

Data-Centric AI for Smart Digital Traffic Twins

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Research activities

- Mobility data analysis
- Traffic modelling and simulation

Projects

[**TORRES**] AI Methods for optimizing traffic in Brussels region

[**TrafficTwin**] Evaluate the impact of disrupting events in urban traffic

Joint collaboration
with ULB (Belgium)

ULB

How do we go from raw data to simulation models to study the complex dynamics of traffic?

- Computational method to define an accurate digital twin of a physical environment
- Optimization techniques for traffic modeling
 - Traffic demand generation, local simulation (time/space), mobility pattern learning

Traffic Calibration

Estimate realistic traffic simulation models from raw counts data

Challenges

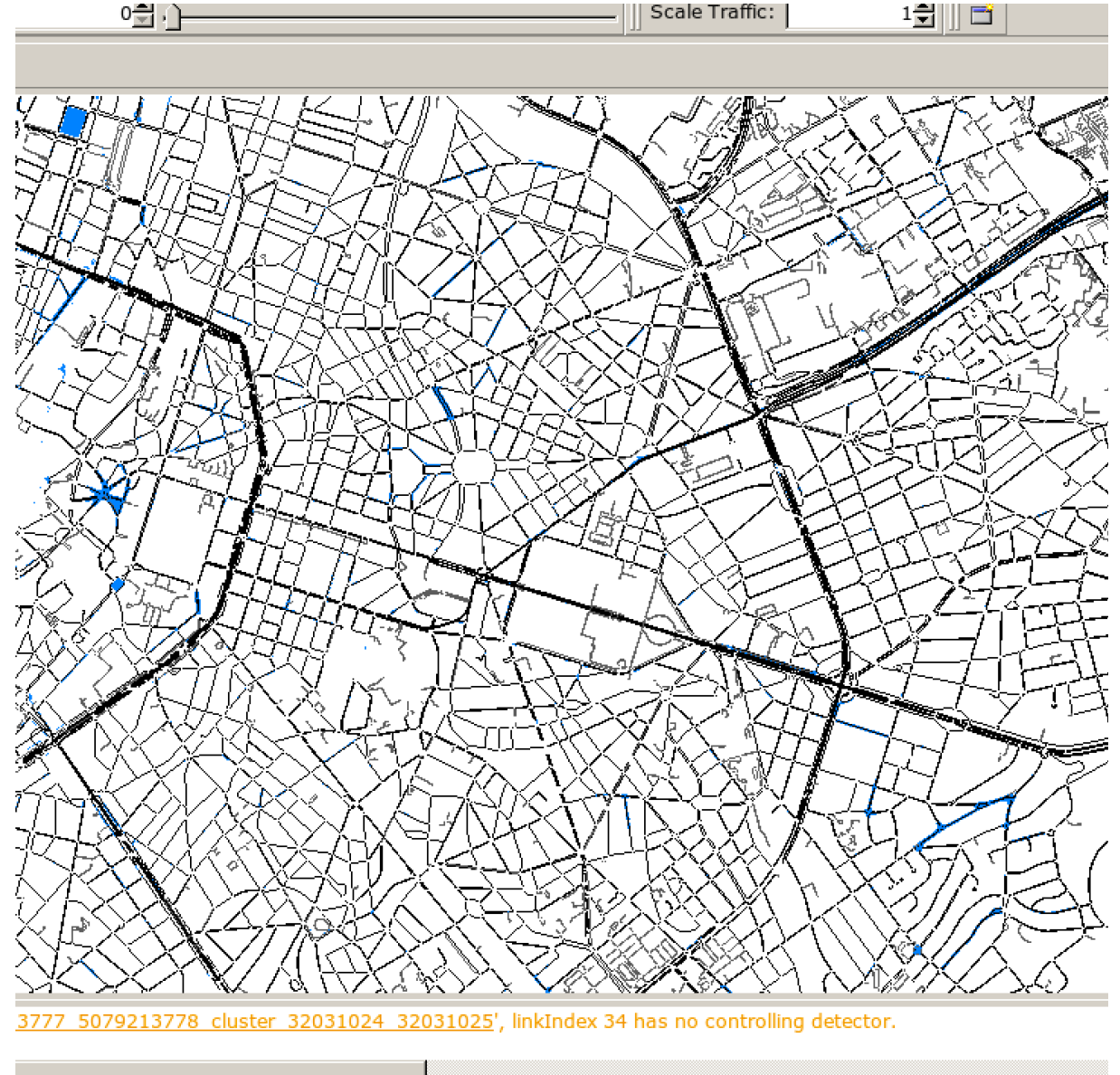
- **Data-driven traffic calibration**
 - Under-determination of traffic calibration
 - **Expensive simulation**
 - Noisy, partial data
 - Low transferability of models
- **Traffic data augmentation**
 - High quantity of data could compromise drivers' privacy
 - Provide synthetic, yet accurate augmented data to improve traffic calibration, prediction and analysis



