So you think you need OCR?

AutoCoding® Systems

Contents

Introduction

If you have read the first two blogs in this series, you are probably now hungry for some answers. We have posed a lot of questions and highlighted a lot of issues, including:

- Coding problems are often random, unpredictable and transitory
- What is a Good or Bad code is a hard question to answer
- Just knowing there is something in the date code box sets the bar too low in most cases
- Technology needs a rule book to work to, but we find it very hard to write one when it comes to defining a good or bad code
- As a result, code inspection systems can appear to make pass/fail decisions that are a bit random and not correlating with the decision a human might make on the same evidence – resulting in Nuisance Line Stops

So how has technology tried to tackle this problem, and how well has it worked ?

We are going to be talking about vision technology – cameras and computer algorithms that photograph the product and analyse the image to try and tell us if it is a good code or a bad code.

What is OCR/OCV?

The most common approach has been to use Optical Character Recognition (OCR) or Optical Character Verification (OCV). In very simple terms these systems are trying to read the information they are presented with in the photograph. OCR/OCV are algorithms that match what the camera sees to a library of characters or fonts. When the match is close enough (to predefined rules and tolerances), the system assigns that part of the image to the character that it has matched it with and it moves on to the next character. If it successfully matches all the characters to its font library, it can compare what it has 'Read' with what it was told to expect. If they don't match, the read is bad and the code is rejected.

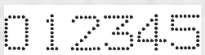
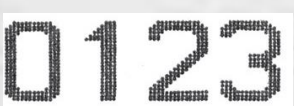
Conceptually this sounds pretty straightforward, yet users of these types of solutions often report an unacceptably high incidence of Nuisance Line Stops – instances where the system stops the line because it says the code is bad, but the people on the line think the code is perfectly OK.

Do you think both these codes are acceptable?
OCR/OCV would reject the second code, despite it being legible

Why is OCR/OCV difficult?

To understand why, we need to go back to our first blog and remember why there is a problem with codes in the first place. When we type a document in Word using Arial 10pt font and press the print button, our desktop printer prints Arial 10pt text – perfectly, every time, no exceptions. Online coders are not like that because the thing they print onto is not as consistent as a sheet of A4 paper and it is often a moving target. Put simply, there are a lot of variables outside of your control on the production line and then you add environment, vibration and operator setup into the mix and the result is that online date code printers – even the very best ones – suffer print quality variations that are unavoidable.

OCR/OCV systems need a font library to match with the code they are inspecting. You might be wondering how that gets created. Well, your vision system expert will need to train the system to recognise every single letter of the alphabet for every single font for all the different printers in your operation use. You don't employ a vision system expert ? Well the reality is that with these types of vision system somebody has to own the responsibility of system setup, font training and generally trying to keep it running. This administrative overhead is something that is rarely made clear in the selling process, but it is real and significant.

Irritating Nuisance Stops

Once you have your library created, everything works fine until one of these unavoidable print quality variations kicks in, and the letter 'A' it sees doesn't quite match the 'A' you taught it. If the difference is outside of the allowable tolerance, the letter and the overall code fails and you get a Nuisance Line Stop. The variation can be very small, such as a leaning or italicised character, when you taught it an upright version. The options available to fix this problem are time consuming and create more downtime:

- Adjust the printer setup to get the print back to normal
- Open out the acceptance tolerance of the vision system – increasing the risk of passing things you don't want to pass
- Retrain the system to recognise the new Italic font

This is annoying because in instances like this, the operator sees the code is correct and legible – maybe not perfect – but certainly not a reason to stop the line. Additionally, the production manager wouldn't be too impressed with the increased downtime caused by the "quality system".

So, the problem is not that OCR/OCV systems don't work. They work fine when shown repeatable characters that look exactly the same as the ones they were trained to recognise. Most production lines, however, can't realistically operate to this level of perfection and nuisance line stops become a part of everyday life and a major problem. OCR/OCV is a very rigid rule system which doesn't cope well with variation and can't exercise discretion in the same way a human brain can, so what else is on offer that might help?

Artificial Intelligence

Artificial Intelligence (AI) is a big topic everywhere in our world today and that is true in machine vision systems as well – we have all seen the amazing videos of robots apparently thinking on their feet. That is AI in action. In layman's terms, we are told AI systems are starting to 'think' like we think so that sounds like it will be very helpful to solving our problem of analysing print quality problems.

It is true that AI systems can be taught to deal with variations and to learn what is acceptable and what is not. However, the key here is that it has to learn – which means it needs a teacher that can show it enough examples of acceptable variation to populate its memory banks with experience to draw upon. You are going to need that vision system expert again – the one you don't employ in a food or beverage factory.

It is clear AI is advancing and changing incredibly quickly and the AI approach is superior to OCR/OCV in dealing with the types of natural coding variation we have been talking about. No doubt it will continue to get better. But it raises another key question about inline vision systems in your business. Do you have the people with the skills to keep these systems running – and if you don't, do you want to employ and try to retain people with those skills within your operation? A system doesn't just need to work, it has to be able to be run and maintained by the people that you employ or can afford to employ.

