Risk Reduced, Production Volume Increased

How the vision-based automation of loading and unloading massive aluminum casts reduces accident risks and leads to ~37% increased production volume

"As well as supporting production and maintenance, a big part of my role is continuous improvements by means of integrating automated solutions to potentially dangerous processes" says Charles Cummings, one of the Controls and Automation Engineers at sand castings specialist Grainger & Worrall.

One such "potentially dangerous" process is now smoothly automated: The loading and unloading of large hot aluminum castings into a vibro-de-core machine (i.e. a vibrating machine used for removing internal cores, typically made of sand, from cast metal parts). Previously this accident-prone process was performed by workers using forklifts.

A KUKA KR300 with a 2700 mm reach, connected to a Siemens 1214 PLC and equipped with a re-purposed robot gripper stemming from a pneumatic manipulator system, was upgraded (and made a lot stronger!) to handle these massive parts.

Varying Object Positions: Robot Needs to 'See'

As the aluminum castings come to the operation on a conveyor, they are not always in a precisely repeatable position. Hence Cummings and his team immediately "knew that we needed a way to have a robot literally SEE the parts so that it could pick them up accurately."

Their search for robust hardware (that will withstand a challenging industrial environment), and user-friendly software (that would not require them to complete a masterclass in robot vision prior to use), led them to Roboception.

The system was outfitted with a complete vision solution that enabled it to detect the parts quickly, accurately, and repeatedly: An rc_visard 160m and an rc_randomdot projector were enclosed in a protective metallic housing and mounted on the end of the robot arm.

Software Training Using 3D-Scans

The sensors were connected to an rc_cube to process the data, with the rc_reason CADMatch software at the core of the detection process.

As no actual CAD models of the castings were available, the team provided 3D scans of their objects for training the software – which was otherwise done in exactly the same procedure usually applied for CAD models.

A Close Working Relationship

Cummings and his team greatly appreciated the constructive working relationship with the Roboception team: Their profound experience and open sharing of knowledge and background information only increased the customer's confidence in the vision solution.

"Finding a 3D vision system to guide a robot to pick-and-place our parts was clearly an elegant solution to our challenge, and working with the team at Roboception on this project was definitely a fulfilling experience" says Cummings.

And he also confirms that Roboception would surely be the 'go to' for several future robotic pick-and-place applications he is currently evaluating.

Increased Production Volume by ~37%

„In the first eight months of operation, Grainger & Worrall have processed over 25.000 parts at an average of 16 castings an hour – corresponding to an increase in capable production volumes of ~37%."

About Grainger & Worrall

Grainger & Worrall is at the global forefront of castings development and innovation, specializing in engineering pioneering sand casting solutions and revolutionizing product development.

www.gwcast.com
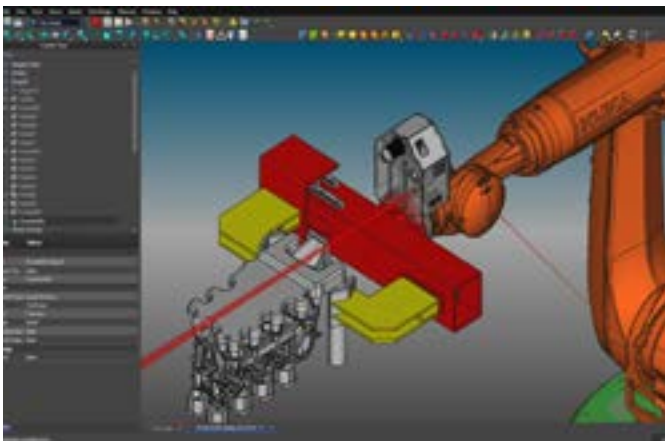
Roboception GmbH

Roboception is a pioneer in the field of 3D sensor technology with innovative hardware and software products: The Munich-based company gives robots ‚eyes and brains' and thus provides customers with key elements for the forward-looking and flexible automation solutions of Industry 4.0

Roboception's stereo sensors and modular software suite effectively couple traditional image processings algorithms and artificial intelligence. They give any robotic system the ability to perceive and analyze its environment, as well as plan and execute actions - such as precisely grasping and placing objects in manufacturing, logistics, or laboratory environments.

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