SOEN 357 Project Research and Observations

NiceShopping

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Section S

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Website Description

The name of our grocery is NiceShopping. The current grocery shopping landscape faces several critical challenges affecting consumers and retailers. Traditional in-store grocery shopping is time-consuming, requiring customers to navigate crowded shelves, wait in long checkout lines, and manually track their shopping lists. Additionally, elderly individuals, busy professionals, and those with mobility limitations often struggle to access physical stores. The COVID-19 pandemic has further highlighted the need for efficient online grocery shopping solutions. While some existing online grocery platforms exist, many suffer from poor user experience, unreliable inventory systems, and inefficient delivery scheduling, leading to customer frustration and lost sales opportunities. The existing online grocery also has some problems such as problems with the UI of the official website of Walmart: outdated user interface, complex checking out procedures, and lack of personalization and relevance. Our website will not be like Walmart or other shopping websites, with so many advertisements and recommendations. We will simplify the appearance of the website, without advertisements and excessive recommendations, and clearly guide all functions.
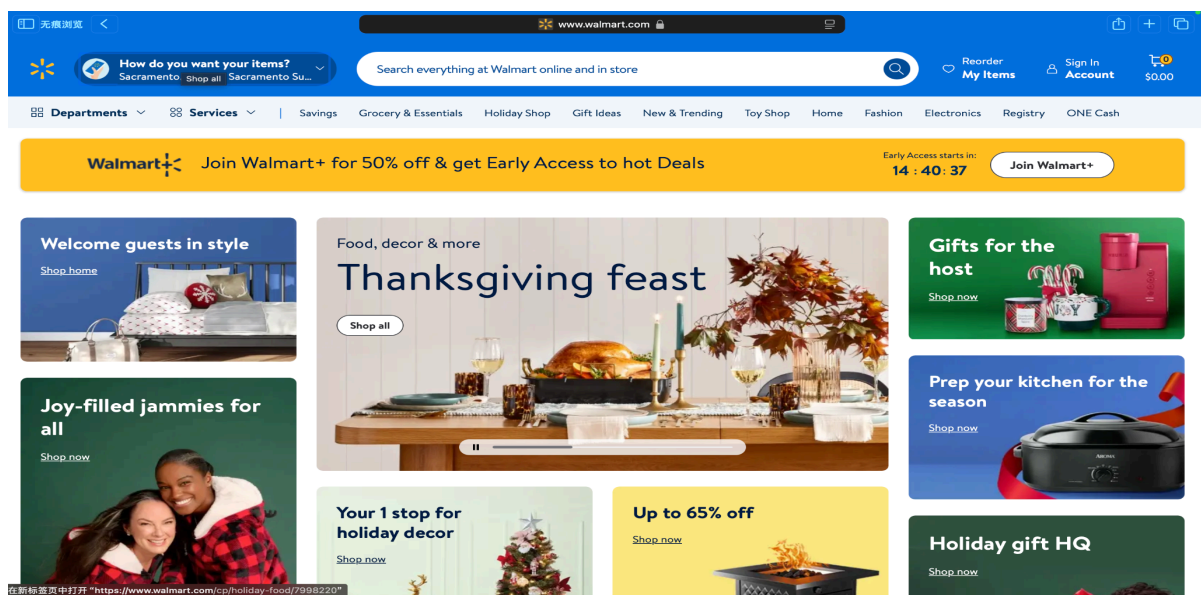
https://www.walmart.ca/en [1]

Hypothesis

This research hypothesizes that a grocery website incorporating user-centric features—specifically AI-powered personalization and streamlined checkout processes—will significantly improve customer engagement and satisfaction metrics within a 12-week evaluation period. We predict that personalized product recommendations and an intuitive interface will reduce cart abandonment rates by 15% compared to traditional grocery platforms, while simultaneously increasing average session duration by 20%. The streamlined checkout process, featuring real-time inventory visibility and simplified payment options, is expected to reduce checkout abandonment by 25%. These improvements will be measured through A/B testing, comparing user behavior between the enhanced platform and a control version using standard features. Secondary metrics will track the impact of personalization on average order value and user retention rates. We anticipate that users exposed to personalized recommendations will demonstrate a 10% higher average order value and show a 20% increase in return visits within the study period. These predictions are based on preliminary user feedback and industry benchmarks from successful e-commerce platforms, suggesting that enhanced personalization and simplified user journeys directly correlate with improved customer engagement metrics.

