

+ Deep Qualicision AI

DOT Code Detection Verifies Characters and Codes on Tires

Innovative product solutions
for optical character and code detection

- + Seamless integration with existing and state-of-the-art systems
- + Increase in process transparency
- + Reduce error rates and avoid follow-up costs
- + Increase in productivity, process quality and system availability
- + Optimization of material and information flow
- + 3D image acquisition in the pass-by saves processing time

PSI 

Deep Qualicision for tire information detection

Deep Qualicision can be used as an inspection system in the field of quality control or process analysis. With the use of Qualicision in combination with deep learning methods tire information can be detected more effectively and accurately. How does it work?

Example: DOT code detection

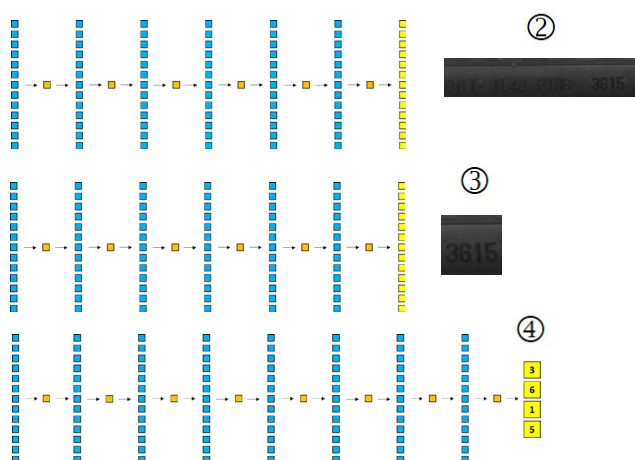
DOT code detection (Department Of Transportation) used in the automotive industry: The DOT number on the sidewall of the tire includes a timestamp of the respective date of manufacturing. The tires used must not exceed a certain maximum age in order to comply with the required quality standards. Therefore, each tire must be inspected for the date of manufacturing before assembly.

The tires travel without stopping through the tire detection system and are captured by the cameras contained therein. The evaluation of the image data takes place on a specialized computer with the DOT code detection software. The time stamp of the tire is continuously recorded and analyzed, therefore no time interruption of the conveying operation is required.

Deep Qualicision—Learning images

Starting from a databasis with labeled images with bounding boxes for the DOT Code, its individual components and for the individual digits of the datetime code. The training of the images takes place on a GPU with in-place data augmentation to extend the training databasis.

In the first two neural networks the bounding boxes are determined to get step by step smaller areas like: unrolled image of a tire sidewall ①, DOT code ②, date code ③. For the first two neural networks seven layers are respectively used. In a third neural network which consists of nine layers the digits ④ of the extracted date codes are determined.



Deep Qualicision—DOT code detection

The original image of a tire is analyzed and the inner and outer radius are determined using digital image processing methods. By transforming the original image into a polar coordinate system, the tire is unrolled and displayed as a long image strip. Hierarchical Structure of the Deep Neuronal Network: The DOT code is located by a sliding window. In an iterative refinement process, the timestamp within the DOT code is determined and finally the individual digits are identified in a multi-class detection followed by a plausibility check.

