RideSmart: A Personalized Motorcycle Product Recommendation System Using TF-IDF and Descriptive Analytics for Javidson Motorshop

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ABSTRACT

RideSmart is a web-based tool designed to provide JavidsonMotorshop clients with personalized product recommendations, including appropriate motorcycle parts, accessories, and services. To create recommendations that are specific to each user, the system examines purchase histories, product qualities, and consumer preferences using TF-IDF (Term Frequency–Inverse Document Frequency) and descriptive analytics. Compared to generic promos, this not only expedites and enhances the shopping experience but also provides insights into consumer behavior, including demand trends, buying habits, and popular products, which aid the store in improving its marketing and stocking plans. The RideSmart recommendation system for JavidsonMotorshop uses TF-IDF to extract key features and keywords from customer reviews and searches, enabling personalized motorcycle product suggestions that improve purchase decisions and customer experience (Huang, 2025). Descriptive analytics complements this by analyzing historical sales, browsing behavior, and product interaction data to identify trends and patterns, supporting data-driven marketing and inventory management (Harvard Business School Online, 2021). Together, these approaches allow the system to tailor recommendations to individual preferences, enhancing sales efficiency and operational effectiveness (Sigma Computing, 2025; MEEGLE, 2025).Laravel, a PHP framework, Python, MySQL, and front-end technologies (HTML, CSS) are used in the technical implementation of RideSmart. Functionality (accurate product details and seamless search, cart, checkout, etc.), reliability (availability and recovery from errors), efficiency (page load speeds, resource usage, handling many users), usability (intuitive navigation, responsive controls, design), and portability (ease of deployment on other servers or in other locales) were the main dimensions that were examined in order to assess its quality using the ISO 25010 standard. Both "technical" and "user" respondent groups evaluated the system: technical respondents emphasized functionality, dependability, and performance, particularly the accuracy and pertinence of recommendations made possible by TF-IDF and analytics, while users prioritized usability, acceptability, and enhancements to day-to-day operations (particularly streamlining product search and enhancing customer satisfaction). The evaluation provides a fair perspective because the respondents are a combination of about 60% users and 40% technical stakeholders. Although there is room for improvement, overall, the results show that RideSmart is technically sound, practically helpful, and effective in real-world situations. Among the suggested enhancements are enhancing and preserving theunderlying data (for both products and users), integrating diagnostic or external tools for more precise compatibility, allowing recommendation adjustments based on a customer's mechanical expertise, broadening the product database, adding multilingual support, incorporating user feedback into the recommendation loop, and creating a mobile-friendly version to extend reach and usability.

Keywords: Recommendation system, PHP, MySQL, ISO 25010, Agile SDLC, RideSmart, Web-Based, Descriptive Analytics, System Efficiency.

INTRODUCTION

The motorcycle industry has experienced robust growth, fueled by riders' enthusiasm for customizing their bikes to elevate performance, comfort, and style. A booming aftermarket parts market — covering upgrades like

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exhausts, suspension kits, engine modifications, brakes, and aerodynamic components — gives riders vast options. Yet the overwhelming variety often makes it difficult for individuals, especially those with limited technical knowledge, to determine which products best suit their specific models and riding goals. Traditional selection methods—manual research, trial-and-error, or generic advice—can be time-consuming, inefficient, and even risky, underscoring the need for a better-matched recommendation system.

Enter RideSmart, an intelligent recommendation platform crafted for JavidsonMotorshop's clientele. It marries natural language processing, specifically TF IDF, with descriptive analytics to align customer-inputted preferences (like desired ride feel or performance attributes) with detailed product data. By parsing and weighing relevant keywords from user text, RideSmart measures compatibility against product specs, while also accounting for trends gleaned from historical sales and browsing behavior. Built on a content based filtering model focused on item attributes rather than behavioral data, the system offers personalized, technically sound parts suggestions. This not only enhances the customization experience—helping riders safely make data-driven decisions—but also supports business intelligence efforts at JavidsonMotorshop, improving efficiency, customer satisfaction, and competitive positioning.

To address this gap, RideSmart proposes an intelligent solution that leverages machine learning techniques to guide riders in selecting the right products for their needs. The system employs a content-based filtering approach, which analyzes the detailed attributes of both motorcycle models and performance parts such as technical specifications, compatibility, and performance metrics to generate personalized product recommendations. By focusing on the built-in features of each item, the system avoids reliance on large volumes of user interaction data and instead provides tailored suggestions based on the user's motorcycle and their specific performance objectives.

