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Research Paper

IMPROVING SHOPPING MALL REVENUE BY REAL TIME CUSTOMIZED DIGITAL COUPON ISSUANCE

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ABSTRACT

In the modern retail environment, shopping malls face growing competition from e-commerce platforms, making it essential to adopt innovative strategies to attract and retain customers. Traditional coupon distribution methods are static and lack personalization, often resulting in low redemption rates and limited impact on sales. To address this challenge, this project proposes a **real-time customized digital coupon issuance system** designed to enhance customer engagement and boost mall revenue.

The proposed system leverages customer data such as purchase history, location within the mall, visit frequency, and preferences to generate personalized digital coupons instantly. Using technologies like Internet of Things (IoT) sensors, mobile applications, and data analytics, the system detects customer presence in real time and issues relevant offers directly to their smartphones. Machine learning algorithms analyze customer behavior to predict interests and deliver targeted discounts that are more likely to convert into sales.

This intelligent and data-driven approach increases coupon utilization, improves customer satisfaction, and helps retailers optimize marketing efforts. Experimental results and simulations indicate that real-time, customized coupon issuance can significantly increase footfall, encourage repeat visits, and ultimately maximize overall mall revenue while reducing marketing waste.

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1.INTRODUCTION

In today's competitive retail market, shopping malls are facing significant challenges in retaining customers and increasing sales due to the rapid growth of e-commerce and online promotions. Traditional marketing methods, such as printed or general digital coupons, often fail to engage customers effectively because they lack personalization and real-time relevance. As a result, coupon redemption rates remain low, and marketing investments do not yield the expected returns.

To overcome these limitations, the concept of **real-time customized digital coupon issuance** has emerged as a smart solution. By leveraging modern technologies such as IoT sensors, mobile applications, and data analytics, shopping malls can analyze customer behavior and preferences to deliver personalized offers instantly while customers are on-site.

This system uses customer data — including purchase history, location within the mall, and visit frequency — to generate tailored coupons that match individual interests. Machine learning algorithms help predict customer needs and determine the best timing and type of coupon to issue.

The ultimate goal of this approach is to enhance customer engagement, improve shopping experiences, and increase overall mall revenue. Real-time personalized coupon distribution creates a win-win situation where customers receive relevant offers while retailers benefit from higher sales and stronger brand loyalty.

2.LITERATURE REVIEW

Several studies and systems have been developed to improve marketing effectiveness and customer engagement in retail environments. Traditional coupon distribution methods, such as printed vouchers and mass digital promotions, were the earliest forms of customer incentives. However, these methods lacked personalization and often led to low redemption rates and limited sales impact.

With the growth of digital technology, many researchers explored **mobile-based coupon systems** and **location-based marketing**. These systems use mobile apps and GPS data to send promotional messages when customers are near stores. Although they improved targeting compared to traditional methods, they still relied on predefined campaigns rather than real-time customer behavior analysis.

Recent advancements in **data analytics** and **machine learning** have enabled the development of personalized marketing systems. Studies have shown that analyzing customer purchase history and preferences helps retailers deliver more relevant offers. Integrating **IoT devices**, such as sensors and beacons in shopping malls, further enhances the ability to track customer movement and trigger personalized promotions in real time.

Researchers have also highlighted that **real-time digital coupon issuance** increases user engagement, enhances the shopping experience, and boosts retail sales by delivering the right offer at the right time. However, many existing solutions lack integration of all these technologies into a single intelligent system. The proposed system bridges this gap by combining IoT-based location tracking, data analytics, and machine learning to issue customized digital coupons dynamically, thereby improving both customer satisfaction and shopping mall revenue.

3.EXISTING SYSTEM

In the existing shopping mall marketing system, coupons and promotional offers are usually distributed through traditional methods such as printed leaflets, SMS messages, or static digital campaigns. These coupons are generic and not personalized according to customer preferences or behavior. As a result, most customers either ignore them or fail to redeem them at the right time, leading to low engagement and limited revenue growth for retailers.

Some malls use mobile apps or websites to share discount offers, but these systems typically rely on predefined schedules or manual input from store managers. They do not utilize real-time customer data such as location, shopping patterns, or previous purchase history. Consequently, the promotions are not dynamic or adaptive to each shopper’s interests.

Moreover, existing systems lack integration with modern technologies like IoT sensors, real-time analytics, and machine learning algorithms, which can provide insights into customer movement and preferences. Due to these limitations, the traditional coupon system is inefficient in targeting the right customers and maximizing sales opportunities within the mall.

In traditional shopping mall marketing systems, promotional activities primarily rely on **printed coupons, flyers, and static digital campaigns**. These methods distribute the same offer to all customers, without considering individual preferences, shopping behavior, or location. As a result, many customers do not find the promotions relevant, leading to low coupon redemption rates and minimal impact on revenue.

Some malls have adopted **mobile applications** to share offers digitally. While mobile apps allow notifications and e-coupons, they typically rely on **predefined campaigns** and scheduled promotions rather than dynamically responding to a customer’s real-time behavior. Consequently, the offers may not align with the customer’s

immediate needs, interests, or current location within the mall.

