TOUCHFIND: A DIY Hardware Product Suggestion Platform with Point-of-Sales, Inventory Tracking and Payment Integration

A Capstone Project
Presented to the Faculty of the
Information and Communications Technology Program
STI College Novaliches

In Partial Fulfilment
Of the Requirements for the Degree
Bachelor of Science in Technology

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FEBRUARY.13,2024
Date Approved

ENDORSEMENT FORM FOR ORAL DEFENSE

TITLE OF RESEARCH: TouchFind: A DIY Hardware application that combines point-of-sale, inventory management, and payment processing.

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In Partial Fulfilment of the Requirements
For the degree Bachelor of Science in Technology
Has been examined and is recommended for Oral Defense.

ENDORSED BY:

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APPROVALSHEET

This capstone project titled: **TouchFind**prepared and submitted by **Jermaine T. Taco, Brandon Lee M. Masculino, Jhonil P. Cacho**, and ,**Mikee L Lutosquen** in partial fulfillment of there quirements for the degree of Bachelor of Science in Technology ,has been examined and is recommended for acceptance and approval.

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Accepted and approved by the Capstone Project Review Panel
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Others <state his/her contributions to your research**>;**

ABSTRACT

Title of research: TouchFind: A DIY Hardware application that combines point-of-sale, inventory management, and payment processing.

Researchers: Mikee L.Lutosquen
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Brandon Lee M. Masculino
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Degree: **Bachelor of Science in Technology**

Date of Completion:**<Month year of graduation>**

Keywords: **<keywords of your research>**

The abstract is a summary of the whole capstone project. It presents all the major elements of your work in a highly condensed form. It must be capable of substituting for the whole capstone project when there is insufficient time and space for the full text. Currently, the recommended size for abstract is 150 to 350 words. Usually a one-pager abstract is the most ideal. The structure of the abstract should mirror the structure of the whole capstone project, and should represent all its major elements. There should be one or more sentences assigned to summarize each chapter of your capstone project.

In the succeeding paragraphs, there should be no indentations, paragraphs are justifiedwith left alignment. Delete this highlighted section and replace it with your Abstract.

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INTRODUCTION

Project Context

Buying stuff for home fixups can be complicated and slow, mainly for those who don't know much about tools and stuff. Many people have a tough time picking the right things for their plans. Hardware stores have many items, and it's tough to select the best one. This can lead to upset, lost time, and buying the wrong things. Finding what you need when store folks are busy or can't help is even more challenging. Some shoppers like to look independently but still need help picking the right stuff. They might do the wrong things or take too long looking without good advice. And in the hardware store, there's a huge place where the location of shelves is; so that customers can find easily what they need. Workers have less assistance for helping consumers.

TOUCHFIND fixes this by using Product suggestion engine. It helps people find the top items they need. The system also handles sales, tracks what's in stock, and looks after payments, making shopping smoother for buyers and store owners. Using this in hardware shops makes customers happier, and the shop works better and easier. Lots of businesses already use this to improve their services and choices. TOUCHFIND will simplify shopping by suggesting the right items, saving people time, and helping shops better track stock.

This project will help people get the right stuff fast, cutting down on mistakes and things they don't need. As more folks do DIY and fix up their homes, a simple-to-use advice system like TOUCHFIND is convenient. It will also help hardware stores give better service and have fewer returns. By using Product engine to suggest items, TOUCHFIND makes shopping better. It makes people feel sure about what they buy and helps stores work well. In short, this project makes it a smarter and easier way to purchase hardware.

Purpose and Description of the Project

TOUCHFIND is a tool that helps people pick the right tech items with ease. It gives tips on products based on what you need, which makes shopping quicker and easier. It also has tracking sales and stock features to help shop owners run their places well.

This project stands out because it uses Product Discovery Module, cutting people's time looking for things. Unlike everyday shopping, where you depend on shop workers or guess what to buy, TOUCHFIND offers fast and correct tips. This makes it new and valuable in today's quick retail world.

The system is made to be easy. People can find what they need fast, and shop owners can watch sales and stock well. TOUCHFIND improves shopping, ensuring people get the right items while helping shops work smoothly.

