Conference Poster

Visualizing Transport Futures
The potential of integrating procedural 3d modelling and traffic micro-simulation in Virtual Reality applications

Author(s):
Erath, Alexander L.; Maheshwari, Tanvi; Joos, Michael; Kupferschmid, Jonas; van Eggermond, Michael A.B.

Publication Date:
2017

Permanent Link:
https://doi.org/10.3929/ethz-b-000129871

Rights / License:
In Copyright - Non-Commercial Use Permitted
The development of VR as a design and engagement tool raises quite different demands. A simplified design model, which is capable of handling details in a different way may be sufficient to garner feedback on user reactions towards infrastructure that does not exist today. Visualizations play an important role in transportation planning to communicate plans and policies that target transport modes. Since adding infrastructure often means a large public investment or a trade-off for space with other transport modes, visualizations are often used in early stages to illustrate the widest range of urban traffic simulation capabilities. PTV Vissim is widely used for implementing a VR cycling simulator. Multi-scenario project testing recently.

To understand what would make Singapore more walkable and cyclable – and given the low popularity of cycling in Singapore – we used our VR tool to better understand the impact of new design and planning interventions. On Seng Poh Road, a parking lot in Yishun Fabric Mall was showcased what Seng Poh Road would look like if it is designed for slow traffic – pedestrians and cyclists. In order to understand what would make Singapore more walkable and cyclable – and given the low popularity of cycling in Singapore – we used our VR tool to better understand the impact of new design and planning interventions. On Seng Poh Road, a parking lot in Yishun Fabric Mall was created on 3DS Max geometrically (right) and visualized unique non-repeating conditions procedurally. Therefore we supplement procedural modeling with parametric modeling to interact with infrastructure that does not exist today.

We also see much potential for the use of VR in research beyond the presented case studies. For example, VR-based transportation research can use VR to test the societal and environmental performances of certain street designs. In the CREATE campus case study, we will further test the potential of VR in capturing and measuring the perceptions and reactions to changes in infrastructure with VR. With VR we can also experience the perspective and feelings of other road users.

1. FOR THE PIPELINE

2. VISUALIZATION OF TRANSPORT FUTURES

The potential of integrating procedural 3D modeling and traffic micro-simulation in virtual reality applications

3. VISUALIZING TRANSPORT FUTURES

The pipeline of integrating in Virtual Reality

4. VISUALIZATION TRANSPORT FUTURES

A schematic representation of software pipeline developed for experiment.

5. VISUALIZATION TRANSPORT FUTURES

Systolic and diastolic pressure of a single individual in a single setting versus systolic and diastolic pressure over time in the same individual. The systolic and diastolic pressure are shown at the top and bottom of the figure, respectively.

6. VISUALIZATION TRANSPORT FUTURES

Micro-simulation in PTV Vissim in plan VR model of Seng Poh Road as is (left) and with modified design (right). Hundreds of images generated from cyclist’s eye level on Unity3D model and heat map of traffic micro-simulation generated in Unity.

7. VISUALIZATION TRANSPORT FUTURES

Bicycle Simulator

An integration of PTV Vissim and VR to test the ground truth of implementing a VR cycling simulator. Multimodal data collection and analysis tools were used to further the application of the simulation and evaluate its success.

8. VISUALIZATION TRANSPORT FUTURES

In order to understand what would make Singapore more walkable and cyclable – and given the low popularity of cycling in Singapore – we used VR to better understand the impact of new design and planning interventions. On Seng Poh Road, a parking lot in Yishun Fabric Mall was created on 3DS Max geometrically (right) and visualized unique non-repeating conditions procedurally. Therefore we supplement procedural modeling with parametric modeling to interact with infrastructure that does not exist today.

9. VISUALIZATION TRANSPORT FUTURES

The pipeline of integrating in Virtual Reality

10. VISUALIZATION TRANSPORT FUTURES

A schematic representation of software pipeline developed for experiment.

11. VISUALIZATION TRANSPORT FUTURES

The potential of integrating procedural 3D modeling and traffic micro-simulation in virtual reality applications

12. VISUALIZATION TRANSPORT FUTURES

A schematic representation of software pipeline developed for experiment.

13. VISUALIZATION TRANSPORT FUTURES

A schematic representation of software pipeline developed for experiment.

14. VISUALIZATION TRANSPORT FUTURES

A schematic representation of software pipeline developed for experiment.

15. VISUALIZATION TRANSPORT FUTURES

A schematic representation of software pipeline developed for experiment.

16. VISUALIZATION TRANSPORT FUTURES

A schematic representation of software pipeline developed for experiment.