

Print quality using anomaly detection from rendering

Background

The LEGO Group is on a journey to increase machine vision presence on all production lines. On one side, automatic monitoring of the quality of the decoration print is being deployed through anomaly detection algorithm Patchcore. On another, rendered data is used to identify and locate elements. They are looking to use rendered images to train their vision system to recognize and localize elements in a scene. Finally, the LEGO group is aiming to increase their printing capacity to provide better play experience.

Problem statement

With the thousands of LEGO elements and prints in the portfolio, the recipe creation and management will be extremely resource consuming. Small discrepancies have been identified between the machines which currently limits the use of a global recipe taught by a single machine. The LEGO Group would like a global inspection system, but the current constraints are forcing to create the recipes on the line which limits the benefits of such a system.

Purpose

With the use of synthetic data, the objective is to automate the recipe creation and allow for quality inspection at a global level. The first objective of the project is to define if synthetic data can be used for this application.

The second objective of the project is to determine if Patchcore should still be used or if other algorithms are outperforming it now.

Task

1. Generate synthetic data of printed elements to be used for the anomaly detection algorithm.
2. Using synthetic data for training, compare current LEGO solution Patchcore with other anomaly detection algorithms on the dataset of real images.
3. Extra task: Based on the algorithm output, classify the defect detected by the anomaly detector. The solution should be scalable

Resources

1. Current vision applications repository
2. LEGO bricks files for rendering
3. Dataset of real images
4. Computational resources