Theoretical Contribution and motivations

What motivates you to explore this issue?

The motivation to explore a new approach to online grocery shopping comes from the observed challenges faced by users, especially during and after the COVID-19 pandemic.

What leads you to believe this is a problem/opportunity?

Many online platforms lack accessibility for elderly users, busy professionals, and people with mobility issues, and they often struggle with outdated interfaces, complex checkout processes, and inaccurate inventory updates. For example, Walmart's online grocery platform has been criticized for its complexity, leading to a frustrating user experience and missed opportunities for customer retention. This project aims to design an improved, user-centered grocery shopping experience with accessibility, real-time inventory tracking, and personalized recommendations to meet a broad range of user needs effectively.

What are the theoretical contributions of your work to existing research in your area?

This project contributes to the field of user-centered design and e-commerce optimization. It builds upon existing theories in accessible UI/UX design and AI-driven recommendation systems.

What is the structure of the space of possibilities that your work explores?

The space of possibilities explored in this work includes accessibility-focused design, real-time inventory tracking, and personalized recommendations. Accessibility is achieved

through a simple, visually appealing interface; real-time tracking keeps product availability accurate; and AI-driven recommendations enhance user engagement and satisfaction.

What are the major decisions from a design perspective and what are their relative merits?

By building on theories in UI/UX design and e-commerce optimization, this work aims to create a simple, visually appealing interface that is easy to navigate for users with limited technical skills. Real-time inventory tracking helps reduce frustration by accurately displaying product availability, which builds user trust, while AI-based recommendations add a personalized element that makes the shopping experience more engaging and relevant. By balancing these features with data privacy and ease of use, the project has potential to meet diverse customer needs, support retention, and reduce the frustration currently common in online grocery shopping.

Background/Related Work:

Please describe several pieces of published research, how they inform your project, and where your work transcends this knowledge. If other commercial systems exist you should also describe these and their shortcomings, thus motivating your work. Be sure to properly cite your related work.

Link 1 [4]:

how does it inform your project, and where your work transcends this knowledge?

https://academic.oup.com/nutritionreviews/article/80/5/1294/6514637

This link explores how online grocery services can better serve low-income populations. It identifies barriers to adoption, including accessibility issues and a lack of affordable options. This study informs our project by highlighting the need to design a system that is not only user-friendly but also equitable, ensuring that underserved groups can easily access essential services online. The review emphasizes the importance of considering accessibility and affordability, which aligns with our platform's focus on real-time inventory tracking and personalized services aimed at improving the user experience for diverse populations

Link 2 [2]:

how does it inform your project, and where your work transcends this knowledge?

https://www.researchgate.net/publication/326048260_Technology_Acceptance_as_a_Determinant_of_Online_Grocery_Shopping_Adoption

This link discusses the Technology Acceptance Model (TAM), which posits that perceived ease of use and usefulness are critical factors influencing online grocery adoption. This research supports our project's goal of prioritizing simplicity in design to enhance user engagement. By addressing the complexity of existing platforms, such as Walmart's online

grocery service, which has been criticized for its complicated interface and checkout processes, our project aims to streamline these elements to improve user satisfaction and retention .

Link 3 [3]:**how does it inform your project, and where your work transcends this knowledge?**

https://www.cambridge.org/core/journals/journal-of-agricultural-and-applied-economics/article/us-consumers-online-shopping-behaviors-and-intentions-during-and-after-the-covid19-pandemic/0A1344881438B4F2E68D134C827F74CF

This link explores the barriers that food-insecure populations face when accessing online grocery platforms, especially during the COVID-19 pandemic. It highlights how many existing platforms fail to address the needs of vulnerable groups due to outdated technologies and lack of accessibility features. Our project transcends this knowledge by incorporating real-time inventory updates, AI-driven recommendations, and a design that prioritizes accessibility, offering a more holistic solution for a broad range of users .

Existing e-commerce platforms like Walmart's online grocery service are widely used but still face criticism due to complexity and the lack of personalized features. While platforms like Instacart focus on ease of access, they often lack features tailored to specific user needs, such as real-time inventory tracking and accessibility-focused design. These shortcomings further motivate our work, as your platform aims to provide a streamlined, personalized, and equitable shopping experience that addresses these issues.

