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## Vision system provides pig's eye view of quality control

By Corinne McLean

### Tracking technology developed for agriculture has plant floor potential

It isn't immediately clear how University of Guelph professor John Zelek's technology for tracking pigs is relevant to automating assembly, yet it could go a long way to increasing quality control on the shop floor.

Immersed in a project to create a robot that has vision but also interacts with and tracks people, Zelek was approached by Nabile Brandl, a researcher with the Danish Institute of Agricultural Sciences in Denmark who was interested in using the technology to track pigs in a pen.

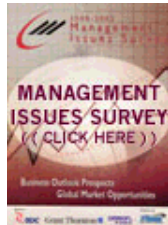
"The intent was to see, using computer vision technologies, if we could provide traces [paths and trajectories] that the pigs followed. The goal was to ascertain the pigs' behavior, for example, how they visited the feeding stations and how they interacted," explains Zelek.

It turns out the technology can also be used to monitor manufacturing and assembly in a plant environment. For instance, it could track a robotic arm to make sure predetermined routines are being performed.

"The [robot] arms are programmed individually, so if one breaks down there's no collective intelligence. But with this vision system the other robots could be notified of the problem and therefore prevent major shutdowns of the line," says Zelek.

Automated visual tracking is different from other vision systems--it goes one step further. Typically, implementing vision systems can be difficult. In many cases manufacturers have to simplify the environment surrounding the product to ensure good visual contact. Products are placed on a conveyor belt, which is a solid color (often black or white), to achieve the maximum contrast for easy spotting by the camera or sensor.

With Zelek's technology the



a remote-controlled forklift truck



With Zelek's technology the plant set-up doesn't have to be modified. Its vision capabilities are more sensitive, allowing it not only to recognize an object, but also to track it along a constantly changing route.

Automated visual tracking is one of Materials and Manufacturing Ontario's (MMO) collaborative research projects. The research funding organization brings together industry and universities to develop science and technology for industry.



**Automated visual tracking can be used on a robot arm to ensure pre-determined routines are performed.**

### **Changing partners**

"Our involvement with the project was basically that of providing financial assistance," says Michael Burgoyne, a network liaison officer at MMO in Mississauga, Ont. "We found the company that John was working with, pitched the project to the industrial partner, introduced the industrial partner to the university people and basically acted as the marriage broker."

The original partner, software developer Metex, recently withdrew from the project due to financial troubles. Burgoyne is now seeking a new partnership.

Still in the developmental stages, Zelek doesn't expect the systems to be that expensive, thanks to the popularity of web cam technology. "Cameras are more expensive, but with the introduction of this niche market of web cams, the price of camera sensors have come down immensely."

General Motors of Canada has shown some interest in using the technology on vehicles. "Inside the car, the camera would monitor people, not like big brother, but in a safety sense, for example keeping people from falling asleep," says Zelek. Or the cameras could be mounted externally as a driver assistant to increase visibility and traffic surveillance.

There's even talk of this pig tracking technology being used in an entirely different pen. A prison approached the research team, interested in finding out if the technology could be used for people surveillance.

From pigs to people, the possibilities appear to be limitless. If this technology proves it reduces downtime and increases quality control, you'll likely find it on the factory floor as well.

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