SUMMARY

This thesis delves into the domain of Extended Reality (XR), focusing on its various applications, particularly in education and training. It explores the terminologies of Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), and elaborates on how XR tools are revolutionizing vocational training across industries, enhancing engineering education and training in hydraulics and pneumatics.

The study further discusses the current hands-on Hydraulics and Pneumatics laboratory setup at Tallinn University of Technology and its limitations and proposes a virtual training system using web based XR technology as a solution. The virtual system allows students to assemble and test circuits in a virtual environment, overcoming constraints of traditional lab-based teaching.

The thesis also provides an analysis of similar applications in the industry and outlines the software and hardware tools used for this project, including WebXR for VR functionality, Three.js for 3D environment creation, and the Meta Quest 3 VR headset for testing and development.