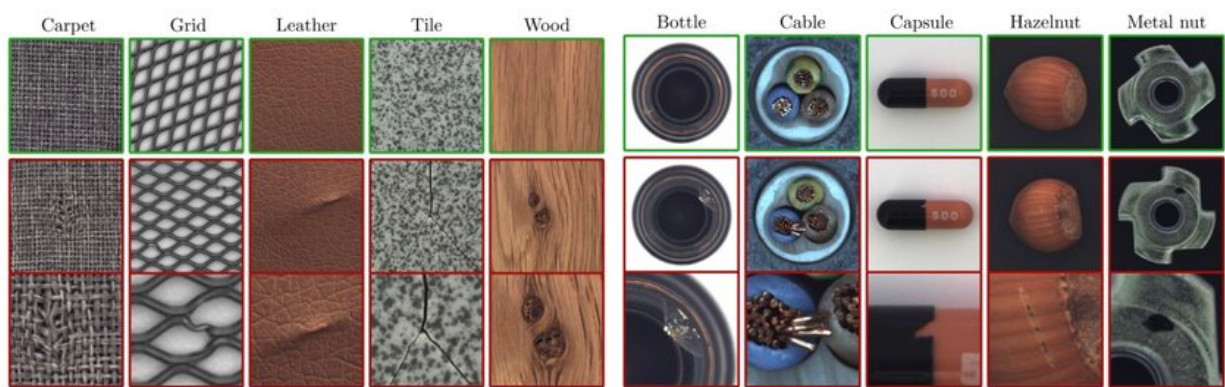


Agricultural Anomaly Detection Benchmark

The idea of anomaly detection is to extract abnormal objects, that break out of the underlying normal data distribution. This is especially interesting for domains with rare or unforeseen objects, where it is difficult to collect enough data samples. It is a semi-supervised approach: the model is trained on normal images only and will likely fail on images with anomalies.

Anomaly detection is heavily explored for industrial inspection tasks. State-of-the-art approaches are mainly evaluated on industrial benchmark datasets such as MvTech AD, MvTech Loco and VisA.



However, anomaly detection is also highly relevant for the domain of agriculture. Example anomalous scenarios include animals running in front of a robot, plants developing diseases, trash lying on the ground, unexpected plants growing in the field. In this work, we ask you to create an anomaly detection dataset for the agricultural domain, which can potentially serve as benchmark in future developments. We will need to identify relevant anomalous scenarios for this specific domain by talking to relevant stakeholders and building up the dataset with a similar structure to existing benchmarks. We will not collect the images with a robot but identify relevant image sources on the internet (existing agricultural datasets, kaggle, youtube, ...).

Secondly, we would like to evaluate state-of-the-art anomaly detection approaches on our new benchmark from a totally different domain. Do they perform in accordance with the results shown on industrial benchmarks? There is a library *anomalib* (<https://github.com/openvinotoolkit/anomalib>), which allows a relatively easy entry point for relevant anomaly approaches.

Finally, if time allows, can we come up with an anomaly detection approach, that is especially designed for our agricultural anomaly benchmark? Are there domain-specific design choices that can improve the performance for specifically this dataset?

Keywords: Anomaly Detection, Agricultural Benchmark, Computer Vision

Related Work:

MvTech AD <https://www.mvtec.com/company/research/datasets/mvtec-ad>

MvTech Loco <https://www.mvtec.com/company/research/datasets/mvtec-loco>

VisA <https://github.com/amazon-science/spot-diff>

EfficientAD <https://arxiv.org/pdf/2303.14535.pdf>

PatchCore <https://arxiv.org/pdf/2106.08265.pdf>

CFlow <https://arxiv.org/pdf/2107.12571v1.pdf>

Required Level: Master student with experience in computer vision, deep learning, and pytorch. You should have performed a computer vision deep learning project before.

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