Objectives of the Study

- To build a DIY hardware suggestion for product tips.
- To make a simple interface that guides users to the right products fast.
- To add a sales system that makes paying easier.
- To put in a stock tracking tool to help shop owners keep tabs on their items well.
- To boost how customers shop by cutting down time and improving product choice.
- To check how right and easy to use the systems.
- To make sure the system helps both buyers and store owners by making service and sales better.

Scope and Limitations of the Study

Objective:

Create TOUCHFIND, a Product Recommender System to enhance the shopping experience for hardware by DIY'ers, contractors, shelf locators, and regular customers.

Scope of the Study

- **Personalized Recommendations:** The system will provide recommendations on hardware products from user input, preference, and history of browsing, thus enabling customers to find tools and materials with ease.

- **POS System Integration**: TOUCHFIND will be integrated with the store'spoint-of-sale (POS) system to provide real-time inventory updates and enable customers to view the most current stock levels.

- **Payment Processing:** Payments will be accepted only at the retail counter, offering a safe and controlled checkout process.

- **User Interface Design:** The system will have a simple-to-use interface to enable customers to interact with the recommender system effectively.

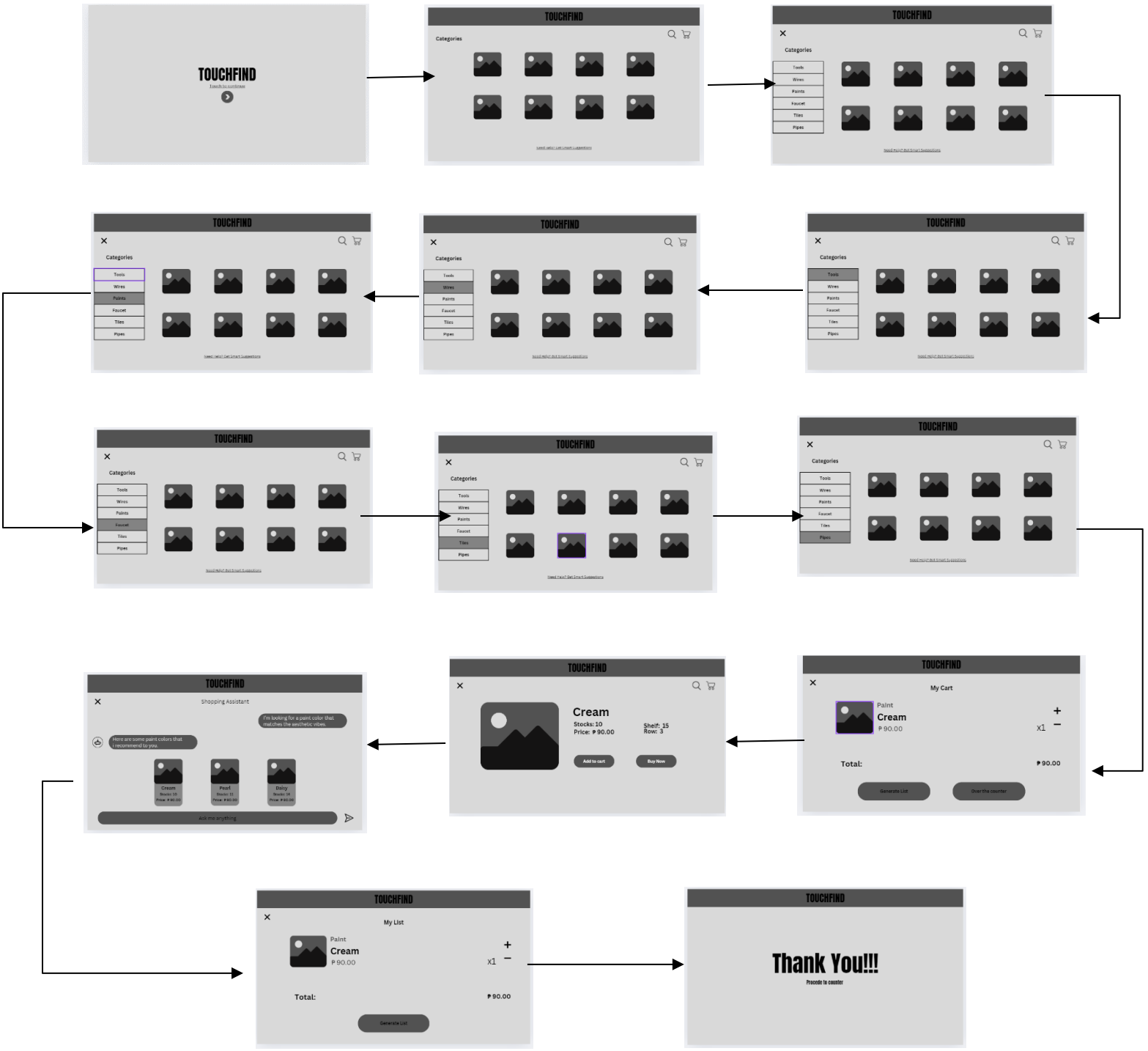
- **Application/System Integration:** The system will be integrated into the current retail setting, with it functioning smoothly with ongoing store operations.