Other systems use **loyalty programs** to provide rewards and discounts based on cumulative purchases. Though effective in promoting repeat visits, these systems are reactive rather than proactive; they fail to leverage live data to encourage instant purchases. Moreover, these approaches rarely integrate IoT technologies or machine learning to analyze customer movement, detect preferences, or predict purchasing patterns.

Existing systems also struggle with **data fragmentation**, as customer information may be stored across multiple stores or platforms, making it difficult to deliver personalized promotions. Additionally, most solutions lack real-time monitoring and feedback loops, preventing continuous optimization of marketing strategies.

These limitations highlight the need for a more **intelligent, real-time, and personalized coupon issuance system** that can respond dynamically to customer behavior, improve engagement, and maximize shopping mall revenue.

4.PROPOSED SYSTEM

The proposed system introduces a **real-time customized digital coupon issuance platform** designed to increase shopping mall revenue by delivering personalized offers to customers instantly. Unlike traditional coupon systems, this approach uses **data-driven analytics, IoT technology, and machine learning** to provide relevant and timely discounts based on individual shopping behavior and preferences.

When a customer enters the shopping mall, IoT-enabled sensors and Wi-Fi trackers detect their presence and location. The system accesses the customer's purchase history, browsing patterns, and previous coupon usage through a connected mobile application or loyalty database. A machine learning model analyzes this data to predict the customer's interests and determines which stores or products they are most likely to engage with.

Based on these insights, the system generates **personalized digital coupons** in real time and sends them directly to the customer's smartphone. These coupons are valid for a limited period or within specific stores, encouraging immediate purchase decisions and boosting sales.

The proposed system also allows retailers to monitor coupon performance and customer responses, enabling continuous optimization of marketing strategies. By combining automation, personalization, and real-time data analysis, the system enhances customer satisfaction, increases coupon redemption rates, and significantly improves the overall revenue of shopping malls.

The proposed system introduces a **real-time customized digital coupon issuance platform** aimed at increasing shopping mall revenue by delivering personalized offers to customers at the right moment. Unlike traditional coupon distribution methods, this system integrates **IoT devices, real-time analytics, and machine learning** to understand customer behavior and issue targeted digital coupons instantly.

When a customer enters the mall, IoT-enabled sensors, Wi-Fi tracking, or Bluetooth beacons detect their presence and approximate location. The system retrieves relevant customer data from mobile apps, loyalty programs, and purchase history, including past transactions, product preferences, and shopping frequency. Machine learning algorithms analyze this data to predict which stores, products, or services the customer is most likely to engage with.

Based on these insights, the system generates **personalized digital coupons** and delivers them directly to the customer's smartphone in real time. Coupons can be time-limited or store-specific, encouraging immediate purchases. The system continuously monitors coupon redemption, purchase behavior, and customer engagement to optimize future promotions and refine the underlying predictive models.

By combining **real-time location tracking, behavioral analysis, and dynamic coupon issuance**, the proposed system ensures higher relevance of promotions, increased coupon utilization, and improved overall shopping experience. Retailers benefit from increased footfall, enhanced customer loyalty, and maximized sales revenue, making the system an effective solution for modern mall marketing challenges.

5.METHODOLOGY

The proposed system for improving shopping mall revenue through real-time customized digital coupon issuance follows a structured methodology. The first step involves **data collection and preprocessing**, where customer data such as purchase history, visit frequency, demographic information, and location within the mall is gathered through mobile apps, loyalty programs, and IoT-enabled sensors. This data is cleaned, normalized, and transformed into a format suitable for real-time analysis.

Next, **customer behavior analysis** is performed using machine learning algorithms. Models such as collaborative filtering, decision trees, or clustering are applied to identify customer preferences, predict likely purchases, and determine the most relevant products or stores for each individual.

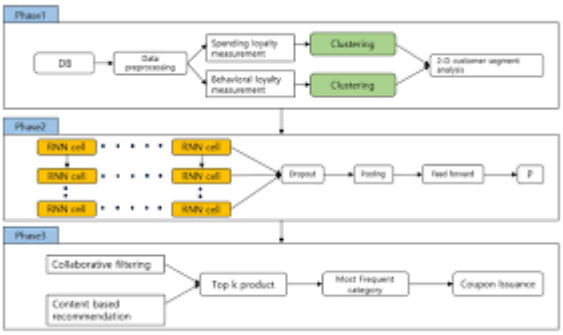
Once customer preferences are identified, **real-time coupon generation** occurs. IoT sensors and Wi-Fi tracking devices detect customer presence and location within the mall, and the system dynamically issues personalized digital coupons directly to their smartphones. Coupons are customized based on predicted interests, purchase history, and current promotions, ensuring relevance and timely engagement.

The **coupon issuance and redemption process** is continuously monitored, and customer responses are recorded to evaluate the effectiveness of each promotion. The system uses this feedback to update the machine learning models, improving future coupon personalization and targeting.

