Masterthesis
A Spatiotemporal Generative Model for Urban Environments employing Scene Graphs as Inputs

Field: Realistic simulation of urban environments is essential for developing and testing perception, planning, and navigation algorithms in autonomous systems. While static models capture spatial structure, many real-world applications require dynamic, time-evolving scenarios with accurate interactions between objects and agents. Scene graphs offer a structured representation of entities and their relationships, enabling more expressive and modular environment modeling. A spatiotemporal generative approach can leverage this structure to produce rich, realistic, and dynamic urban scenes for simulation and analysis.

Problem Statement: You will investigate existing spatiotemporal generative modeling techniques and methods for representing environments as scene graphs. Building on this, you will design and implement a generative model that produces time-evolving urban scenarios from scene graph inputs. Furthermore, metrics and evaluation schemes are required to ensure both spatial, as well as temporal consistency of your methods.

Required Skills: Programming skills in python or C++; Knowledge of machine learning (preferably generative models)

Benefits: You will be working closely with a young, dynamic, and enthusiastic team of researchers and students on industry-relevant topics. Your contributions are directly applied to various projects and research topics. Furthermore, we offer extracurricular workshops on scientific writing, software engineering and more. Supervision includes weekly meetings with your supervisor and team.

Research Group:
Mobile Agents and Robotic Systems

Thesis Type:
Experimental Study, Simulation, Machine Learning

Majors:
Mechanical Engineering, Mechatronics

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immediately

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German/ English

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