Limitations of the Study

- Product suggestive cannot determined if more effective because its rely more on product availability of the store.
- Transaction modalities are constrained to over the counter interactions.
- Receipt access is limited to kiosk interface.
- Voice-based language adaptation is not implemented.
- Pre-purchase physical evaluation is not supported
- Our application just presents an item list; there are no transactions.

PROTOTYPE: HIGH LEVEL PROCESS DIAGRAM

FRONT END/USER:



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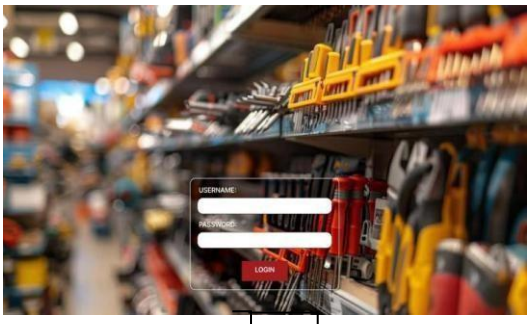
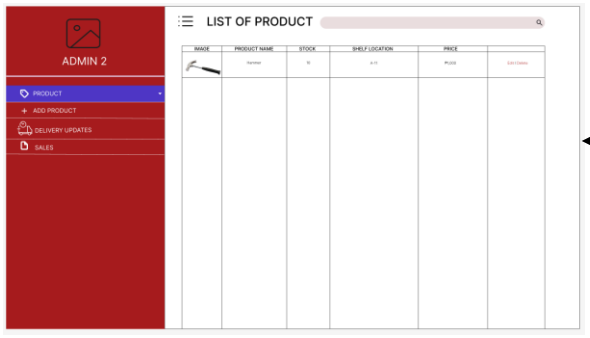
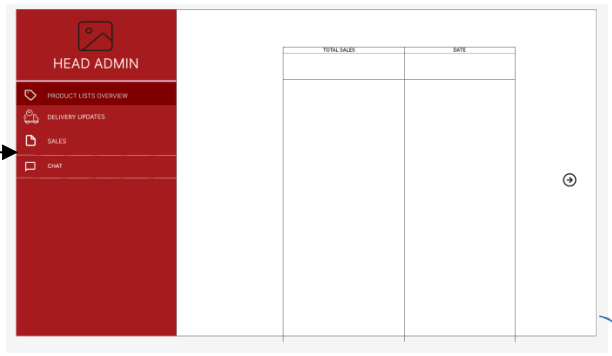
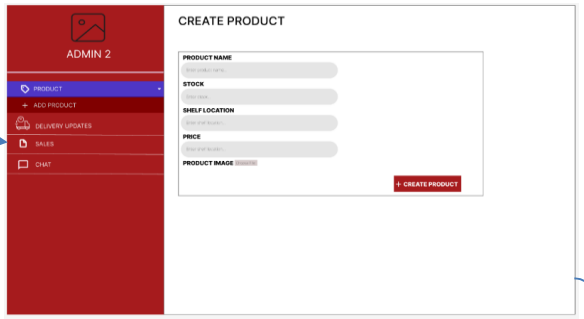
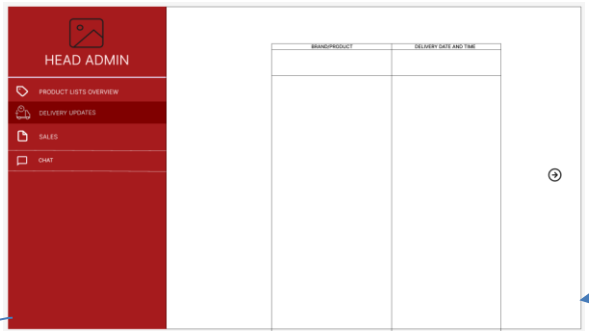
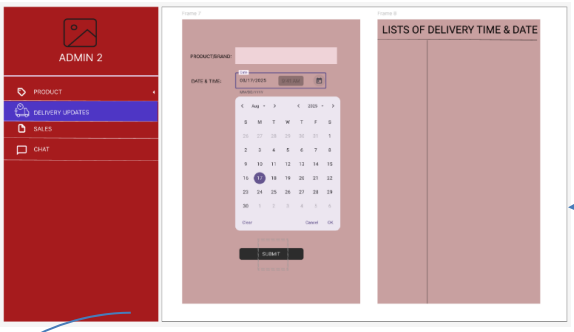