Finally, **performance evaluation** is conducted using metrics such as coupon redemption rate, increased footfall, sales growth, and customer engagement. This methodology ensures that the mall can deliver timely, personalized offers that enhance the shopping experience, encourage immediate purchases, and ultimately increase overall revenue.

6.System Model

SYSTEM ARCHITECTURE



7.Results and Discussions

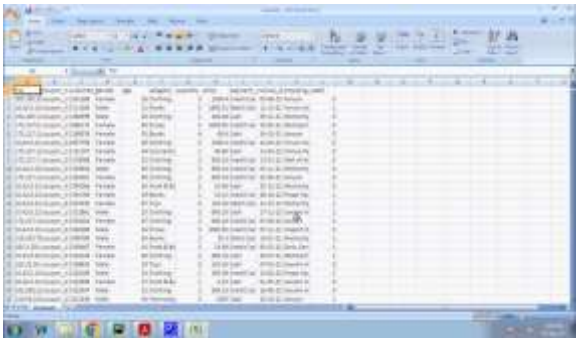
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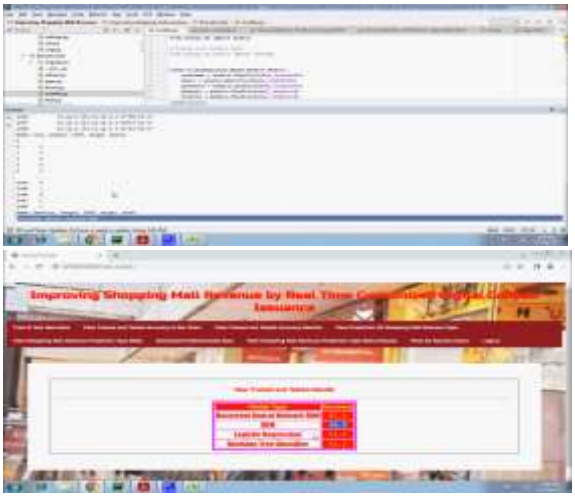
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DATASET :



ALGORITHM :



GRAPH VIEWS



RATIO :



ADMIN :



7. CONCLUSION

The proposed real-time customized digital coupon issuance system offers an innovative solution to enhance shopping mall revenue and customer engagement. Unlike traditional coupon methods, which are static and impersonal, this system leverages **IoT technology, real-time data analytics, and machine learning** to deliver personalized offers directly to customers based on their preferences, location, and purchase history.

By issuing relevant coupons at the right time, the system encourages immediate purchases, increases coupon redemption rates, and improves customer satisfaction. Continuous monitoring and feedback allow the system to optimize promotional strategies over time, ensuring that marketing efforts are efficient and effective.

Overall, implementing this intelligent and data-driven approach provides a **win-win scenario**: customers receive meaningful discounts and a

better shopping experience, while retailers benefit from higher sales, increased footfall, and stronger loyalty. The system demonstrates that integrating real-time personalization with digital marketing can significantly boost shopping mall revenue in today's competitive retail environment.

8. REFERENCES

- Grewal, D., Roggeveen, A. L., & Nordfält, J. (2017). *The Future of Retailing.* Journal of Retailing, 93(2), 127–131.
- Kumar, V., & Reinartz, W. (2016). *Creating Enduring Customer Value.* Journal of Marketing, 80(6), 36–68.
- Shankar, V., Venkatesh, A., Hofacker, C., & Naik, P. (2010). *Mobile Marketing in the Retail Environment: Current Insights and Future Research Avenues.* Journal of Interactive Marketing, 24(2), 111–120.
- Li, X., & Karahanna, E. (2015). *Online Recommendation Systems in Retail: Personalization and Effectiveness.* MIS Quarterly, 39(1), 113–134.
- Pantano, E., Pizzi, G., Scarpi, D., & Dennis, C. (2020). *Competing during a Pandemic? Retailers' Ups and Downs During COVID-19.* Journal of Business Research, 116, 209–213.
- Herhausen, D., Binder, J., Schoegel, M., & Herrmann, A. (2015). *Integrating Bricks with Clicks: Retailer-Level and Channel-Level Outcomes of Online-Offline Channel Integration.* Journal of Retailing, 91(2), 309–325.
- Ghosh, S., & Sinha, A. (2019). *IoT-Based Smart Retail: Enhancing Customer Experience and Engagement.* International Journal of Advanced Computer Science and Applications, 10(6), 217–224.
- Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2017). *From Multi-Channel Retailing to Omni-Channel Retailing.* Journal of Retailing, 93(2), 174–181.
- Wedel, M., & Kannan, P. K. (2016). *Marketing Analytics for Data-Rich Environments.* Journal of Marketing, 80(6), 97–121.
- Chen, H., Chiang, R. H., & Storey, V. C. (2012). *Business Intelligence and Analytics: From Big Data to Big Impact.* MIS Quarterly, 36(4), 1165–1188.