Joint collaboration with ULB

What-if analysis

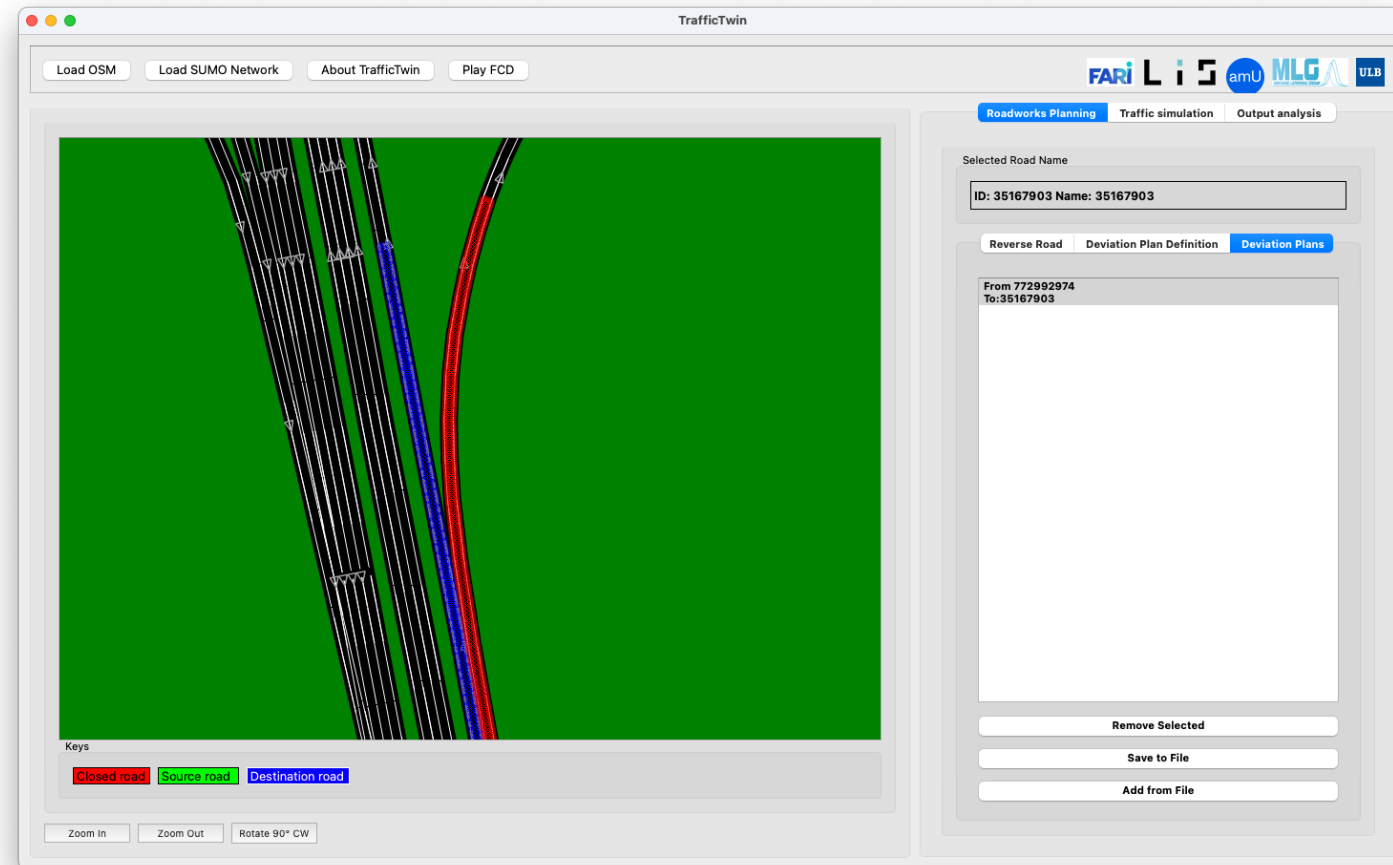
- Analysis of traffic behavior in unpredictable situations (disruptive events)
- Evaluation of network resilience
- Effect of traffic information dissemination (crowd-sourcing)



