

No chance without logo

Smart camera system checks beverage packaging

With the proceeding development of the industrial image processing nowadays an automated usage is possible, where it was not thinkable either economically or technically yet. In the meantime robust and cost-effective image processing solutions can be developed shortly with the help of more powerful hardware components and optimized software components. Reverse vending machines for the confident return of beverage packaging are an example for this.

■ Ulli Lansche



Camera in action:
Checking of a beverage
packaging

At the turn of the millennium it was the current opinion, that image processing would be too expensive for a deposit system. Years later image processing became accepted economically and represents the central unit for a reliable and robust receiving of disposable beverage packaging. Although system and requirements changes have to be included in short time, since May 1st, 2006 cans and disposable beverages packagings can be received Germany-wide in a consistent deposit system. Some people could understand the statement "in short time" cynically. After all since 1991 with the

"Verordnung über die Vermeidung von Verwertung von Verpackungsabfällen" (order to avoid and recycle packaging waste) of then environment minister Klaus Töpfer the foundation stone of the today's deposite system was placed for ecological reasons. Due to this order since January 1st, 2006 a deposit was charged for beverage packaging. Furthermore the industry was granted time to change the system. Now the question comes up, why there was no consistent deposit system until the year 2004? Even though on October 1st, 2003 the national trade obligated themselves to establish a consistent

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system, the launch of the system delays. An appeal on an institution issue and a conviction of the European Court of Justice (C-463/01, 14th December, 2004), which confirmed the can deposit, but gave the beverages manufactures more time, got in the way of a fast realization of the deposit system and provided isolated applications of single trade chains. Not until June 2005 the Deutsche Pfandsystem GmbH (German deposit system, in short DPG) was founded which was consigned to create a consistent Germany-wide deposit system for disposable beverages packagings until May 1st, 2006.

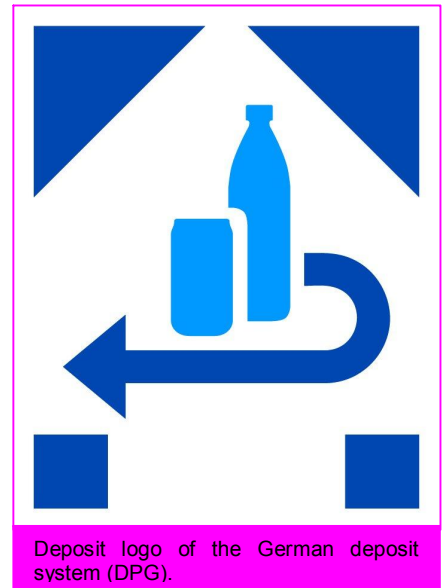
So far only a barcode helped to indentify disposable beverages packagings. With reverse vending machines and industrial image processing it was possible to clasify beverages packagings without manpower inside isolated applications. The new packaging order bind traders with a sales area from 200 m² to accept all beverages packagings even though they didn't place them into circulation. So that the traders can differ between packagings of the German deposit system and foreign packagings as a further indentifier a new deposit logo was introduced by the DPG. With this logo the traders are secure from deposit fraud trials.

IR system for more sureness

In the first instance an ultraviolet procedure was tested to get the deposit logo forgery-proof. But after this procedure was outwitted in November 2005, the DPG elected an infrared procedure. With the support of MATRIX VISION and some other image processing companies the infrared procedure was defined and an excessively tight timetable was

worked out to redevelop a reader for the deposit system. However, the reorientation of the procedure six month before launch had one disadvantage, the manufacturer of the reverse vending machines could not develop a reader for theirs machines in the remaining time, which can validate the deposit logo additionally.

A solution of the problem had MATRIX VISION: The security mark reader mvSMR was developed in short time based on the proven mvBlueLYNX technology. The intelligent camera as the camera unit features two essential advantages: the intelligent camera can process the acquired images in the camera directly and it can control the different exposures of the lamps to recognize the deposit logo. Since the reverse vending machine only receives the positive or negative result from the camera unit no reverse vending machine has to be redeveloped. A retrofitting with the mvSMR and a firmware update suffice to update the reverse vending machines. The camera unit features a 400 MHz processor to work with the information, which is sufficient power for current and furture tasks of the reader. Furthermore the camera unit has a sensor with 1280 x 1024 pixels. This sensor is necessary to support a both-way inlaid direction of the beverages packagings, because the camera unit has to cover a larger field of vision. The mvSMR supports beverages packagings diameters up to 120 mm and a maximum rotation speed of 25m/min. The recognition algorithm is reliable as well as robust and can identify the deposit logo also on slight deformed and polluted packagings. Due to the attributes as well as the compact and modular composition manufactures can adjust



Deposit logo of the German deposit system (DPG).

and refit the mvSMR to the respective requirements of theirs counting centers and reverse vending machines. Future extensions of the deposit system with other or additional security checks can be done with online updates of the firmware. For this reason the mvSMR is prepared for all possible

Conclusion

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The intelligent camera mvBlueLYNX provides a basis for the development of the mvSMR.