ISSUE 2
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Gridlines

Matrix Technologies, Inc.

Welcome to the second addition of our bi-monthly newsletter. We hope you enjoy reading this publication that covers a variety of topics. Click here to provide us with feedback.

Matrix Technologies Installs Solar Array at Corporate Headquarters

Matrix Technologies Inc., a process design and automation firm with corporate headquarters in Maumee (Toledo), Ohio, has made an investment in solar energy at their Maumee, OH headquarters.

The new solar array will be installed on the rooftop of the Matrix-owned office building. Matrix Technologies, Inc. engineers will coordinate the installation and integration of the generation equipment. "Our investment in this solar technology reflects on our overall corporate philosophy to help our customers become more efficient in their operations", said David Bishop, President of Matrix Technologies, Inc. "This is just one more indication of our full support of technologies and designs that improve our impact on the environment, and our customer's bottom line".

Capitalizing on the solar panel expertise in the Toledo, OH area, the solar array will be comprised of solar panels built by First Solar, headquartered in Tempe, AZ. From raw material sourcing through end-of-life product collection and recycling, First Solar is focused on creating cost-effective renewable energy solutions that protect and

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Self-Contained Vision System to Inspect Unlabelled Cans Improves Food Safety

The potential liability involved in mislabeling a product which might be inadvertently ingested by someone who is allergic to the ingredients is a major concern for food and beverage producers.. When you are labeling hundreds of thousands of cans at a rate of 1000 per minute, it's a major challenge to spot a few incorrect cans or labels that were mixed in with the batch. With machines operating at this speed, 100% manual inspection is not a viable option. The only way to be sure about the ingredients is to read the character-based product code printed on the can and match it up to the Universal Product Code (UPC) barcode on the label. This operation is called bright field inspection because the metal can creates a bright background that makes it hard to read characters.

Bright field inspection is so difficult that it has only been attempted a few times by complex custom vision systems that are assembled from a camera, frame grabber board and computer. More recently, the power of much more robust and easier to apply and operate self-contained vision systems has increased to the point that they are now capable of inspecting bright field product codes at the required line speeds. Matrix Technologies has developed what is believed to be the first vision system-based bright field inspection solution, which also reads the UPC barcode and makes sure the label is fully attached to the can. This approach provides improved regulatory compliance and traceability while being much easier to configure and use and is more reliable than systems based on vision building blocks.

The bright field inspection challenge

Producers of canned foods typically make a large volume of a particular product, such as a soup, then store the cans in a warehouse without labels while waiting for orders from customers. The cans are labeled just before shipment, often with the customer's private brand label. This process is called bright stacking because it begins with bright unlabelled cans. The challenge for the food producer is to make sure that each can is labeled correctly. This is important not only because customers will be unhappy if they buy a can of bean soup and discover that it is actually crème of mushroom, but an even greater concern is that they might be harmed by unknowingly ingesting an ingredient that they are allergic to.. Inspection is difficult due to the large volumes and high speeds involved as well as by the challenge of inspecting the hard-to-read product code. Additionally, private brand labels usually have the same motif regardless of product which makes it problematic to tell one product's label from another's.

A new approach

Matrix Technologies utilized recent advances in vision system technology to develop a better approach to bright field automated inspection. "The key to the new approach is the use of the Cognex In-Sight 5600 vision sensor to inspect the product codes against the bright can background at a speed of 1000 products per hour," said Les Haman, Department Manager for Matrix Technologies. "In-Sight 5600 vision systems offer the same rugged design and outstanding performance as the In-Sight 5400 series, but with twice the processing speed and memory to perform inspections at line rates no other vision systems can match. In-Sight vision systems are an excellent fit for the factory environment because they are completely self-contained in an IP67 (NEMA 4) rating to withstand dust and wash down without an accessory enclosure. Cognex In-Sight vision sensors also provide a software interface that simplifies setup and operation to the point that many users allow machine operators to configure the system to inspect new parts."

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Matrix 30 Years Technologies INCORPORATED

Industrial Infrastructure Management Using GIS
What is a (GIS) Geographic Information System?

Formally, a Geographic Information System has been defined as “a system of hardware, software, data and organizational structure for collecting, storing, manipulating, and spatially analyzing 'geo referenced' data and displaying information resulting from those processes." (Ghilani and Wolf, 2008) Simply stated, a geographic information system combines different sources of data that have defined geographic locations into a common database for analysis and comparison.

