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Implanted QR Code Enabled Incentivized System for Container Reuse

ABSTRACT

Single use disposable containers are widely used for a variety of products. Reuse of the containers offers environmental benefits. This disclosure describes techniques to facilitate efficient reuse of commodity packaging via an incentivized system for tracking of purchases. During product manufacture, unique metallic QR codes are embedded into product containers marked with a sticker indicative of the amount due to the consumer for the returned container. The QR codes are registered in a central database and enable tracking of the containers. Upon completion of product use, consumers can place the container into repositories placed at suitable locations. A full-sphere X-ray is used to read multiple QR codes and provide immediate credit to the consumer while recording container details. Product use information associated with consumers can be determined based on the recovered containers. With user permission, purchase information of specific products can be utilized to determine the effectiveness of advertisements. A portion of advertising revenue can be shared with the consumer.

KEYWORDS

- QR code
- Recycling
- Single-use plastic
- Product packaging
- Full-sphere X-ray
- Bulk scanner
- Advertising effectiveness

BACKGROUND

Single use disposable containers are widely used for a variety of products such as food, utensils, cleaning agents, toys, etc. Some containers are intended to be used for a short period of time such as to contain a single meal or beverage, while others remain on a shelf at home for months at a time, e.g., such as a large container of laundry detergent. Use of containers contributes to negative environmental externalities like landfill use. Recycling can mitigate this to some extent.

Recycling of used containers offers environmental benefits when compared to landfill disposal. However, reuse offers additional environmental benefits, e.g., due to energy savings from not having to melt or otherwise break down the container material. Reuse of containers includes sorting, shipping, and cleaning of the containers. A system that incentivizes reuse can improve the rate of recycling and can result in significant cost and environmental benefits. Additionally, packaging costs can be reduced with greater reuse of containers.

DESCRIPTION

This disclosure describes techniques to facilitate efficient reuse of commodity packaging via an incentivized system for tracking of purchases and strategies for achieving efficient automation. Per techniques of this disclosure, QR codes are embedded in containers (packaging) to enable tracking and transport of used containers from consumers to corresponding manufacturers for subsequent reuse, while simultaneously providing an incentive payment to the consumers.

The proposed techniques can be utilized in a full-cycle reuse system whereby a manufacturer sells a product in a container and purchases the container back from the consumer for reuse after cleaning. The system provides consumers with the convenience of single use

plastic while reducing waste and possibly even manufacturer cost. Optionally, with user permission, the system can integrate with advertising systems to measure effectiveness of advertising.

To facilitate reuse, metallic QR codes are embedded (implanted) into glass, plastic, wood, and other non-metallic containers. Manufacturers use the tagged containers to package their products before sale to consumers. After product use, manufacturers repurchase the containers from consumers for reuse. The containers can be designed and manufactured to be more durable than conventional single-use containers to enable multiple reuses.

