

Introduction

• Relevant concepts:

anomaly detection, outlier, out-of-distribution (OOD), long-tail problems, rare samples, etc.

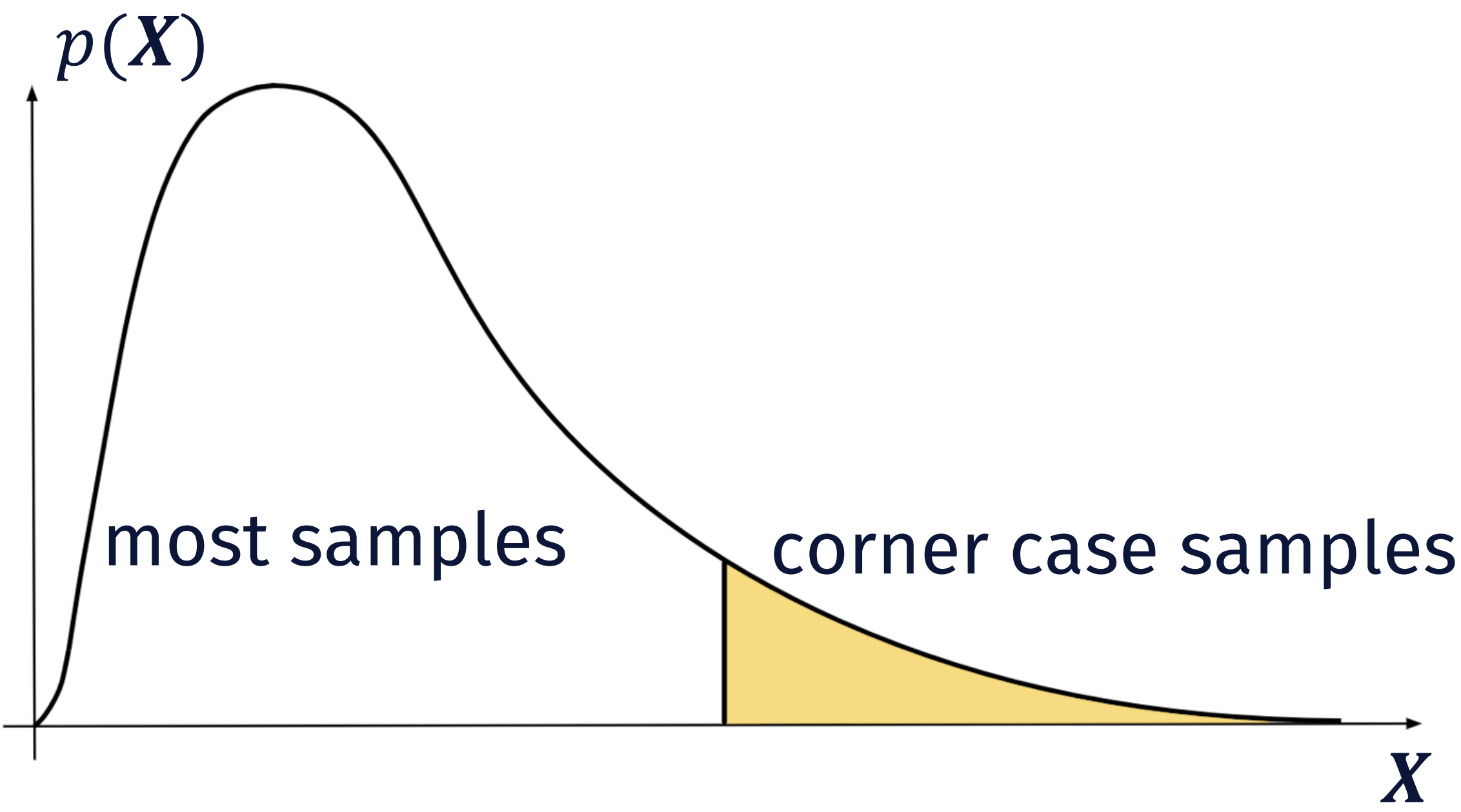


Figure 1: General and underlying assumption of data distribution

• Challenges in corner case identification:

- Difficult to describe the distribution of high-dimensional, and even its lower-dimensional representation → hard to use conventional data-driven clustering approaches
- Absence of ground-truth annotations for corner cases → hard to apply supervised learning approaches

• Proposed task-driven approach:

- A target model trained on a given dataset can effectively fit most data samples.
- Poor performance of the target model on "unfitted data" leads to the identification of corner case samples.

