KI ABSICHERUNG
Safe AI for Automated Driving

Synthetic Data Generation based on a modern Game Engine

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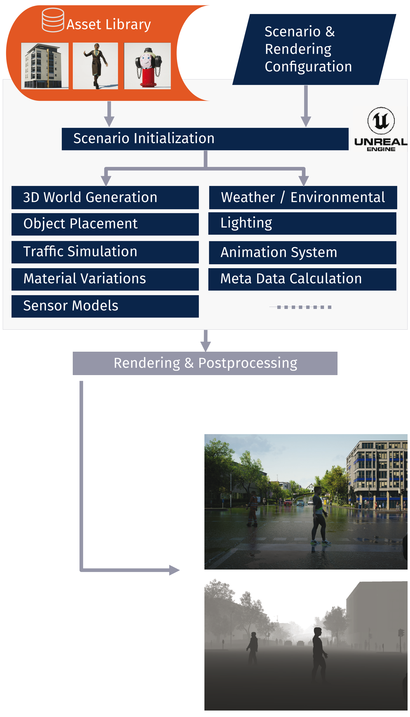
Figure 1: Synthetic data generation allows the adaption to different light and weather situations such as clear sky, wetness, or night scenarios.

Synthetic Data Generation with Unreal Engine

Modern game engines such as Unreal Engine [1] are perfectly suitable for synthetic data generation. High quality physically-based lighting systems with ray tracing, powerful material systems, features for animation systems, and flexible APIs can be leveraged to create realistic complex worlds for systematic data generation.
With custom developed modules (Fig. 2), the requirements of KI Absicherung data sets such as a high degree of variance, varying light conditions (Fig. 1), and sensor effects are met.



Procedural lighting with ray traced global illumination combined with parametrizable materials are used for a wide range of light and weather scenarios as shown in Fig. 1

Ground Truth & Meta Annotations

An extensive amount of ground truth data and meta annotations are available:

- Semantic group & instance segmentation
- Depth values
- 2d & 3d bounding boxes
- 2d & 3d skeleton/pose data
- Camera & sensor meta data
- Light data
- Environment conditions
- Pedestrian occlusion
- Material data

Scenario Setup

Scenarios are automatically set up with given object distributions, configurable parameters, and an animation system. Additionally, JSON files with pedestrian poses and vehicle placement as well as environment parameters can be imported for structured data requests.

References:

[1] Epic Games. Unreal Engine, Available at: https://www.unrealengine.com.

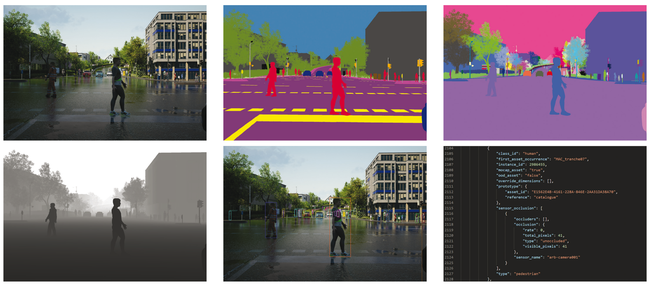


Figure 2: Custom modules of the data generation toolchain for the KI Absicherung data set.

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KI FAMILIE

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