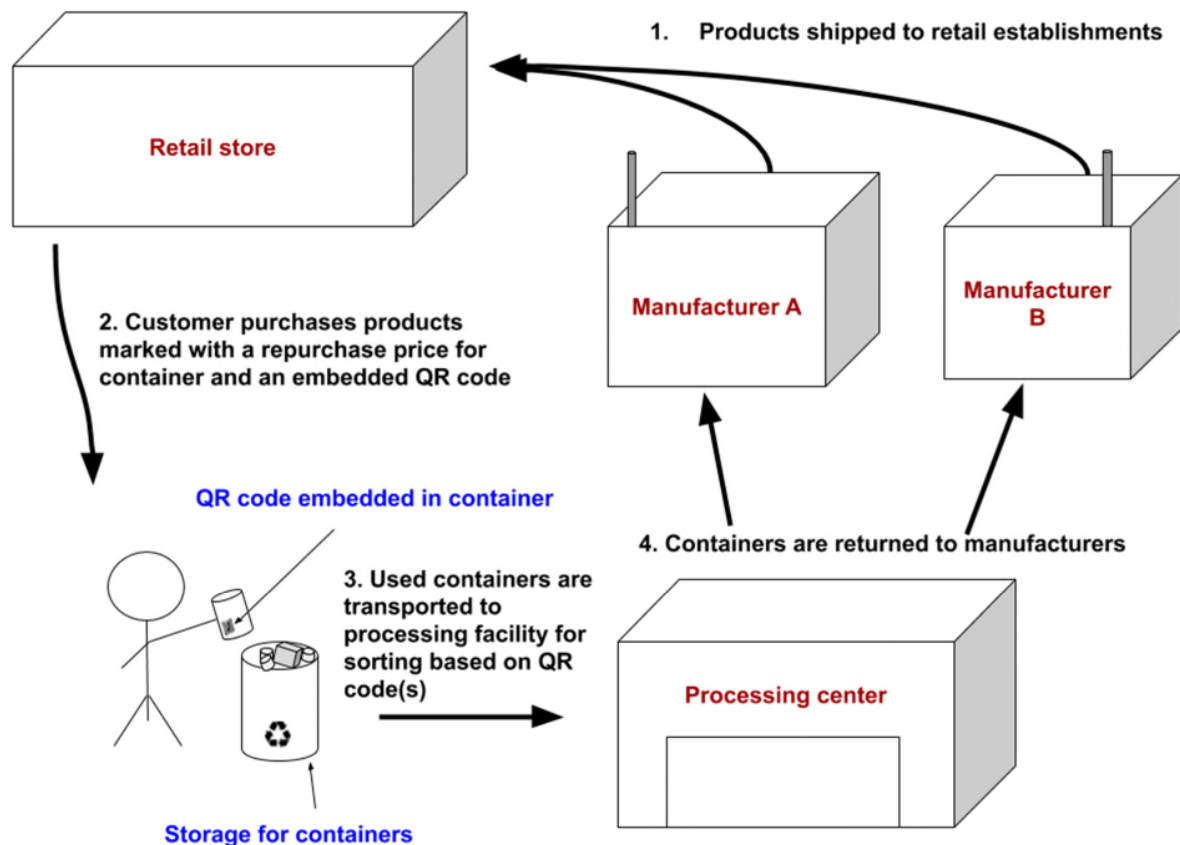


Fig. 1: Reuse of containers enabled by embedded QR codes

Fig. 1 illustrates an example system for reuse of containers, enabled by QR codes.

During manufacture, unique QR codes are embedded into product containers. The containers

are marked, e.g., with a sticker indicative of the amount due to the consumer for a returned container. The QR codes are registered in a central database and enable tracking the source (and destination after use).

Consumers purchase the products via various channels. Upon completion of product use, consumers can place the container into repositories placed at suitable locations. For example, the repositories can include:

- A specialized disposal bin placed at the consumer's home which is for example, solar powered and self-locking, and which generates GPS alerts when engaged. An autonomous or human-controlled acquisition vehicle can be utilized to collect the bin or its contents.
- A bin placed at a private business or public location, which can accept a large number of items from different consumers.
- A bin placed in a public collection facility

A full-sphere X-ray (or other suitable technology) is utilized to read multiple QR codes and provide immediate credit to respective consumers, while simultaneously recording product details. A full-sphere X-ray (bulk scanner) enables rapid scanning of a large number of items, for example, the contents of an entire bin, without individually scanning each item. Consumers are paid an amount based on the containers deposited and the amounts indicated on each container. Intermediaries such as the private business involved with the collection can also be paid specified amounts.

The collected bins or containers are shipped to a central facility and are sorted to separate types of containers. After sorting, similar containers are shipped to the corresponding manufacturer(s). The manufacturers utilize cleaning processes appropriate for the specific

product (consumable) stored in the container to enable efficient reuse. The containers can then be reused to package a fresh batch of the product for retail distribution and sale.

With user permission, product use information can be determined based on the gathered containers. Purchase information of specific products can be utilized to determine the effectiveness of advertisements. A portion of advertising revenue can also be shared with the consumer or other parties.

CONCLUSION

This disclosure describes techniques to facilitate efficient reuse of commodity packaging via an incentivized system for tracking of purchases. During product manufacture, unique QR codes are embedded into product containers marked with a sticker indicative of the amount due to the consumer for a returned container. The QR codes are registered in a central database and enable tracking of the containers. Upon completion of product use, consumers can place the container into repositories placed at suitable locations. A full-sphere X-ray is used to read multiple QR codes and provide immediate credit to the consumer while recording container details. Product use information associated with consumers can be determined based on the recovered containers. With user permission, purchase information of specific products can be utilized to determine the effectiveness of advertisements. A portion of advertising revenue can be shared with the consumer.