By the simple definition, GIS is merely overlaying data with spatial information onto a common map for analysis and review. The theory of GIS is not a new concept. Variations of this type of analysis have been in practice for over 200 years (Ghilani and Wolf, 2008). For instance, military leaders during the American Revolutionary War mapped information to track the location and movement patterns of the British forces. Also, GIS was used in Europe to compare the locations where people resided that had died from Cholera and their proximity to city wells. As these examples demonstrate, any process of overlaying multiple sets of data onto a single map for analysis is a GIS system.

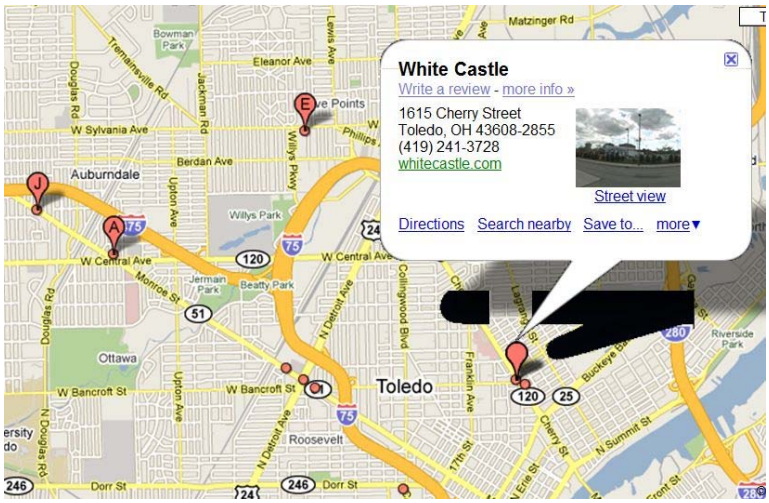
Modern applications of GIS are becoming more common and are frequently used in everyday life. For example, MapQuest and Google Maps are everyday applications of GIS systems. Databases can be queried to identify the nearest fast food restaurant. Information is linked to the restaurant such as the menu, address, photos, phone number, and links to the restaurant’s website. Also, spatial analysis can be conducted to identify the quickest route to the restaurant and determine the time of travel.

GIS is also used by government and industry for infrastructure management. Pavement management is a common application for governmental agencies. The road has a physical location on the earth and there is data available such as pavement type, pavement condition, travel lanes, traffic volume, direction of traffic, classification of the road such as an interstate, and many other pieces of information that might be useful to a GIS user. Soil information such as classification, environmental quality, and bearing capacity is another type of data that has spatial information. A typical GIS analysis would be to overlay the road map overtop of the soils information map and try to find a relationship between soil type and pavement condition. Not only can the GIS user identify which pavement sections are in the worst condition and in most need of repair, the user can also identify the soil type where the pavement may need special design considerations for future repairs and replacement due to poor soils. This is one example that can be very beneficial to planners, engineers, and managers for determining maintenance schedules, designing better pavements, and forecasting budgets over several years.

To summarize, modern day GIS systems should have the following abilities:

- Collect, store, and retrieve information based on its spatial location
- Identify locations within a targeted environment that meet specific criteria
- Explore relationships among data sets within that environment
- Analyze the related data spatially as an aid to making decisions about that environment
- Facilitate selecting and passing data to application-specific analytical models capable of assessing the impact of alternatives on the chosen environment
- Display the selected environment both graphically and numerically either before or after analysis" (Ghilani and Wolf, 2008)

See next the addition of Gridlines for Part 2 of 2 on Industrial Infrastructure Management Using GIS, to see how you can apply GIS software to your facility to help you to better manage your infrastructure projects.



Vision System

(Cont.)

Matrix Technologies’ bright stacking solution inspects products immediately after a label is applied to a bright product. The Cognex PatMax pattern matching tool inspects the product code. This application takes advantage of the ability of the PatMax tool to recognize a pattern regardless of its location. Rather than reading individual characters the application is configured to simply look for an image that matches the three-digit product code. A new product code can be configured simply by putting a can with the new code in position to be viewed by the vision system and positioning a rectangular box around the product code. From that point, the vision system will detect that product code even if it is in a different position or at a different angle as long as it is in the field of view. This approach is much simpler, more robust and more economical than the machine vision technology used on this application in the past.

Matrix Technologies’ bright stacking solution also includes a laser scanner that reads the bar code on the label of each product. A fiber optic sensor identifies labels that have not been properly glued to the can by detecting a protruding flap. A proximity sensor triggers both the vision system and the bar code reader. The vision system, barcode scanner and fiber optic sensor independently inspect each product and send pass and fail signals to the programmable logic controller (PLC) that overseas the inspection station. The pass or fail signals are buffered until the product travels to the reject mechanism. The buffer is then processed at the reject mechanisms to either allow the product to proceed or eject the product from the conveyor.

