Visual Quality inspection using Machine Learning (PM)

PM was found in 1966 as a company focusing on precision grinding of flat surfaces. Among the first products, linear bearings were produced. These bearings feature cylindrical rolling elements which roll between two linear guideways. Each guideway has a V-groove. The rolling elements are mounted in a cage in a cross configuration. During the various phases of a movement (acceleration, constant speed, deceleration) the rollers and the body that holds and separates them (the cage) can slip a little bit. This is called cage creep. To avoid the cage creeping, a solution was developed with the name ACC (Anti Cage Creep). This solution consists of a rack on both rails and a pinion connected to the cage. Because the cage is now physically connected to the rails, slip cannot occur. The first inspection of these racks is done manually by using a microscope next to the machine. Due to this manual inspection, PM depends on the operator of the machine. PM would like to automate this visual inspection.

Task description

The goal of this assignment is to create a way for doing an automatic visual quality inspection on the rack with a camera and artificial intelligence and check for abnormalities like:

- Burrs, Breakouts, Missing teeth, Position of rack vs. rail

PM would like to design and realize a setup that is able to differentiate bad products from good products using Machine Learning for vision. Deliverables in the project are: Design documentation (requirements and design description, test reports, installation and user manual) and a working setup.

This project can be executed at Saxion mechatronics research group or at PM in Dedemsvaart.

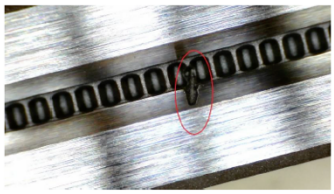

Figure 6 Breakout in the rack profile

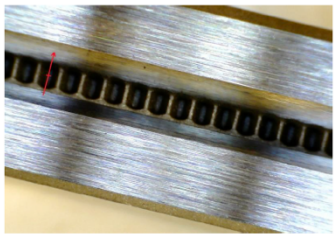

Figure 7 rack not in the center of the rail

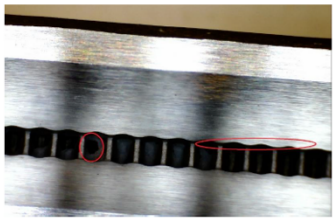

Figure 8 rack to deep what gives breakthrough

Practical Information

Student Profile: Mechatronics, Mechanical Engineering, Electrical Engineering, Computer Science
Duration: February 2021 – July 2021
Compensation: Euro 230 at Saxion, at PM to be determined
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