This research aims to design, develop, and evaluate the effectiveness of the Ride Revolution system in improving the decision-making process for riders. The study explores key aspects such as feature extraction, similarity computation, and the integration of domain knowledge in the recommendation algorithm. Ultimately, RideSmart seeks to enhance the motorcycle customization experience, empowering riders to make informed, data-driven choices that lead to safer and more effective performance upgrades.

In one study, Johari, M. Z. F., &Laksito, A. D. (2021). The Hybrid Recommender System of the Indonesian Online Market Products using IMDb weight rating and TF IDF. This study describes a hybrid recommendation engine combining TF IDF features (from product descriptions) with IMDb-style weight ratings, using both demographic filtering and content based analysis to produce more relevant suggestions in an Indonesian e commerce setting. Another study is [Anonymous authors] (2021). Decision Making System in Online Marketplace using TF IDF Algorithm in Indonesia: A Micro Analysis of Vespa Spare Parts. This study focuses specifically on recommending spare parts for Vespa (motor scooter) via content-based filtering powered by TF IDF. The system matches buyer queries to product descriptions to improve relevance and ease of search in a niche marketplace setting

Cognitive abilities refer to an individual's overall mental capacity—encompassing skills like reasoning, planning, and problem solving. They enable one to engage in abstract thinking, grasp intricate concepts, pick up new information swiftly, and learn from past experience.

Founded with a mission to deliver quality motorcycles and exceptional service, JavidsonMotorshop has grown steadily over the years. However, the company now faces modern challenges, including increasing competition, a rapidly expanding product catalog, and evolving customer expectations in the digital age. The manual approach to customer assistance has proven inefficient for keeping up with the growing volume of product inquiries and personalized needs. These limitations highlight the urgent need for an intelligent recommendation system like RideSmart. By implementing this solution, JavidsonMotorshop aims to enhance operational efficiency, improve customer satisfaction, and stay competitive in a tech-driven marketplace.

By relying on a fully manual system to handle customer inquiries, JavidsonMotorshop has struggled to manage the increasing volume of questions about products and individual customer needs. This strain underscores the need for a smarter solution—like RideSmart—that leverages intelligent recommendations. Adopting this

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technology will help JavidsonMotorshop streamline day-to-day operations, boost customer satisfaction, and maintain a competitive edge in today's technology-driven market.The primary objective of this study is to develop and implement a content-based recommendation system for Ride Revolution, an online motorcycle shop, to enhance customer experience and improve motorcycle performance customization.

Specific Objectives

- To design and develop a recommendation algorithm that suggests motorcycle parts, accessories, and upgrades based on user preferences, purchase history, and product features.
- To improve the accuracy and relevance of product suggestions by leveraging content-based filtering techniques, focusing on item attributes such as compatibility, performance benefits, and customer reviews.
- To increase user engagement and satisfaction by providing personalized shopping experiences tailored to individual rider needs and motorcycle types.
- To optimize motorcycle performance by guiding users toward appropriate parts and enhancements that align with their specific riding style and vehicle specifications.
- To use ISO 25010 standards in the evaluation of the web-based system in terms of:

    1. Functional Suitability
    2. Usability
    3. Reliability
    4. Security
    5. Maintainability
    6. Portability

Scope

The following are the scope of the study:

- Integration of a content-based filtering algorithm into the Ride Revolution e-commerce platform.
- Collection and utilization of product data (brand, type, compatibility, specifications) and user input (browsing history, previous purchases, preferences).
- Personalized product recommendations aimed at improving both user experience and motorcycle performance.
- Evaluation of the system's performance using key metrics such as recommendation accuracy, relevance, and user satisfaction.
- Recommendation of products based on the algorithm and specifications of the motorcycle.
- Personalization form where the user can fill up the brand, and other specifics of their motorcycle.
- User registration and login (Users can register using Email and password)
- Shopping cart and checkout process (Add products to cart, update product quantity, and remove individual products to cart)
- Order tracking and history (a list of all past orders with order date and total amount.)

List of Reports Generated within the System:

- products – count of all items in the catalog
- motorcycle_types – count of motorcycle type records
- users – total registered users
- sales – amounts & status used for the Sales card, revenue bar-chart, and order-status donut

LIMITATION

The limitations are:

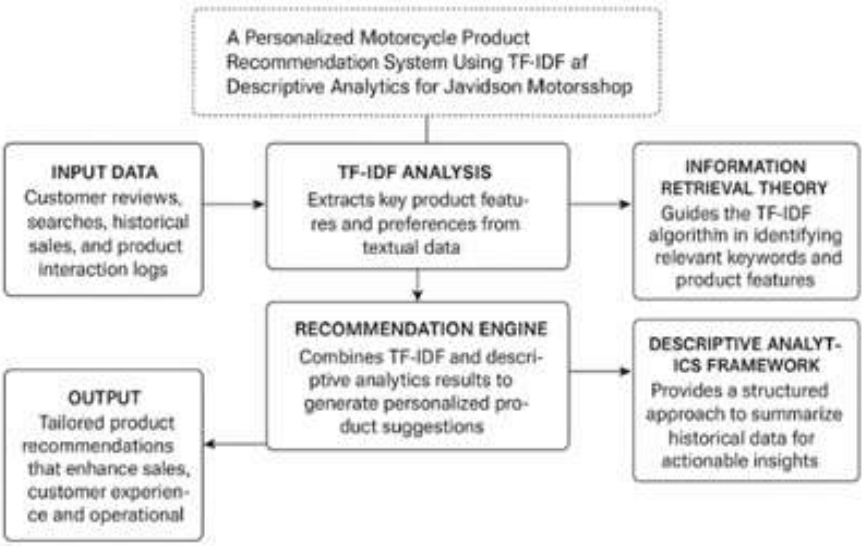
- The accuracy of recommendations is highly dependent on the completeness and consistency of the product and user data.

- The system recommends parts based on general compatibility and performance indicators but does not account for real-time technical diagnostics or user mechanical expertise.

THEORETICAL FRAMEWORK

The RideSmart recommendation system for JavidsonMotorshop uses TF-IDF to extract key features and keywords from customer reviews and searches, enabling personalized motorcycle product suggestions that improve purchase decisions and customer experience (Huang, 2025). Descriptive analytics complements this by analyzing historical sales, browsing behavior, and product interaction data to identify trends and patterns, supporting data-driven marketing and inventory management (Harvard Business School Online, 2021). Together, these approaches allow the system to tailor recommendations to individual preferences, enhancing sales efficiency and operational effectiveness (Sigma Computing, 2025; MEEGLE, 2025).

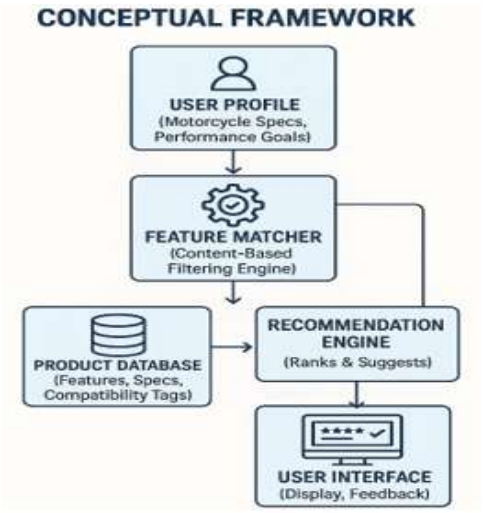
Figure 1: The Theoretical Framework



The diagram presents a personalized motorcycle product recommendation system that uses TF-IDF and descriptive analytics to generate tailored suggestions. It starts by collecting customer data such as reviews, searches, and sales records. The TF-IDF analysis identifies key product features, while descriptive analytics interprets historical data to reveal trends. These combined insights feed into the recommendation engine, which outputs personalized product recommendations to enhance sales and customer satisfaction.

CONCEPTUAL FRAMEWORK

Figure 2: The Conceptual Framework



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This diagram represents a conceptual framework for a personalized motorcycle product recommendation system. Let's break it down step by step:

User Profile: Contains information about the user, such as motorcycle specifications (bike model, engine type, etc.) and performance goals (speed, fuel efficiency, style preferences). This acts as the input that guides the recommendation process.

Feature Matcher (Content-Based Filtering Engine): This module analyzes the user profile and matches it with the features of available products. Uses content-based filtering, which means it compares attributes (like specifications or tags) of products with the user's preferences to find relevant matches.

Product Database: Stores all motorcycle-related products with detailed features, specifications, and compatibility tags. Serves as the source of data for recommendations.

Recommendation Engine: Receives input from the feature matcher and the product database. Ranks and suggests products that best match the user's profile. Essentially, it decides which items are most suitable for the user.

User Interface: Displays the recommended products to the user.

Allows the user to give feedback, which can further improve future recommendations.

Significance of the Study

This study is significant as it evaluates the effectiveness, usability, and overall quality of the Personalized Motorcycle Product Recommendation System, providing insights for both practical application and future improvements.

Use Categories: Users: Shop owners, staff members, and system users (motorists and IT/CS students) benefit from the study by understanding how the system meets their daily operational and purchasing needs.

Technical People: IT professionals gain insights into the system's technical performance, reliability, and portability, helping guide maintenance and optimization strategies.

