FFI001: FOUNDATION IT

Assignment 3: Individual Technology Showcase Report

SUBMISSION DATE

STUDENT NAME
Student ID

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Topic name

Functions of Cashierless Stores: Their Benefits and Limitations

Introduction

Cashierless stores represent an innovative convergence of artificial intelligence (AI), computer vision, and sensor technologies, enabling shoppers to select items and exit without traditional checkout processes. Based on seamless integration of these elements, the system automatically tracks purchases and processes payments, thereby streamlining the retail experience. Consequently, this technology not only minimizes human intervention but also enhances operational efficiency in high-traffic environments. From a broader perspective, cashierless stores address evolving consumer demands for convenience, particularly in urban settings where time constraints are pronounced, thus marking a significant shift in retail paradigms.

Showcase Project Motivation

The selection of cashierless stores as the focus of this project stems from their rapid emergence within the retail sector, driven by post-pandemic preferences for contactless interactions and the escalating integration of AI in everyday commerce. Given that the global unmanned stores market is projected to expand from USD 81.4 billion in 2024 to USD 962.6 billion by 2033 at a compound annual growth rate (CAGR) of 31.59%, exploring this technology provides timely insights into how digital advancements can reshape traditional business models. Furthermore, the choice aligns with the project's aim to investigate practical applications of information and communication technologies (ICT), as discussed in Module 2 of the course. To present this topic effectively, a website format has been adopted, allowing for interactive elements such as embedded videos and expandable sections, which facilitate a more engaging and accessible demonstration compared to static reports.

Showcase Project Major Contents

The showcase project delves into the multifaceted aspects of cashierless stores through five interconnected components, each building upon the previous to offer a comprehensive analysis. Initially, the operational mechanics are examined, revealing how entry via biometric or app-based authentication initiates a tracking process where AI algorithms monitor

shopper movements and item selections in real-time. This foundation is essential, as it directly influences subsequent efficiency gains, such as reduced queuing times that can enhance customer satisfaction by up to 80% in optimized implementations.

Building on this, the key technologies underpinning the system are explored, including computer vision for object recognition and sensor fusion that combines weight detection with visual data to minimize errors below 1%. Due to these synergies, retailers can achieve precise inventory management, which in turn supports scalability across diverse store formats. From this technological vantage point, a comparative analysis follows, contrasting cashierless models with traditional retail setups; for instance, while the former incurs high initial capital expenditures for infrastructure, it yields long-term operational savings through labor reductions of approximately 30%, thereby justifying adoption in cost-sensitive markets.

Further extending the discussion, the limitations are critically assessed, highlighting challenges such as privacy risks from extensive surveillance and potential technical failures in variable lighting conditions. Since these issues stem from over-reliance on data collection, they necessitate robust mitigation strategies, like encrypted biometric handling, to sustain consumer trust. Finally, the future trajectory and ethical considerations are addressed, projecting widespread integration with predictive analytics for dynamic pricing by 2030; however, this evolution demands ethical frameworks to balance innovation with societal impacts, such as job displacement, ensuring that technological progress aligns with equitable principles

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Appendix A

URL of the showcase project: