

TRAFFIC SIMULATION

SUMO: SIMULATION OF URBAN MOBILITY

- Sumo specializes in efficient, large-network simulations.
- Multiple simulation types are supported, and live changes can be made during run-time.
- Importing of OpenStreetMap® road networks is supported, and, with minor modifications, can help automatically process a network for a specific scenario.
- Many open-sourced tools are provided to help modify, visualize, and summarize simulations.



Figure 1: A traffic simulation in microscopic view



Figure 2: A traffic simulation in mesoscopic view

AR SANDBOX INTERACTIVE TRAFFIC SIMULATION

Making education more engaging with augmented reality

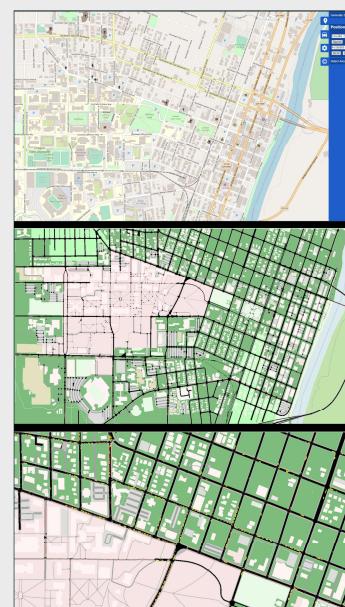


Figure 3: Importing a map of Corvallis from OpenStreetMaps

IMPROVEMENTS ON PREVIOUS WORK

In addition to the traffic simulation mode, enhancements have been made including:

- Improvements to the topographical view color scheme and added contour lines.
- Inclusion of "virtual buttons" for menu functions.
- Saving and loading of sandbox topographies.

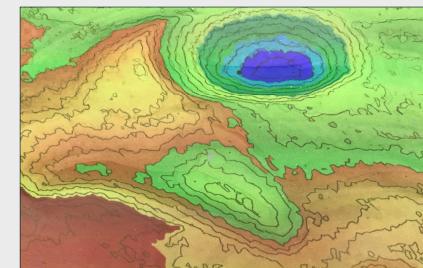


Figure 4: Improved depth mode with contour lines

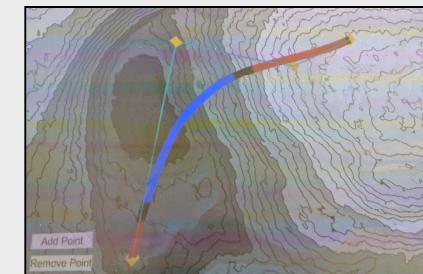


Figure 5: Improved design mode with contour lines

ADDED FUNCTIONALITY

- Road network import and creation in Unity® 3D and SUMO.
- Procedurally generated 3D scenes.
- Real-time interactive traffic simulations.
- Augmented reality marker integration.

USER INTERACTION

VUFORIA® AUGMENTED REALITY

- Vuforia Engine uses computer vision and deep learning to detect and track images.
- Physical markers are used to interact with virtual traffic simulations.
- An interactable medium like augmented reality improves student engagement.



Figure 6: A marker being used to create a work zone on a road



Figure 7: A set of virtual buttons used for menu interaction



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