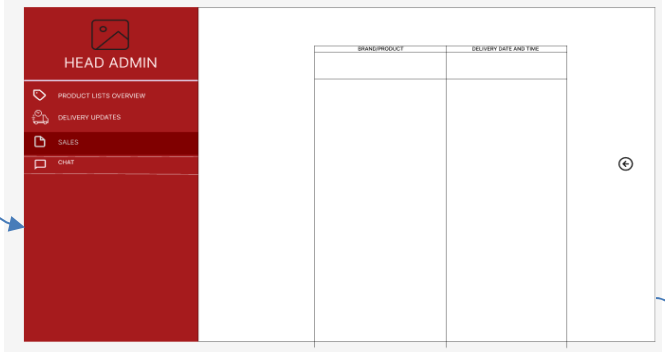


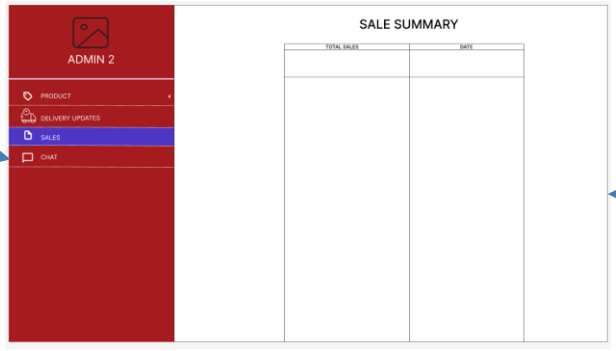


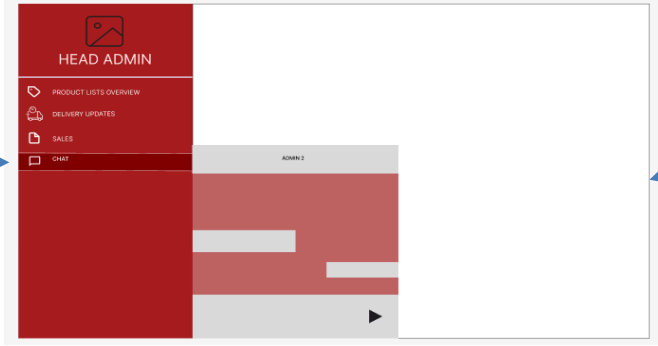




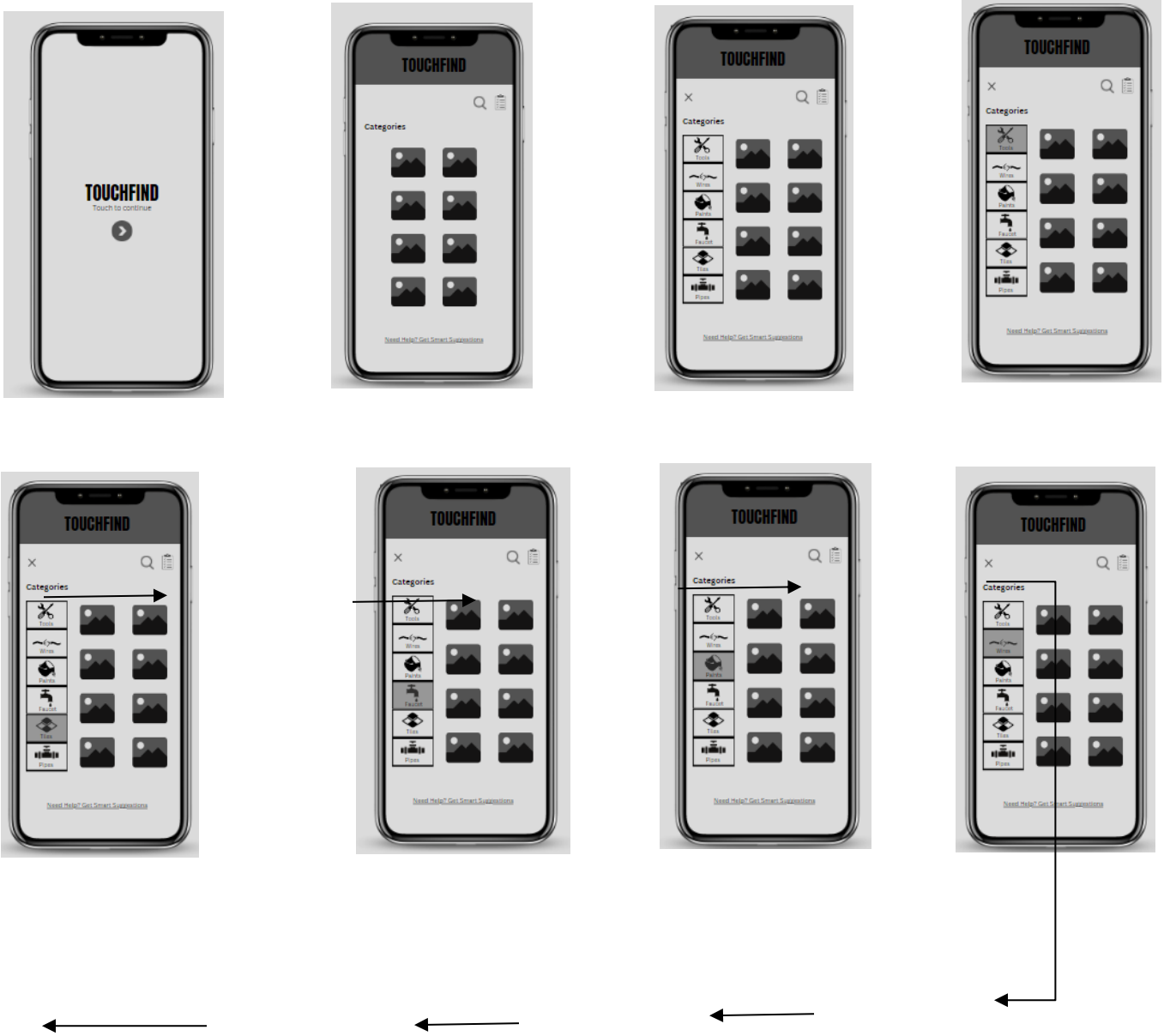








APPLICATION



REVIEW OF RELATED LITERATURE/SYSTEM

Review of Related Literature

Local

According to Sanico, Arguelles, and Melicio (2023), it is essential for every enterprise to regularly evaluate its business operations. Inventory management is a crucial aspect, ensuring businesses track stock levels and have the right number of products available when customers need them. It also helps prevent financial losses due to excessive stock.

The study examines how inventory management services can support small and medium enterprises (SMEs) in improving efficiency and productivity. It focuses on Sunbird School, Office Supplies, and Gift Shop, which served as the host enterprise. The business faced inventory management challenges, such as poor forecasting that led to overstocking. Storing products for

extended periods resulted in damage, making them unsellable.

