TECH DAY_VR WALKTHROUGH

CENTRE FOR IMMERSIVE VISUAL TECHNOLOGIES

About the Centre

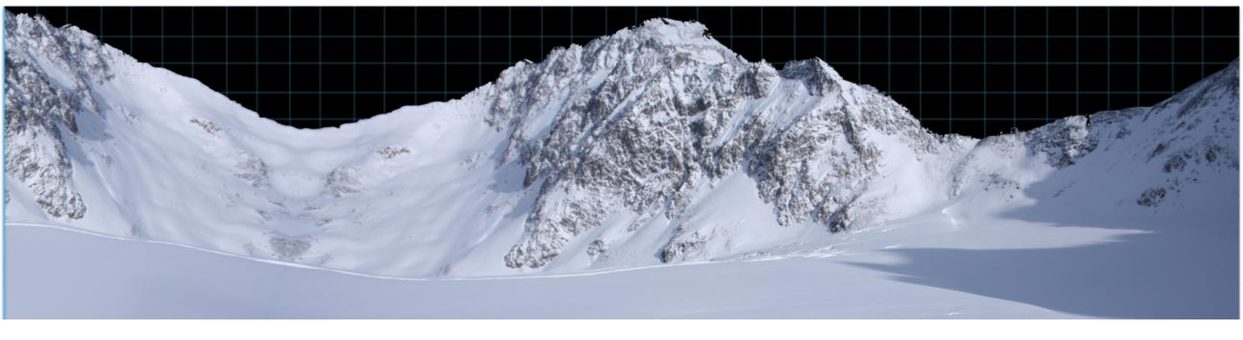
Centre of Immersive Visual Technologies (CIVIT) is a national-wide infrastructure unit, jointly funded by the Academy of Finland and Tampere University of Technology. CIVIT's main purpose is to provide expertise and facilities for studying and utilizing emerging visual technologies and the related new user experience with the aim to enhance the existing and to develop new scientific and industrial applications where advanced visualization is a must.

CIVIT establishes facilities and gather and develop expertise in three sectors: Visual content creation and representation of visual data, Advanced displays, and Immersive user experience.

CIVIT's services are organized in three groups: (1) Research – for supporting academic and industrial projects, (2) Talent – for reaching students as future talents, and (3) Platform for Partners – for interacting and collaborating with various industry and public sector stakeholders.

CIVIT offers access to an unprecedented level of high quality, state-of-the-art equipment to its users in an economically efficient way. Thanks to this infrastructure, all major branches of visual technology are available without having to allocate significant portions of research projects' resources for equipment purchases, allowing it instead to focus purely on research and achieving the set objectives.

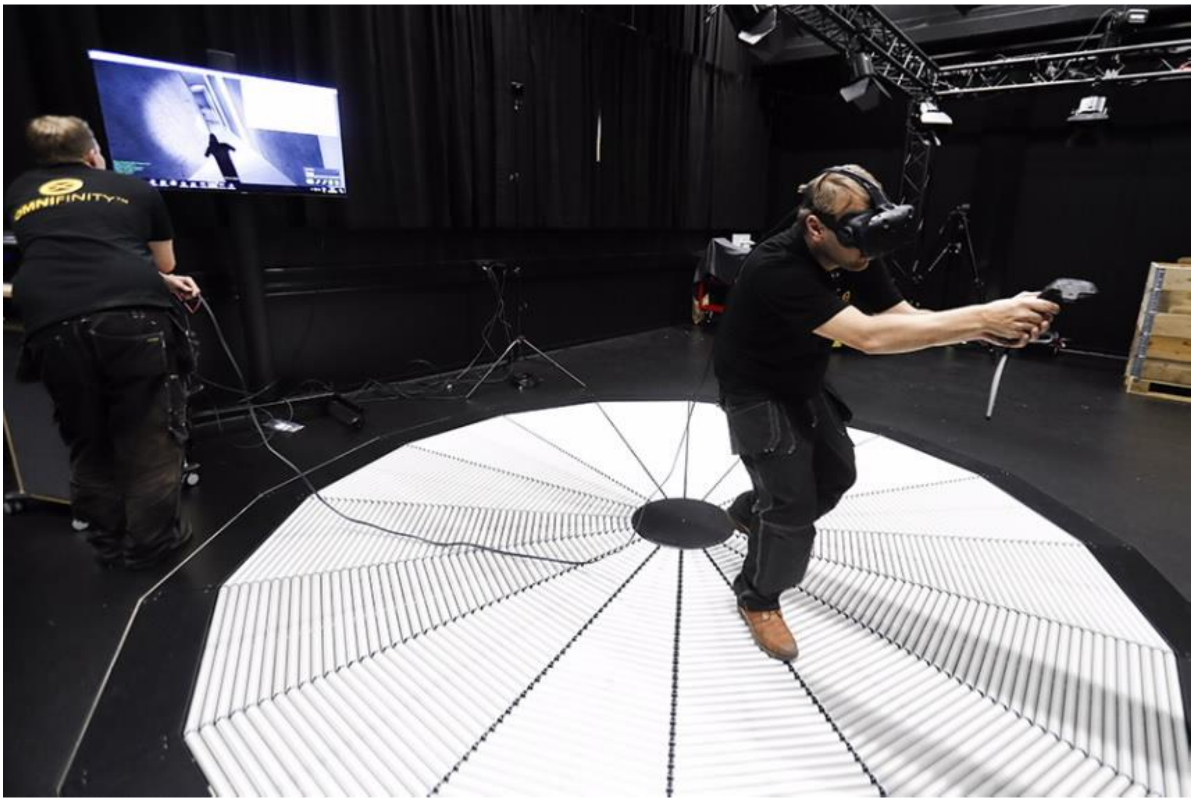
CIVIT is maintained by 3D Media Group, led by Prof. Atanas Gotchev, which is part of the Signal Processing Research Community at Tampere University of Technology.



