CV for anomaly detection in industrial applications

Viacheslav Kozitsin, Iurii Katser, Arman Alahyari, Anton Hinneck, Rahim
Tariverdi

Skolkovo Institute of Science and Technology

Abstract

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1. INTRODUCTION

Anomaly detection problems have a great importance in industrial applications, because anomalies usually represent faults, failures or the emergence of such. To detect these automatically, we propose deep learning algorithms for anomaly / fault detection and their classification. We develop an algorithm achieving Segmentation Defects classification Its performance will be examined on two different problems: anomaly detection in oil pipelines and fault detection on transmission system components. Both these systems can span over thousands of kilometers, which makes manual inspection very costly. How such computer vision techniques can be applied on an industrial scale is discussed in the following.

The damage of pipelines that transport petroleum and gas products lead to serious environmental problems. Eliminating breakthroughs and their consequences is expensive. To avoid accidents, it is recommended to improve diagnostics quality and to increase the frequency of pipeline inspectors deployment. These are specialized robots (inspectors) that Identify defects and evaluate the thickness of the pipeline. Most of the techniques currently used for analysis relate to heuristical or traditional ML approaches and don't involve CNN or DL algorithms.

Transmission infrastructure, on the other hand, physically connects power sources and consumers extending over thousands of kilometers. Many different components exist, which is why maintaining power grids is a serious cost factor for transmission system operators (TSOs). Automated fault detection could potentially help to decrease costs. To use an automated visual system however, specific infrastructure first needs to be identified and segmented, to then perform any type of fault detection. Therefore, the proposed deep learning-based approach, to segment and identify faulty components (i.e. insulators) in handheld footage, will be tested regarding its viability. If a deep-learning based approach would prove reliable, drones could monitor equipment automatically.

2. LITERATURE REVIEW

3. CONTRIBUTION

Viacheslav Kozitsin.

Iurii Katser.

Arman Alahyari.

Anton Hinneck.

Rahim Tariverdi.

4. 3RD PARTY CODE LIST

5. METHODS PIPELINES

6. RESULTS PIPELINES

7. METHODS TRANSMISSION

8. RESULTS TRANSMISSION

9. CONCLUSION