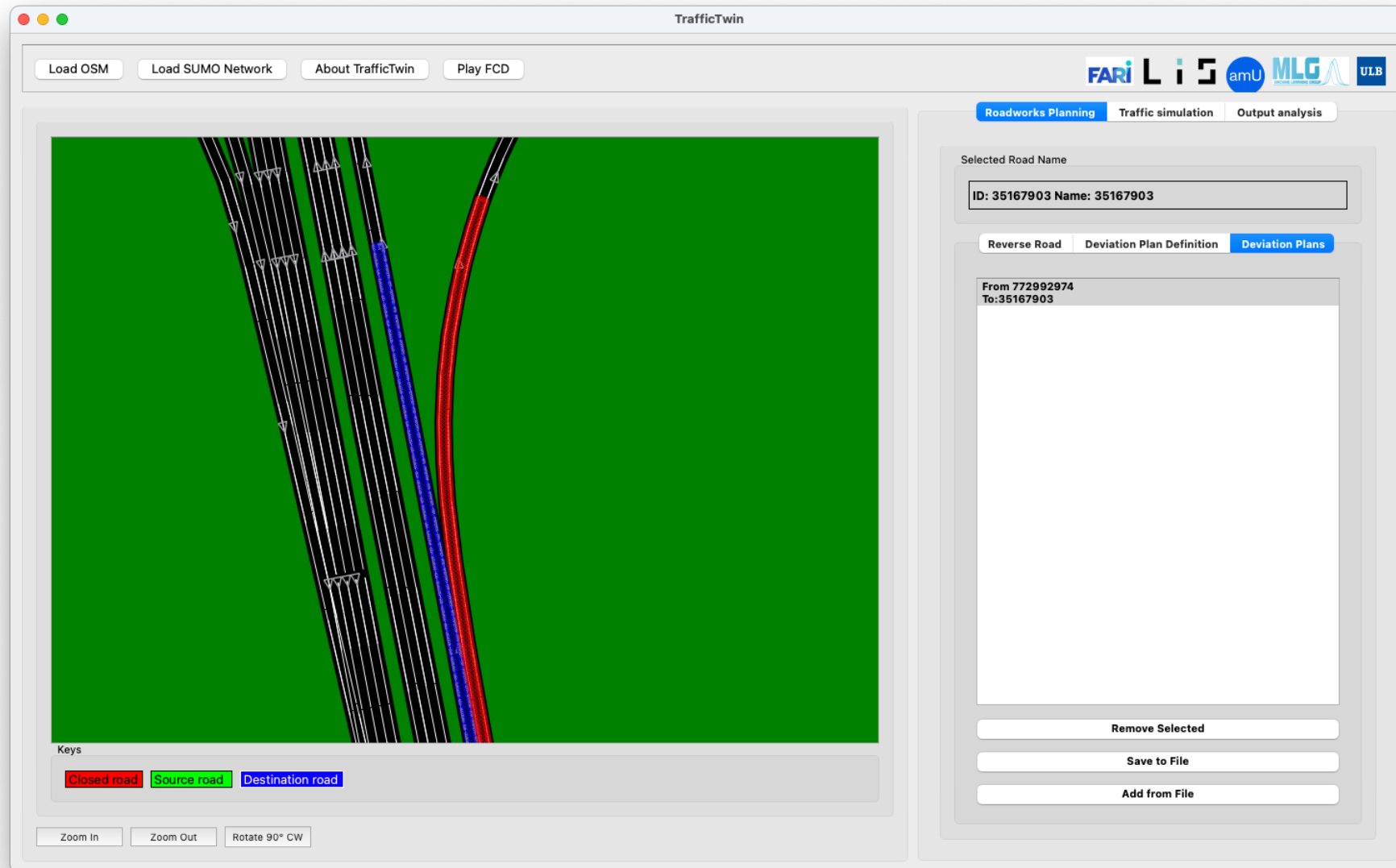
TrafficTwin

Problem: testing control strategies on road infrastructures in real-life settings is costly, risky, and often unfeasible.