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An Environment for Successful Innovation

The magic in innovation is not in the generation of new ideas, because new ideas are a dime a dozen, says Mark Sebell. “The real magic is in nurturing and managing an organization’s commitment to the development of an idea-through the evolutionary maze to market launch.”

Sebell is founder and CEO of Creative Realities Inc., a Boston-based firm that trains executives to “think out of the box” by anticipating future trends or customer needs and to develop new products and target new markets.

Among the hurdles that executives must overcome along the path to successful innovation, he says, are these:

Confusing creativity with innovation. A great idea is just a great ideas until you make it real. Thomas Edison once said, “I never want to invent anything I cannot sell.”

The failure of upper management to set the vision. Unless the project vision is defined early, with clear benchmarks, the likely result will be wasted resources, the potential for misdirection, and frustration.

Misunderstanding how to involve the customer. In qualitative research, don’t take the customer’s feedback literally. Rather, it needs to be treated as directional input from which deep insights can be gained. Then integrate these points with your own expertise.

Defining cross-functional teams too narrowly. Failure to open up the creative process results in insular thinking. Be sure to include those outside the loop when planning creative sessions. Sebell notes that “Often the seemingly irrelevant can be very relevant in the pursuit of innovation.”

Confusing responsibility with empowerment. Putting an individual or department in charge of bringing a new idea to market is not the same as providing them with the resources and active management support they need to succeed.

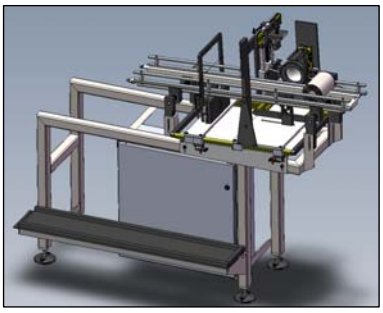
Solar Array at Headquarters (Cont.)

enhance the environment. In keeping with the philosophy of using local resources, Matrix will also utilize local construction manager Romanoff Electric to perform the installation of the equipment.

The investment in solar technology follows the company’s core competency in the engineering and technology marketplace. “Many companies will tout their expertise in green technology and sustainability, but Matrix is showing our solid commitment to these goals through this investment in our own facility, said Mr. Bishop. “This investment gives us the opportunity to showcase our expertise in designing and applying these systems while embracing the core philosophy of sustainability.”

Vision System (Cont.)

Network connectivity simplifies setup



Corporate ERP connectivity relates product codes to UPC codes. The system also utilizes Microsoft SQL Server to centralize configuration parameters and to retain failed inspection results. Setup mode leverages the ERP and SQL Server connections to ensure that the latest updates are deployed. The vision system communicates with the PLC using static outputs and communications with the PC running the over an Ethernet connection. The operator enters the new product code in the running HMI. The HMI sends the setup code to the vision system to identify the product code image it will identify. The HMI also sends the correct barcode to the barcode scanner. The HMI also provides real time image updates, inspection statistics, diagnostics and setup functions.

If you have an application for bright product inspection, please contact us today to discuss your application.

Operational Excellence

Every plant manager dreams of a plant that is humming along at the optimum speed with no disruptions and making quality products. However, in reality things operate much differently. There are various challenges that are constantly hampering the smooth operation of a plant. There are unplanned downtimes, scrap and waste as well as overtime expenses. Most of the plants are asset-intensive and plant managers are constantly on the lookout to reduce cost of manufacturing while also ensuring that these cost cutting measures do not jeopardize the growth and operational excellence.

The plant manager is constantly presented with multiple project ideas from production, maintenance and/or quality departments to alleviate some of the plant constraints and to increase productivity. In the present economy, it is not possible to implement any project without business justification. A cost savings project has to be properly documented with benchmarks and clearly defined goals/savings.

In order to achieve operational excellence, it is critical to define and document all the constraints in the plant. An operational excellence evaluation should be performed that spans all aspects of the business- production, quality, maintenance, warehousing, purchasing, scheduling, etc. This evaluation helps gather the needs and concerns of all the departments within the plant. Aligning these constraints with the business drivers helps prioritize the projects. It also helps identify the low hanging fruits (projects) that will give you the most bangs for your buck. It is critical to install systems in place that will help you collect data that will help you justify projects based on real data versus gut-feel. They also help you benchmark the before and after scenarios to clearly demonstrate the direct impact of projects that were implemented.

Contact us today to arrange a discussion about your operational excellence needs and how Matrix can help you achieve this goal.

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Control Engineering System Integrator Hall of Fame