Unsupervised corner case detection

We propose a reconstruction-based corner case identification pipeline as shown in Fig. 2.

• Reconstruction task:

- Using SelectionGAN model, we can generate a ground-view image from BEV satellite input and semantic segmentation.
- The reconstruction GAN model serves as our target model, chosen for its ability to integrate GPS information and geographic context.
- Although the target model may differ from

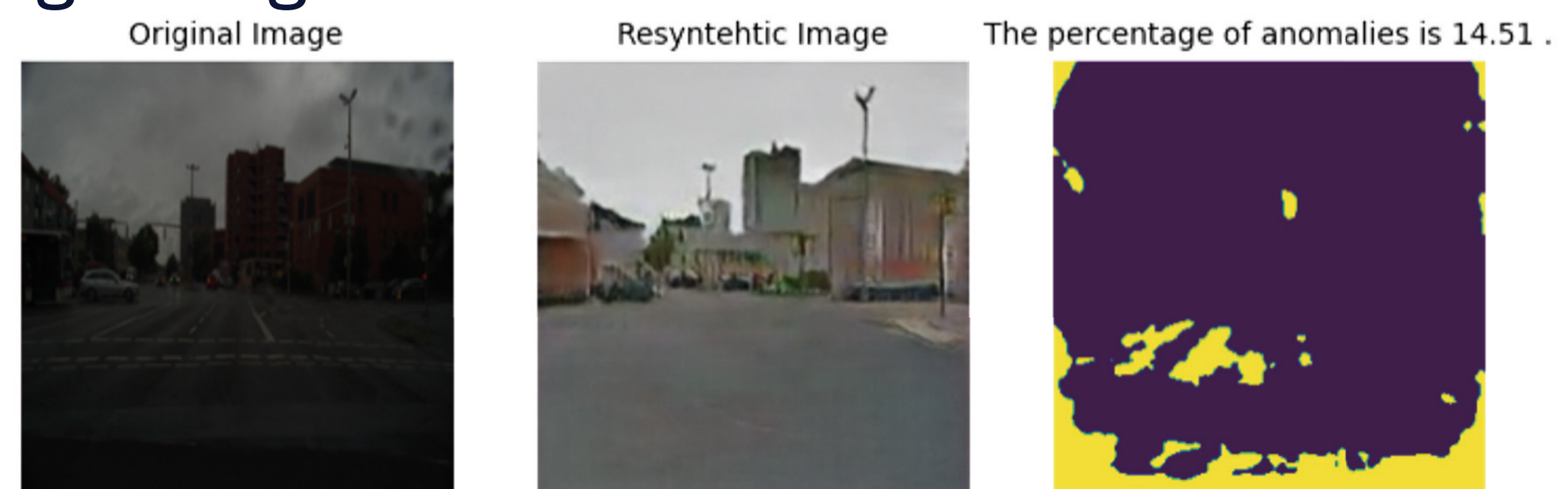
the final downstream task, with careful design it can function as a plausible examiner of the data.

- Poor reconstruction performance highlights unfitted data that differs from most training samples.
- **Anomaly score prediction and final corner case identifier:**
 - By comparing the perception loss between the raw input image and the reconstructed ground view image, we obtain an anomaly score heatmap.
 - Using pixel-wise anomaly scores, we set thresholds to determine the number of incorrect pixels and categorize images as corner cases.
- **Expanding for further active learning tasks:**
 - Identified corner cases can be included in the training data, facilitating data growth and manipulation.

Empirical results on KI-DT data

While we present empirical results instead of numerical analysis due to the lack of ground truth, our approach serves as a prototype pipeline for selecting additional images.