According to Barcelona et al. (2024), inventory management is crucial for any business, especially in auto supply businesses, where maintaining optimal stock levels affects profitability and customer satisfaction. It involves tracking, ordering, storing, and selling stock. In auto supply businesses, effective inventory management ensures essential parts are available while avoiding excess inventory costs or stock outs.

The study analyzed inventory management practices in auto supply businesses in Candelaria, Quezon, surveying nine business owners/managers. Despite the small sample size, it represents a significant portion of the local industry and provides valuable insights.

According to Manares, Buñag, Occeña, and Villaluna (2019), the Central Philippine University Smart Touch Information Kiosk with Campus Navigation was designed to offer students fast and reliable access to academic and institutional information. These kiosks serve as

a digital hub where students can view their grades, university events, class schedules, major examination schedules, and the history of different colleges within the university.

According to Biblanias, Figurasin, Magno, and Marasigan (2019), the Web-based Emergency Vehicle Monitoring and Deployment System with GPS Locator and SMS Notification was designed to improve emergency response times and enhance communication between barangays. The study highlights the importance of real-time tracking and automated communication in optimizing emergency vehicle deployment. This is supported by research from Santos and Mendoza (2017), which emphasizes that integrating GPS tracking and mobile communication can significantly reduce response delays.

According to Francisco and Kalaw (2023), the Tourist Spot Locator Information System (LIST) was developed to assist tourists in finding the shortest route to their desired destinations using Johnson's Algorithm. The system aims to enhance local tourism by providing an efficient and user-friendly navigation tool, addressing the growing demand for real-time travel assistance.

Foreign

According to **Marico, J., Purnama, J., and Galinium, M. (2021)** in their study *Analysis of Open-Source Solution for Point of Sales Inventory Management System*, POS systems enable businesses to facilitate transactions between buyers and cashiers while also managing inventory, employee operations, and payment processing. The research aims to understand the impact of POS systems on businesses and determine their significance in enhancing operational efficiency.

The study highlights that while POS systems are widely used to improve business operations, their effectiveness depends on how well they align with the specific needs of a business. In one case, a food distributor was forced to close after several months due to the inefficiencies of a newly implemented POS system that was not designed for their industry. This emphasizes the importance of selecting a POS solution tailored to the business type and size to ensure sustainable operations.

According to **Lute, S. (2022)** in the study *Improving Retailers' Inventory Updates in an Online Shopping Platform: Establishing a Method for Real-Time Inventory Connection*, optimizing and supporting existing merchant portals is crucial for improving inventory updates in online shopping platforms. The research emphasizes the importance of real-time inventory integration, particularly for retailers who already have POS systems but lack proper synchronization with the platform. A bulk update solution is suggested as an efficient way to bridge this gap, benefiting both retailers and platform operators like Peddler.

The study highlights different types of retailers on the platform some with up-to-date POS systems and others without any inventory management system. The research explores methods to achieve direct integration for seamless inventory tracking. Additionally, it stresses the importance of user-friendly techniques, such as tablets and guided assistance, to enhance inventory management and streamline operations.

According to **Jambo, G. M. (2024)** in the study *Design of Point of Sales Application Using Design Thinking Approach at UKM Mart*, the rapid advancement of technology has

significantly transformed business operations, particularly in sales and inventory management. The study highlights how Point-of-Sale (POS) systems contribute to business efficiency by enabling faster and more accurate data management, improving bookkeeping processes, and simplifying operations for workers.

With the increasing reliance on digital marketplaces and online stores, businesses are no longer confined to local sales but can expand their reach through technology. The study references previous research emphasizing the impact of information technology on modern business operations, noting that digital integration provides added value and competitive advantages. The research suggests that POS applications, when designed effectively, can streamline sales processes and enhance overall business performance.

According to **Lawal, S. A. (2022)** in the study *A Critical Analysis of Point of Sales Types and Their Efficiency for Business*, Point-of-Sale (POS) systems play a crucial role in business operations by influencing consumer purchasing behavior and optimizing sale processes. Traditionally, businesses place POS systems near store exits to encourage impulse purchases, making them strategic tools for maximizing revenue.