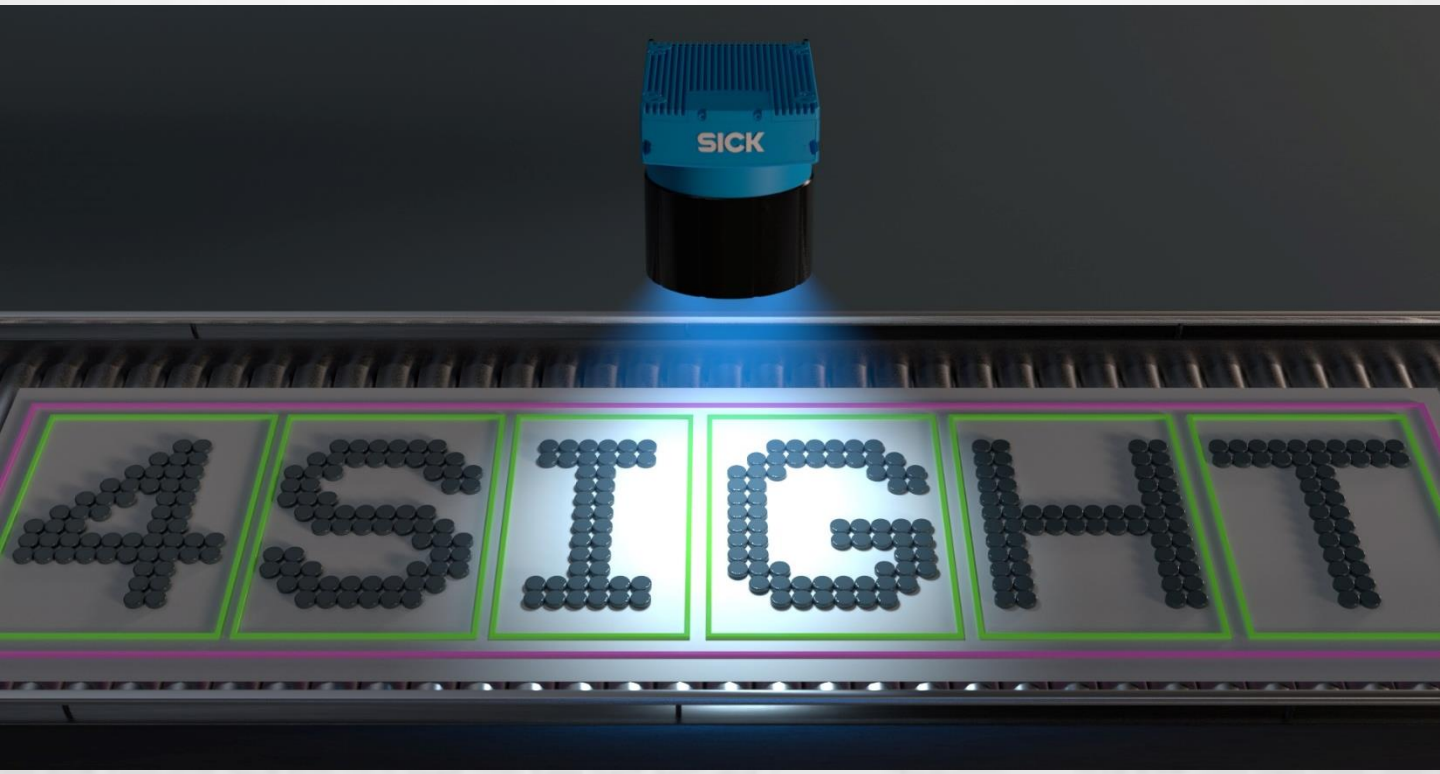
A New Approach

In our final piece we will take a look at a new approach to solving this problem called **4Sight.**

As William Blake once said,

“**Hindsight is a wonderful thing but foresight is better, especially when it comes to saving life, or some pain!”**

He never knew it, but he was about 200 years ahead of his time in understanding print inspection.



AutoCoding® Systems

With over 15 years' experience and a new product platform which is the result of over 40 man years' recent development, AutoCoding Systems is a leading supplier of packaging and coding control systems for the food and drink manufacturing industry. With over 1000 lines under our control in the UK, USA, Australia and SE Asia, we are proud to name many of the world's largest food companies among our customers.

With a full product installation and aftersales care team, AutoCoding Systems improves efficiency on the packaging line and manages the compliance of coding and packaging on millions of products every single day. We offer a completely vendor-agnostic solution, providing our customers with complete flexibility and freedom of choice to use coding and printing technologies from all the leading suppliers thanks to our extensive driver library and vendor partnerships.

Ready to find out what our solution could do for your manufacturing business? Reach out to us today to request a free demo.

+61 (0) 418 700901 info@autocodingsystems.com www.autocodingsystems.com/au/

See how AutoCoding Systems can help your company

Request a demo