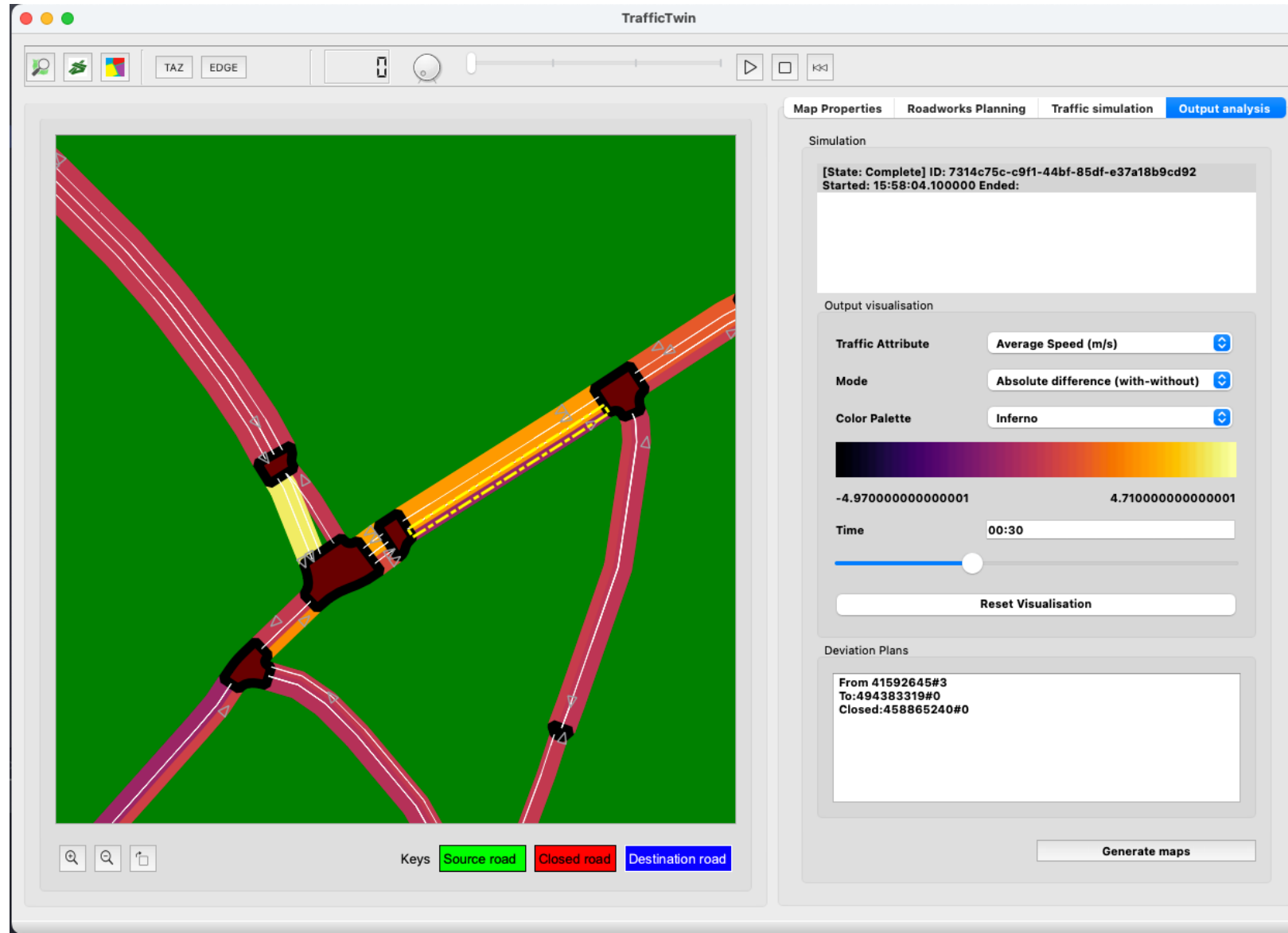
Proposal: a tool called TrafficTwin for assessing the impact of alternative road deviation plans on vehicular traffic



TrafficTwin



TrafficTwin



Target Calls

Targeted call

- Improved mobility for people and goods
- resilient, sustainable mobility solutions with reduced carbon footprints

- **HORIZON-CL5-2026-10-D6-10:** Enhanced resilience in multimodal passenger transport through digital technologies and generative and discriminative AI
- **HORIZON-CL5-2027-06-D6-08:** Enhancing Mobility for All: affordable, reliable, and accessible multimodal transport for inclusive rural and urban connectivity – Societal Readiness pilot
- **HORIZON-CL5-2026-10-D6-01:** Flagship-pilot: large-scale demonstrations of CCAM (CCAM Partnership)

International collaboration LIS - ULB

- Machine Learning
- Traffic Modeling and Simulation
- Data Analysis (imputation, forecasting)



Contact Details

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