• Lightning issue:



• Rare Objects:



• Unseen buildings:

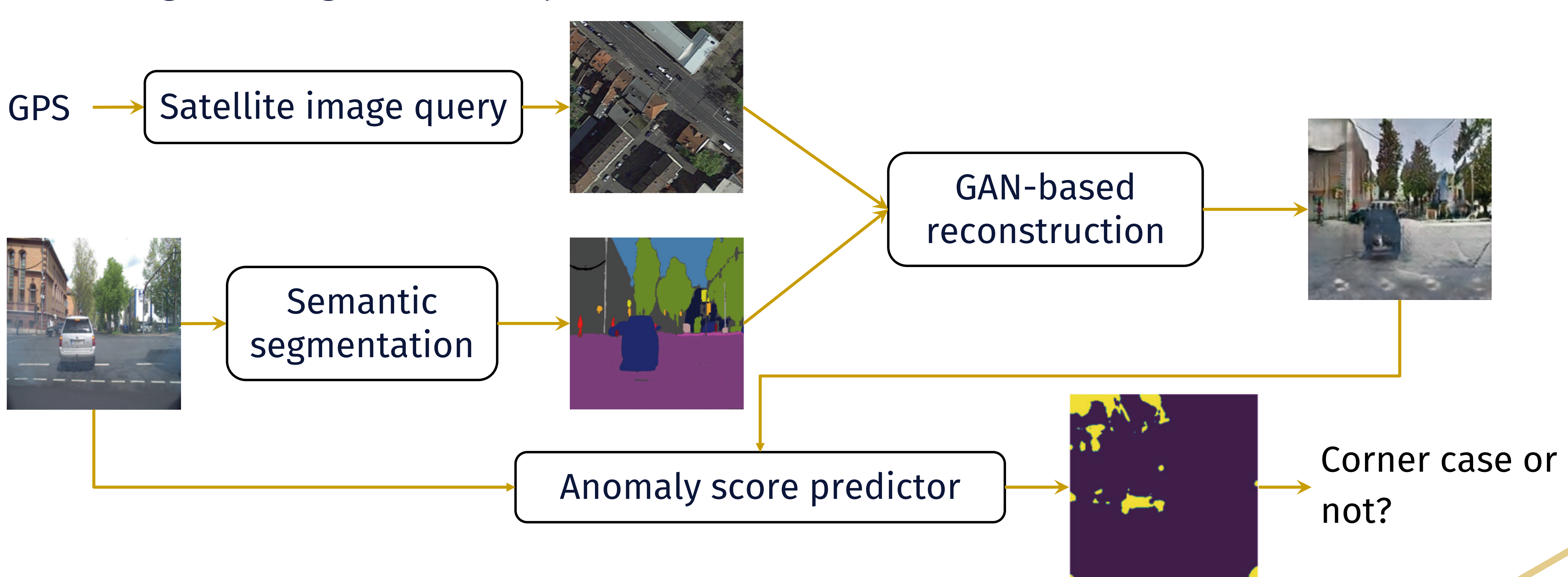


Figure 2: Proposed Unsupervised corner case detector pipeline

Partners



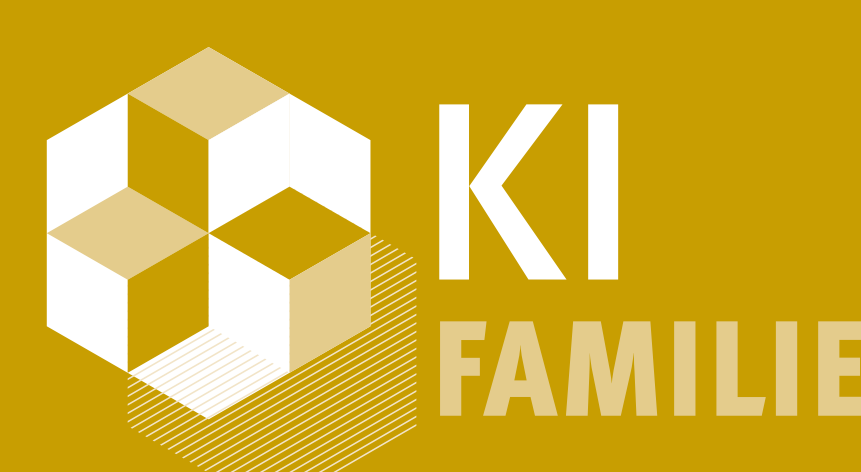
External partners



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