

VRVis K1/INFRASIGHT
VRVis Zentrum für Virtual Reality und Visualisierung
Forschungs-GmbH

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Zentrum für Virtual Reality und Visualisierung Forschungs-GmbH

DIGITAL TUNNEL TWINS SUPPORT TUNNEL SAFETY

VISUALISATION AND STORYTELLING STRENGTHEN PREDICTIVE MAINTENANCE AND TUNNEL MONITORING.

As a country of many mountains, Austria has more than 500 road and railway tunnels. This important transport infrastructure must be built to last, but must also be regularly maintained - ideally without long downtimes in the traffic flow.

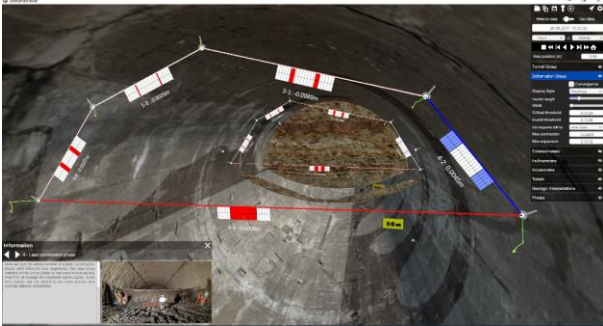
The INFRASIGHT project is dedicated to innovative solutions for the measurement and quality assurance of tunnels in order to make it easier to regularly check the durability of these structures using the latest visual computing technologies. A key part of modern tunnel monitoring are high-resolution 3D scans of the tunnel surface: digital tunnel twins. The engineering teams work with these digital 3D images to monitor the construction progress; additionally they use sensor data to evaluate how or whether the construction is deforming the tunnel wall.

Integrated storytelling strengthens tunnel monitoring

A key innovation in the project is the embedded storytelling function, which was integrated into the existing tunnel monitoring system. Storytelling is an excellent method that can be used in asynchronous collaboration as it makes analysis processes more understandable and comprehensible – which

SUCCESS STORY

increases trust. This approach is also well suited for the education and training of tunnel safety experts.



Digital tunnel twins and storytelling are important tools to monitor deformations on tunnel surfaces. © VRVis

The embedded storytelling mechanism makes it possible to create stories directly from an exploration and analysis session of high-resolution 3D tunnel scans. A story consists of at least one

station, which is defined by a location and a viewing direction in the 3D scene. As tunnel monitoring is a spatio-temporal activity, each station also shows a specific status of the construction process at a specific location.

Simplified and clear knowledge transfer

As part of a story, users navigate between the stations and can call up additional animations and media. Another important feature is that no interactions in the 3D scene are blocked by running through a story, so users can carry out their own monitoring tasks at any time. Maintenance using 3D tunnel models can be carried out efficiently from the office desk, minimizing on-site work or large-scale closures or diversions. This means that the thousands of kilometers of tunnels can be maintained efficiently without most drivers being impaired or even noticing.

Project coordination (Story)

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Project partner

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- Geoconsult ZT GmbH
- TU Wien

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