Scorpion Vision Software® 3D cubed in a Sony SmartCam

Article, November 2010

3D imaging is making a big impact in the automation market. In this article Thor Vollset of Tordivel and Myriam Beraneck of Sony discuss the technology's role in delivering more accurate automation systems.

Tordivel, the company behind the Scorpion Vision Software suite, has completed a 3D automation project for Stellana, a major industrial manufacturer headquartered in Sweden.

Thor Vollset, founder and CEO of Tordivel said: "They produce 30 – 40 different wheels types in a production batch and these products are placed random on a conveyor line. To automate the machining of each wheel they wanted a robot to pick the wheels from the conveyor and place it in machining tool. The machining process requires that the product ID is known. We were asked by Stellana to deliver a system that could both identify the wheel and measure the position of the wheel of the conveyor.

"We started the project using a Scorpion 2D system, but it quickly became apparent that the system was it not be able to distinguish all the information necessary to reliably gauge the type of wheel being scanned. The 2D system was only partially successful because teaching the system was labour intensive."

"Upgrading the sorting system to a true Scorpion Vision 3D solution solved the labor intense teaching and enabled more reliable identification and location. In the 3D system all dimension, radius and heights are measured in mm. This makes the system easy to understand and the data from the CAD drawings can be entered directly into the system when defining the sorting criteria."

According to Thor, the majority of machine vision projects place an emphasis on small physical size, accuracy, reliability and "naturally, cost is an important factor too".

The Stellana system utilises two stereoscopically linked machine vision cameras. Scorpion Vision 3D software is used to analyse the data and the 3d location is used by an ABB robot to pick the wheels."
"We used a Sony smart camera, which has an integrated FPGA processor and thus eliminates the need for an additional PC. This not only cuts down significantly on cost, it also allows you to work more easily within the space constraints demanded by a given project."
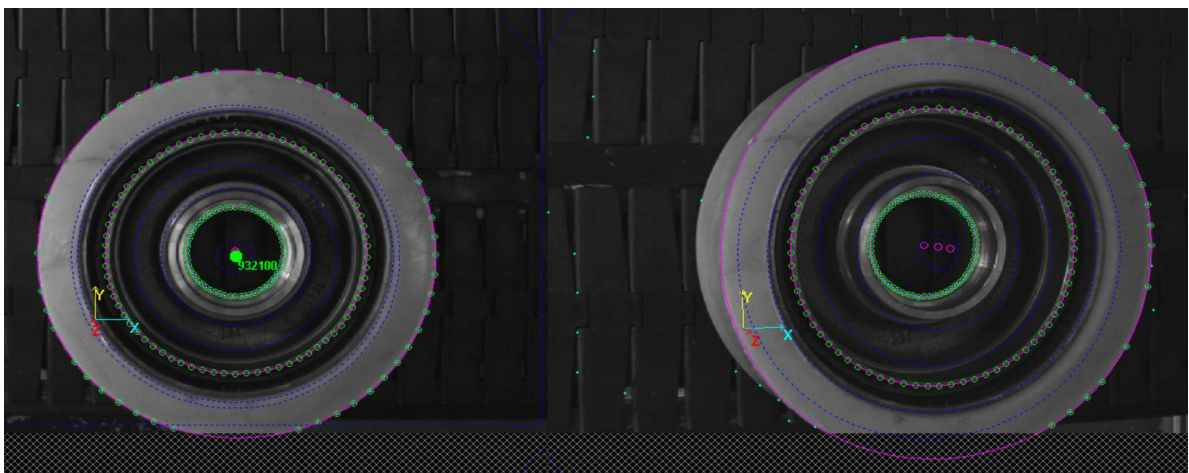

The Scorpion Vision GUI shows the two images used to create the 3D Model, the wheel type and the location used to to pick the wheel.

Myriam Beraneck of Sony's machine vision camera division backed this up: "In many ways smart cameras are now fast computers with a high quality integrated video camera; rather than the other way round. Having an on-

board processor cuts a rate-limiting step, and therefore analysis time drops too. "Typically, just a few kilobytes of data are needed for an automated system, such as a picking robot, so having the hardware to transmitting up to 90 frames per second also adds to the cost of a given project."

According to Myriam, the 'concept' of smart cameras has changed in the few years since they were first launched. Instead of a fixed function, which was only commercially viable for mass-market applications, an open platform is now used. Unique programs can now be developed for a plethora of applications, giving an edge in even the most niches of business sectors.
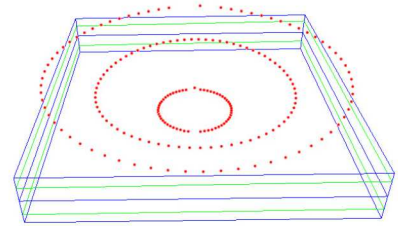
The 3D Image generated by Scorpion Vision shows the three radiuses and the center point of the wheel.

Modern smart cameras are getting faster too. Sony's XCI camera range, for example, uses a 1GHz processor and has 512MB of high bandwidth DDR2-SDRAM. Sony says their customer feedback surveys suggest a three-fold improvement in performance over the past generations, making it more than capable of 3D image analysis.

The second camera in the stereoscopic system is a Sony GigE module. Sony's range of GigE vision cameras has devices delivering up to 90 frames per second or 5 mega pixels. This quality, coupled with the fast data transfer speeds - the units transmit uncompressed image data at 1000 Mbps - and the module's small footprint made the device particularly applicable to the Stellana project's needs.

The system is, according to Tordivel, an important factor in the continuous cost-cutting process staying competitive as a manufacturer in Sweden.

"The benefits of measuring in 3D have been clear for many years and we're now at the turning point where the accuracy is proven and the cost is low enough for 3D vision systems to take off in many sectors," said Thor, who believes the applications of 3D machine vision analysis are limited only to the imagination.

Indeed, new applications are being rapidly developed by a number of organisations. One recently promoted example is a 3D medical scanner that measures changes in inflammation over time to assess the onset of rheumatoid arthritis. And, in the consumer market, a PC control technology that used 3D imaging was demonstrated on Sony's booth at Vision 2009.

Scorpion 3D Smartcam with optional GigE camera from Sony

Such is the uptake in automation systems based on 3D images that Tordivel now runs training courses on. And Thor says there are three key steps that need to be taken when developing an accurate 3D system for analysis. "Data quality is only as good as the images used, so a high quality camera is essential. Real time systems also require fast processing times so a good computer and simple, effective algorithms are needed. Lastly, people have to use it so a clean user interface is essential."

For further information visit:
- *www.tordivel.no*
- *www.scorpionvision.com*
- *www.pro.sony.eu/vision*
- *tordivelblog.wordpress.com*

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