The research highlights that modern POS systems encompass a wide range of features, including sales transaction management, inventory control, reporting, customer communication, and seamless integration with other business operations. Additionally, the

The study highlights the various functions of POS systems, including refining target marketing strategies, tracking supplier purchases, analyzing customer purchasing patterns, and generating reports for inventory management and reordering. Lawal categorizes POS systems into three main types: stand-alone electronic cash registers (ECRs), ECR-based network systems, and controller-based systems. While all these systems serve as sales and cash management tools, each offers unique features that cater to different business needs.

According to **Uriawan, W., Faroj, R. Z., Hadid, R. A., Khoirunnisa, S., Julianto, S., & Sopian, A. R. (2024)** in the study *Innovative Data Management Strategies in Point of Sale Application Development: Increasing Business Productivity*, effective inventory

management is essential when developing Point-of-Sale (POS) applications. The study emphasizes that maintaining an optimal inventory level is critical for business success. Insufficient inventory may lead to unfulfilled consumer demands and customer dissatisfaction, while excessive inventory can result in financial losses due to increased storage costs, depreciation of goods, and additional expenses in accounting and maintenance.

The study also highlights the dual impact of information technology on businesses, noting that while it enhances efficiency and customer service, it also introduces competitive challenges. POS systems are identified as vital tools in commercial services, improving transaction speed and overall business performance. Additionally, the research underscores the importance of using appropriate development methodologies, such as Agile Development, to create networked and efficient POS systems that align with business objectives.

According to **Asrani, H., Vishwakarma, S., Asrani, D., & Asrani, K. (2024)** in the study *Point of Sale System*, POS systems serve as essential tools for businesses by integrating hardware and software to facilitate transactions, manage inventory, and provide valuable operational insights. The study explores the evolution of POS systems, their technical functionalities, and the challenges businesses face in implementing them across various industries.

study discusses the benefits and challenges of POS system implementation and anticipates future advancements that could lead to more adaptable and innovative solutions.

According to **Raffik, R., Rakesh, D., Venkatesh, M., & Samvasan, P. (2021)** in the study *Supply Chain Control and Inventory Tracking System using Industrial Automation Tools and IoT*, supply chain management and inventory tracking are critical processes in various industries. Traditionally, sorting and tracking inventory relied on manual labor, which led to inconsistencies in quality and efficiency. To address this issue, the researchers developed an integrated system that combines Inventory Tracking and Supply Chain Control to enhance automation and efficiency.

The study highlights the role of Industrial Internet of Things (IoT**)** in optimizing inventory tracking and supply chain management. By utilizing IoT, businesses can reduce industry downtime, automate raw material ordering, and control production rates based on supply and demand data. This intelligent system improves overall operational efficiency and minimizes errors caused by manual processes.

According to **De Arco, S. B. (2024)** in the study *Developing the Inventory System with the Inputs from Front-end Staff: Analyzing Inventory System Challenges Faced by the Front-end Staff to Help in System Development*, an inventory system is a crucial tool for tracking stock, supplies, and sales throughout the supply chain. Companies rely on these systems to maintain accurate records of available items, their locations, and the movement of products entering or leaving the warehouse. This ensures proper stock management, organization, and accountability.

The study highlights that effective inventory management is essential for businesses aiming to optimize efficiency, reduce expenses, and maximize productivity. As companies expand and become more complex, a well-developed inventory system becomes necessary to regulate and oversee material flow within operations. Additionally, insights from front-end staff are valuable in identifying inventory management challenges, allowing for improvements in system design and functionality.

Related Studies and/or System

Local

According to Noble Roy Allan (2023), the study examined whether there was a significant difference between two groups of respondent's customers and employees in their assessment of the kiosk system. Additionally, it explored the challenges encountered while using the system and proposed solutions for improvement.

A total of 152 participants from Quezon City, Valenzuela, and Caloocan took part in the survey. Statistical tools such as percentage and frequency distribution, weighted mean, descriptive rating, and the Mann-Whitney U Test were used to analyze the data. The findings provide insights into enhancing self-ordering kiosk systems in quick-service.

According to Soliveres, Herrera, and Cedillo (2024), effective inventory management is essential for pharmacies to ensure a consistent supply of pharmaceutical products and prevent stock outs or overstocking, ultimately improving customer satisfaction. This study examined the inventory management practices of small-scale pharmacies in selected towns in Cavite, Philippines.

