TATA GLOBAL BEVERAGES

ONLINE REJECTION SYSTEM FOR ENVELOPE TEA BAGS

IMPLEMENTED INNOVATIONS

TGBL's new Infrared array-based vision inspection system has enabled to reduce the rejection rate of its envelope tea bags and to eliminate customer complaints.

THE CONTEXT

Tata Global Beverages (TBGL) began producing tea bags in 2014 at its Pullivasal plant in Kerala. An internal performance review in 2015-16 revealed a quality concern. While the flexi packs of tea scored a high 98.77% on the Right First Time (RFT) parameter, this score was only 90.52% for tea bags. The high rejection rate of nearly 10% was majorly because of minute misalignments of tea bag w.r.t envelope in packaging process, which results in empty envelopes and leaking tea bags. These defects accounted for 53% of all customer complaints.

The high rejection rate also increased the work load, as the entire lot had to go through a second inspection to identify and eliminate defective tea bags. Since the machine worked at a high speed to produce 130 tea bags per minute, a manual intervention was impossible and TGBL looked for an engineering solution.

THE INNOVATION

The team explored options such as an X-ray and a vision-based system using traditional cameras, but these were not viable. It zeroed in on a cost-effective system using a sensor-based coordinates system which compares pre-set and actual coordinates of corners of tea bags.

However, the system was unable to achieve a 100% detection rate despite several iterations and modifications. The team realised that this was mainly because of the technology was unable to detect counter clockwise sway of tea bags inside the envelope. Also, the system was having limitations to modify the pre-set coordinates.

After interacting with multiple vendors, the company finally entered into a collaboration with Wenwish Technologies, a Cochin based start-up. TGBL in partnership with Wenwish innovated a rejection system, which is having infra-red (IR) transmitter and receiver arrays across the tea bag's periphery in the shape of a tea bag. This will generate a shadow image of the tea bag and subsequently will get compared with a standard reference image. The misaligned packets are accurately detected by this method. The control system then rejects any misaligned envelopes with a directed air blow.

KEY CHALLENGES

TO SET UP STANDARD REFERENCES AND TO ACHIEVE MILLI METER LEVEL ACCURACY IN A HIGH SPEED LINE

The team overcome this issue by developing an auto calibration mode through which the ideal reference image will be generated automatically.

ONLINE REJECTION OF TEA BAGS

The team implemented a ring counter based algorithm to reject the exact defective packet even though the packing machine is running at high speed.

NON-RELEASING OF TBS FROM HOLDERS

Installed an additional sensor to check whether there is any remaining of tea bags in holder.

THE IMPACT

The new system has improved the RFT rate for envelope tea bags from 90.52% to 99.85%, thereby eliminating customer complaints about empty envelopes and leak tea bags. It has also reduced spends on rejected lots and reworking costs besides improving labour and machine utilisation rates.

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