

Data-Centric Anomaly Detection with Diffusion Models

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Abstract : Anomaly detection, also referred to as one-class classification, plays a crucial role in identifying product images that deviate from the expected distribution. This study introduces Data-centric Anomaly Detection with Diffusion Models (DCADDM), presenting a systematic strategy for data collection and further diversifying the data with image generation via diffusion models. The algorithm addresses data collection challenges in real-world scenarios and points toward data augmentation with the integration of generative AI capabilities. The paper explores the generation of normal images using diffusion models. The experiments demonstrate that with 30% of the original normal image size, modeling in an unsupervised setting with state-of-the-art approaches can achieve equivalent performances. With the addition of generated images via diffusion models (10% equivalence of the original dataset size), the proposed algorithm achieves better or equivalent anomaly localization performance.

Keywords : diffusion models, anomaly detection, data-centric, generative AI

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