The study provides valuable insights for small-scale pharmacies to refine their inventory management practices, contributing to a more efficient product flow and better customer service.

According to Bautista Jr. and Young (2022), inventory management plays a critical role in supply and distribution management, especially in manufacturing companies. Effective inventory management ensures that stock levels are sufficient to meet customer demand without overstocking, preventing disruptions in business operations.

The study focuses on developing a reordering system template as a tool for replenishing inventory, achieving optimal stock levels, and optimizing truckload capacity. The research established a significant relationship between key inventory components, including desired inventory level, safety stock, replenishment cycle, lead time, and truckload maximization**.**

According to Peteza, Lopez, and Senorin (2024), the study examines the experience of deaf customers using McDonald's self-service kiosks in Cavite. Using the Technology Acceptance Model **(**TAM**),** the research assesses perceived ease of use, perceived usefulness, and behavioral intention after kiosk usage.

This quantitative study employed purposive sampling to select 110 respondents from the Federation of the Deaf-Cavite Province, Inc. The findings indicate that respondents strongly agree that kiosks provide clear images of menu items, making it easier for them to place orders. In terms of ease of use, respondents agree that the kiosks are user-friendly and the instructions are easy to understand. Respondents expressed intent to use the kiosks more in the future.

According to Rodriguez, Yambao, and Balagulan (2024), the study examined customer satisfaction among DLSU-CTHM students regarding the kiosk systems in fast-food chains in Dasmariñas, Cavite. It aimed to assess satisfaction levels based on reliability, assurance, empathy, and responsiveness while also exploring the relationship between customer satisfaction and demographic factors such as age and gender**.**

Using a descriptive research design and purposive sampling**,** the study surveyed DLSU-CTHM students who frequently used self-service kiosks in fast-food chains. Data collection was conducted through a modified DINESERV questionnaire**,** and statistical tools were applied for analysis.

Foreign

According to **Kyung Hwa Seo (2020)** on their Study on the *Application of Kiosk Service as the Workplace Flexibility: The Determinants of Expanded Technology Adoption and Trust of Quick Service Restaurant Customers*, this presents fundamental data on the technology acceptance of kiosks in QSR (Quick Service Restaurants) and the marketing plans for efficient management performance. This study was evaluated by 303 customers with experience using QSR kiosks. It was also found that facilitating conditions and price value have a significant positive effect on trust. Lastly, trust has a significant positive effect on performance expectancy and behavioral intentions.

The study aims to provide data on Kiosk's marketing strategy plan leading to customer behavioral intentions to QSR's manager. There is a need to first identify the independent factors involved in customers' behavioral intentions based on the UTAUT2 model. It reviews the notion that perceived trust of kiosks is a key factor for determining customer technology acceptance. By integrating the UTAUT2 model and trust, this study presents an extended UTAUT2 model of QSR. This extended model offers guidance to managers for creating the most effective strategies to gather new customers and retain loyal customers, and these actions will help with the successful performance of QSR.

According to **ARUMUGAM NAIDU, J., RAVI KUMAR, S., MUHAMAD SHAMBUDIN, U. N., & MASANDIG, H. (2024)** in their study *Dynamic Bookstore Self-Ordering Kiosk System. Multidisciplinary Applied Research and Innovation, Kiosks* are becoming increasingly popular in various industries because they allow customers to order for themselves and streamline business operations. This project explored the benefits of implementing kiosk systems in a bookstore to increase efficiency, improve the customer experience, and reduce operating costs. The goal of the kiosk system is to develop a self- order kiosk that allows customers to browse, purchase, and check out books without the assistance of an employee.

Implementing a kiosk system in a large bookstore holds tremendous potential for improving the customer experience, simplifying operations, and achieving cost savings, according to the results of the project testing. The results also indicate that efficiency, ease of use, time savings, and speed of browsing result in numerous customers using the kiosk system is noticeable. Future improvements include the implementation of popular mobile payment systems such as Apple Pay or Google Pay should be included to meet the increasing desire for digital payment methods and increase customer satisfaction.

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