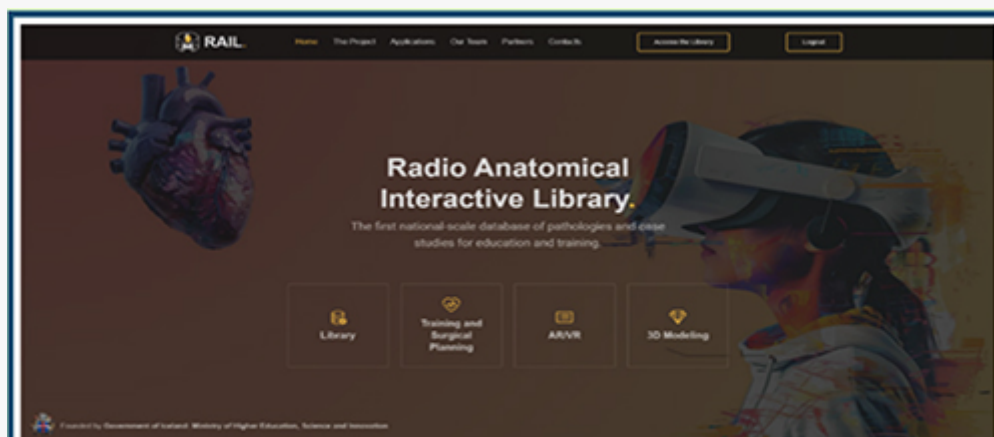


Figure 1. RAIL website's main page. [<https://rail.ru.is/>].