



## AI-POWERED AUTONOMOUS CHECKOUT SYSTEM

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### ABSTRACT

AutoBill introduces an innovative AI-driven autonomous checkout system specifically tailored for retail establishments. Its primary aim is to address the inconvenience caused by lengthy queues and waiting times. By seamlessly integrating advanced computer vision and machine learning technologies, AutoBill revolutionizes the checkout process by efficiently identifying items on the counter without requiring manual scanning. This paper provides a comprehensive exploration of AutoBill's developmental journey, highlighting its utilization of Raspberry Pi and emphasizing its ability to enhance the overall shopping experience while minimizing human interactions, particularly in light of the ongoing pandemic. Furthermore, by swiftly generating bills and facilitating QR code payments, AutoBill offers a seamless and expedited checkout solution, marking a significant transformative shift in the retail landscape.

### Keywords: -

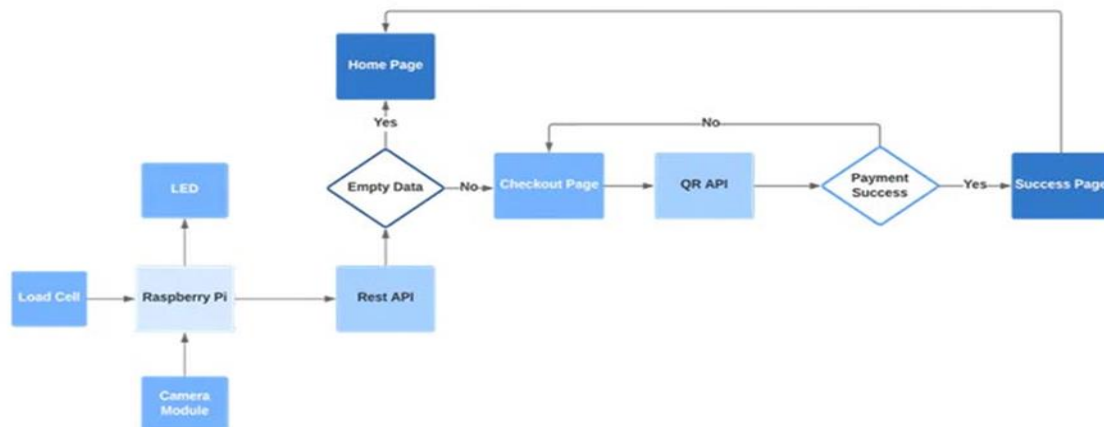
Bill, Detected, edge impulse and check out.

### I. Introduction

Self-checkout systems, also referred to as assisted checkouts or self-service checkouts (SCOs/ACOs), represent a technological advancement in retail operations. These systems empower customers to independently complete transactions without the need for traditional staffed checkout counters. Operating SCOs involves customers scanning item barcodes before finalizing payment for their entire purchase, all without requiring direct assistance from store staff. While self-checkouts are predominantly found in supermarkets, they are increasingly prevalent in department stores and convenience stores as well. Typically, self-checkout areas are overseen by at least one staff member who assists customers with transaction processing, price corrections, and providing additional service as needed.

The self-checkout system, commonly known as AutoBill, stands as an epitome of innovation in retail technology. AutoBill represents an AI-powered autonomous checkout solution designed for retail establishments, integrating advanced computer vision and machine learning capabilities to enhance the shopping experience. By harnessing the power of these technologies, AutoBill endeavors to expedite the checkout process, thereby reducing the need for extensive human interaction within the store environment, particularly amidst the challenges posed by the ongoing pandemic.

Employing state-of-the-art computer vision and machine learning algorithms, the self-checkout system autonomously identifies items placed on the counter. Additionally, the system incorporates weight sensors to accurately measure the weight of items placed on the countertop. Once items are visually recognized and their weights determined, they are seamlessly added to the customer's cart, facilitating a frictionless checkout experience. Furthermore, AutoBill swiftly generates a detailed bill, complete with a QR code for payment processing. Customers can conveniently settle their bills by scanning the QR code, further enhancing the efficiency and convenience of the checkout process.



AutoBill stands as a pioneering AI-driven autonomous checkout solution set to transform the retail landscape. Through the integration of cutting-edge technologies such as computer vision and machine learning, AutoBill excels in swiftly detecting and recognizing items positioned on the checkout counter, obviating the need for manual scanning. Augmenting its capabilities, the system incorporates weight sensors to precisely gauge the weight of items, thereby amplifying accuracy and operational efficiency. Once the items are successfully identified, they are seamlessly integrated into the virtual cart, culminating in the instantaneous generation of a bill. This streamlined process is further complemented by the provision of a QR code for swift and contactless payment, thereby ensuring a frictionless transaction experience for users.

## II. Literature

Several studies have delved into the correlation between checkout time, store congestion, and customer satisfaction within retail settings. Bagozzi (2002) investigated the influence of situational factors, technology readiness, and customer demographics on the perceived usefulness (PU) and perceived ease of use (PEOU) of self-service technologies (SSTs) in retail. They discovered that prolonged waiting times negatively affect PU and behavioral intention but do not impact PEOU. Moreover, crowding negatively affects behavioral intention, PU, and PEOU. Zammit (2006) also observed that SSTs, especially through self-scanning processes, can expedite the purchasing process, thus reducing overall customer wait times. Consequently, SSTs can act as an alternative service source or mitigate issues like long queues. These findings align with the Technology Acceptance Model (TAM) proposed by Davis et al. (1989), which suggests a direct relationship between attitude toward SSTs and intention to use SSTs. Other factors influencing customer acceptance of SSTs include perceptions of ease of use, service quality, reliability, and initial positivity. Conversely, factors such as fun, enjoyment, perceived control, novelty-seeking behavior, self-efficacy, and ability to use are deemed less critical situational factors.

In addition to situational factors, consumer characteristics like technological anxiety (TA) and technology readiness (TR) serve as predictors of consumer intention to use SSTs. Technological anxiety, specifically, is extensively researched in the context of SSTs, referring to a user's state of mind, ability, willingness, and motivation to learn and use such technologies. High TA has been shown to decrease SST usage, and coercion by retailers may exacerbate TA, resulting in a perception of loss of freedom. Conversely, mastering SSTs can shift shoppers from self-efficiency motivations to satisfaction with SSTs. Technology readiness encompasses consumer beliefs regarding optimism, innovativeness, discomfort, and insecurity about SSTs. Prior research has emphasized the significant role of customers in service delivery, with external and intrinsic motivation factors influencing readiness and trials for SSTs.

## III. Conclusion



A self-checkout system offers numerous benefits, including convenience, efficiency, and reduced operational costs for businesses. However, its success ultimately hinges on seamless user experience, reliable technology, and effective management of potential challenges such as theft and technical glitches. In conclusion, while self-checkout systems present promising opportunities for modernizing retail operations, their implementation should be strategic, focusing on enhancing customer satisfaction while addressing any concerns to ensure a positive overall impact on both businesses and consumers.

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