Methods

The development of the online grocery shopping system will be composed of well-established tools and technologies to ensure a user-friendly experience. The primary development interface will include web-page programming technologies such as HTML, CSS, JavaScript, and PHP for front end, while JavaScript frameworks such as Node.js may be integrated for necessary backend operations. The project will rely on MySQL or PostgreSQL for database management to handle product data, user accounts, and real-time inventory tracking.

Furthermore, for the user interface and user experience design, Figma, Visily, and Adobe Photoshop will be utilized to create intuitive, visually appealing mockups that enhance usability. On the security side, tools such as SSL certificates, OAuth, and encryption will be incorporated to protect personal information and cyber security, and facilitate secure payment transactions. To handle payments, the utilization of Stripe or PayPal will be included, ensuring secure and smooth checkout processes. Finally, the system will add features such as options like changing font sizes for elders to have a user-friendly experience.

Evaluation and Study Design

To evaluate the development of our grocery website, we will apply a comprehensive, user-centric testing approach that ensures the platform meets the needs of its intended user base and performs effectively under real-world conditions. The evaluation will begin with prototype usability testing, where participants from diverse user groups—such as busy professionals, families, and elderly shoppers—will be recruited. These users will be asked to

perform tasks such as browsing for items, adding products to their cart, and completing the checkout process. Metrics including task completion time, user error rates, and post-task satisfaction ratings using the System Usability Scale (SUS) will be captured to gauge the intuitiveness and functionality of the interface.

In addition, we will conduct A/B testing to explore the impact of various features that are key to user engagement and conversion. For example, one user group will interact with a version of the site that includes personalized shopping recommendations and a streamlined checkout process, while another will use a version without these enhancements. We will measure engagement rates, conversion rates, and retention metrics to determine how effectively these features contribute to user satisfaction and repeat visits. This type of comparative analysis allows us to pinpoint which features most significantly enhance the user experience and encourage purchases.

To ensure the grocery website can handle real-world demands, we will also carry out load and performance testing using tools like Apache JMeter. This testing will simulate high-traffic scenarios to monitor page load times, system uptime, and server response rates. Success will be defined by maintaining an average page load time of under 2 seconds, achieving 99% uptime, and demonstrating seamless performance during peak traffic periods. A well-rounded evaluation, combining qualitative user feedback with quantitative performance data, will confirm whether the grocery website is capable of providing a smooth, reliable, and user-friendly shopping experience that stands out from current market offerings.

Biggest risk

The biggest risk of the project is the integration of real-time inventory management and its synchronization across the system. Real-time updates are significant and critical to accurately reflect current stock, particularly during intensive situations or promotional events. Any failure would lead to vital user inconsistencies, resulting in customer dissatisfaction and potential loss of sales or even loss of customer loyalty. To mitigate this risk, the development will incorporate reliable data processing frameworks and ensure the reaction speed of database queries.

Another risk involves ensuring data security, particularly with user payment information. To address this, encryption protocols such as TLS/SSL will be used, along with secure payments gateways like Stripe or PayPal that offer build-in fraud prevention.

References

[1] https://www.walmart.ca/en

[2] Bauerova, Radka, and Martin Klepek. *(PDF) Technology Acceptance as a Determinant of Online Grocery Shopping Adoption*, www.researchgate.net/publication/326048260_Technology_Acceptance_as_a_Determinant_of_Online_Grocery_Shopping_Adoption. Accessed 12 Nov. 2024.

[3] Jensen, Kimberly L., et al. "US Consumers' Online Shopping Behaviors and Intentions during and after the Covid-19 Pandemic: Journal of Agricultural and Applied Economics." *Cambridge Core*, Cambridge University Press, 31 Aug. 2021, www.cambridge.org/core/journals/journal-of-agricultural-and-applied-economics/article/us-consumers-online-shopping-behaviors-and-intentions-during-and-after-the-covid19-pandemic/0A1344881438B4F2E68D134C827F74CF.

[4] Trude, Angela C B, et al. "An Equity-Oriented Systematic Review of Online Grocery Shopping among Low-Income Populations: Implications for Policy and Research." *OUP Academic*, Oxford University Press, 24 Jan. 2022, academic.oup.com/nutritionreviews/article/80/5/1294/6514637.