

Gear Teeth Counting Machine



Client

Our client is a family run company with a global presence and they've been in the market for over 6 decades with almost 5000 employees.

Their three Business units are: 1) Discrete Manufacturing & Process Industries, 2) Mechatronic & Motion Systems and 3) Mobile & Wind Industries.

Problem Faced

Since our client is a manufacturer of gear motors, drive systems, planetary gearboxes and inverters for industrial automation, they required a machine vision system that could count the number of teeth available on the machine gears and classify the gears based on the number of teeth. Counting the teeth of gears was important because of their vital role in generating the required torque. The diameter of the gears and patterns of the teeth varied over a wide range based on shape, teeth height, thickness etc., hence, in order to curtail the time consumption and most importantly achieve accuracy, automation of the system was a must.

Technology introduced by Qualitas

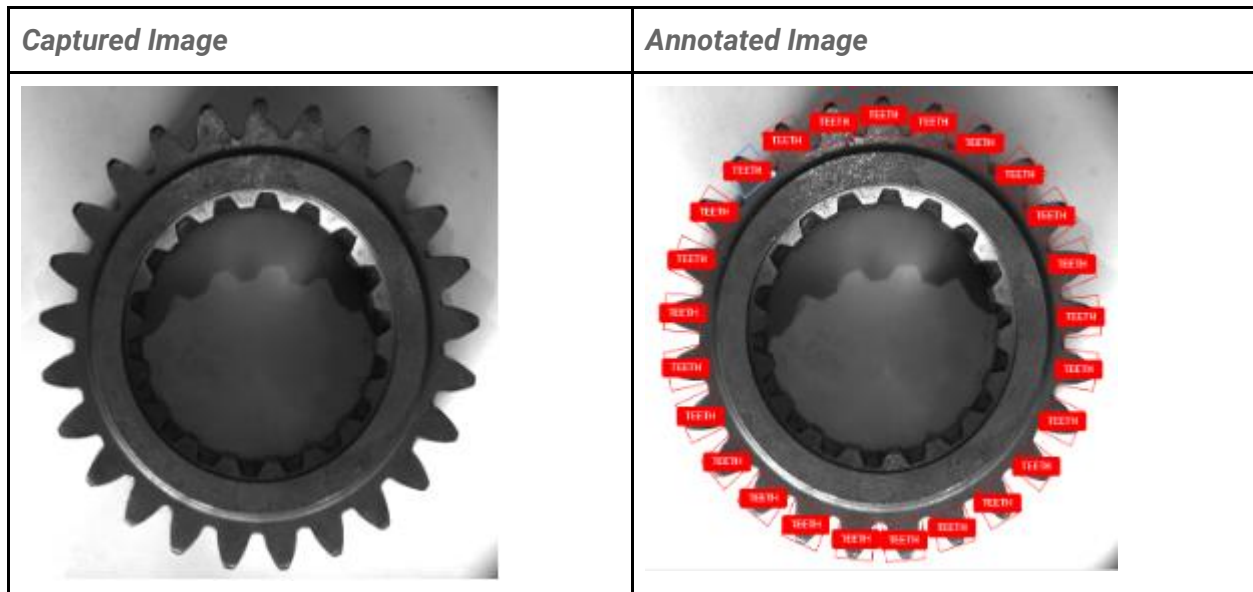
AI is a powerful technology that has the capacity to solve a number of industrial problems. DNN, which is accounted as a subset of AI was introduced for training a machine according to user requirements. This introduction resulted in a very strong algorithm and vast training set. An area scan camera with dome lighting was used so that the images that were taken are clear enough for the software to distinguish between the different gears and work efficiently.

Solution

An AI / DNN based solution typically follows the below steps. Image acquisition; Image training (includes image segregation); Model deployment and testing. The set-up required would be a typical machine vision setup where an area scan camera is mounted on the top of the inspection table to image the top surface of the component. FOV is adjusted to cover the entire body of the largest gear. The image set acquired, is then labelled and trained for extracting the features. And

then, the system gets trained for all the available inspection dataset. Once the training is complete, the model is then ready for deployment.

Images



Results

The test images set were trained and the results were extremely accurate and thus our client's problem was resolved.

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