1. Omnidirectional Treadmill

Peter Thor, Omnifinity

The Omnideck is a 360-degree platform that can be used to enhance analysis and exploration into any field or industry, allowing full immersion before implementing practical changes. The Omnideck enables you to perform natural instinctive movement, in any direction, within the virtual world – walking, running, jumping, and even even crawling, are all possible.



2. Bionic VR Headset

Mikko Ollila, Varjo

Bionic display™ lets you see VR as clearly as you see the real world because it works just like the human eye does.

When you look around the real world, your eyes focus in on a small part of the big picture. That's where the highest and most intense resolution is.

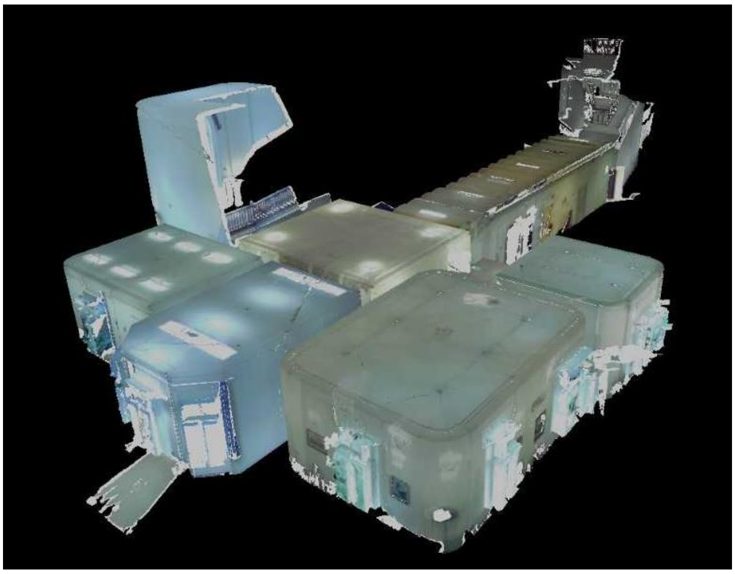
As your eyes move around, the area with the highest resolution moves with them. You can see what's happening in the periphery, but your focus is on what's right in front of your eyes.

By tracking your eyes in real-time, Bionic display™ delivers a flawless and completely accurate image that far surpasses anything on the market today.

3. LIDAR and Point cloud to Unity conversion

Jani Mäkinen, CIVIT

Lidar (Light Detection and Ranging) is a surveying method for making 3D-representations (often point clouds) by utilizing laser light illumination and sensors to measure the differences in return times and wavelengths of the light. We demonstrate the conversion from Lidar scanned data to the multi-platform game engine and development toolkit Unity. The conversion enables straightforward development of different practical applications due to the vast amount of content and support readily available on the Unity platform. For example, the content in Unity can be displayed on various VR headsets for a highly immersive visual experience. We will demonstrate this by showing Lidar scanned data of a building on a VR headset. Additionally, a Lidar scanner from FARO is on display during the demo.



4. SMI Eye Tracking Glasses

Ugur Alkpinar, CIVIT

SensoMotoric Instruments Eye Tracking Glasses (SMI-ETG) offers both monocular and binocular eye tracking solutions by means of infrared cameras mounted on the rim of the device. Each eye reflects infrared light rays sent from six different positions around the rim, which are then captured by the cameras. The obtained data is utilized to detect the pupil position and track the gaze of the participant. Mounted in front of the glasses, a third camera records the outside world at the same time with gaze tracking. The tracking information is then combined with the real world to detect which objects are focused. The device is provided together with the software to design various types of experiments and transform the tracking data into more structured and meaningful representations.

5. Light Field Reconstruction and Visualization

Robert Bregovic, CIVIT

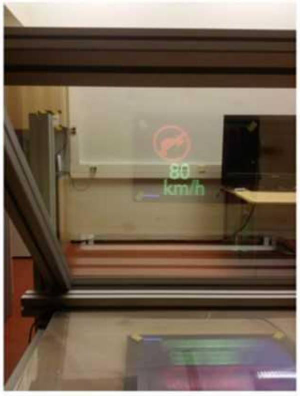
In this demo, we illustrate a novel method, developed by researchers at 3D Media Group, for light filed reconstruction though epipolar plane image processing. The method takes an input of camera views sparsely distributed on a horizontal line and generates a reconstructed densely sampled light field. The importance of densely sampled light fields (obtained by either capture or reconstruction) is illustrated by visualization of differently sampled light fields on the Holovizio 722RC light-field display.

7. Depth-corrected transparent display for augmented reality on glass surfaces

Erdem Sahin, CIVIT

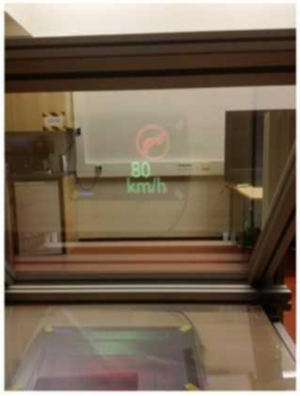
The developed proof of concept demonstrates a thin form-factor virtual head-up display system. Thanks to the utilized lens array based autostereoscopic display technique, the image projection unit is very compact, which is at most few centimeters thick, and yet it is able to present virtual images at 2-3m away from the driver.

Proof of concept



Left view

Middle view



Right view

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