Future Research: The study serves as a reference for future researchers to enhance recommendation systems, explore new algorithms, and address emerging user and technical requirements.

Review of Related Literature

Globally, the motorcycle industry continues to grow, driven by increasing urbanization, rising fuel prices, and the demand for efficient transport in both developed and developing countries (Motorcycle Data, 2023). In parallel, the market for performance-enhancing motorcycle products has expanded, as riders seek improvements in speed, handling, fuel efficiency, and aesthetics. The complexity and variety of available products have increased the need for intelligent systems that can assist riders in making informed choices (Bianchini et al., 2020).

Several international e-commerce platforms, such as RevZilla in the United States and Motoin in Europe, already use basic recommendation engines to suggest motorcycle gear and performance parts. However, these systems often lack deep personalization, particularly when it comes to nuanced rider preferences or specific performance goals (Chen & Zhang, 2020). As such, a more sophisticated content-based recommendation system could fill this gap by integrating user behavior, product reviews, and detailed technical specifications.

To overcome the limitations of individual recommendation approaches, hybrid systems combine multiple techniques, such as content-based and collaborative filtering. These systems leverage the strengths of each method to provide more accurate and diverse recommendations. For example, a hybrid recommendation system integrating content-based filtering with collaborative prediction using artificial neural networks demonstrated improved accuracy and precision in product recommendations (Shao, 2022). Moreover, hybrid systems have

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been effective in addressing challenges like data sparsity and cold-start problems by utilizing both user behavior data and item attributes (Çano&Morisio, 2019).

The Philippine motorcycle industry has experienced significant growth in recent years, with motorcycles becoming a preferred mode of transportation due to their affordability and efficiency in navigating congested urban roads (Land Transportation Office [LTO], 2023). According to the Department of Trade and Industry (DTI), the motorcycle market in the Philippines has seen an average annual growth rate of 7%, driven by both personal and commercial usage (DTI, 2022). This increase has led to a rising demand for performance-enhancing motorcycle parts and accessories.

Content-based filtering has shown potential in improving user satisfaction in recommendation systems by leveraging product metadata and user preferences (De Guzman & Reyes, 2022). In the context of motorcycle product recommendations, this means analyzing features such as brand, model compatibility, performance specifications, and user reviews. A locally-developed system that incorporates this method can offer targeted recommendations, especially when integrated with indigenous knowledge from Filipino riders' behavior and preferences.

The integration of recommendation systems in digital platforms enhances user experience by providing personalized suggestions. Lecaros and Khan (2022) developed Project ATHENA, a hybrid recommendation engine combining content-based filtering and collaborative filtering techniques. Although their study focused on academic resources, the methodologies employed can be adapted for recommending motorcycle products based on user preferences and behaviors.

Synthesis

The motorcycle industry, both globally and locally, continues to grow due to urbanization, rising fuel costs, and the increasing demand for efficient transport. Alongside this growth is the rising interest in performance-enhancing motorcycle parts, creating a need for intelligent recommendation systems to help users navigate a complex and expanding product market. While international platforms like RevZilla and Motoin offer basic recommendation engines, they often lack deep personalization, prompting the development of more advanced content-based and hybrid systems. Studies have shown that combining content-based filtering with collaborative techniques—especially using AI models like neural networks—can enhance recommendation accuracy, solve data sparsity issues, and adapt to user behavior over time.

Research from countries such as Malaysia and the United States demonstrates the effectiveness of content-based systems in automotive and motorcycle-related recommendations. These systems prioritize compatibility, technical specifications, and evolving user preferences—factors highly relevant to personalized motorcycle recommendations. Locally, the Philippine motorcycle market has seen significant expansion, increasing the demand for smarter product recommendation tools. Content-based filtering has proven valuable in improving user experience, especially when tailored to Filipino riders' behavior and preferences. Projects like ATHENA and Viajefy highlight the adaptability of hybrid and TF-IDF–based systems in local contexts, while descriptive studies on consumer satisfaction further support the integration of product quality, pricing, and promotion in predictive modeling. Overall, both foreign and local findings reinforce the potential and relevance of RideSmart's approach, which blends TF-IDF, user behavior, and descriptive analytics to offer personalized motorcycle product recommendations.

METHODOLOGY OF THE STUDY

Research Design

This study employs both developmental and applied research designs to create and evaluate the RideSmart recommendation system. The developmental phase focuses on designing, implementing, and testing a prototype that applies content-based filtering to generate accurate and personalized motorcycle product recommendations.

Guided by the ISO/IEC 25010 software quality model, the system is assessed based on functionality, usability, reliability, and performance efficiency to ensure it meets user needs and quality standards.

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Data Collection

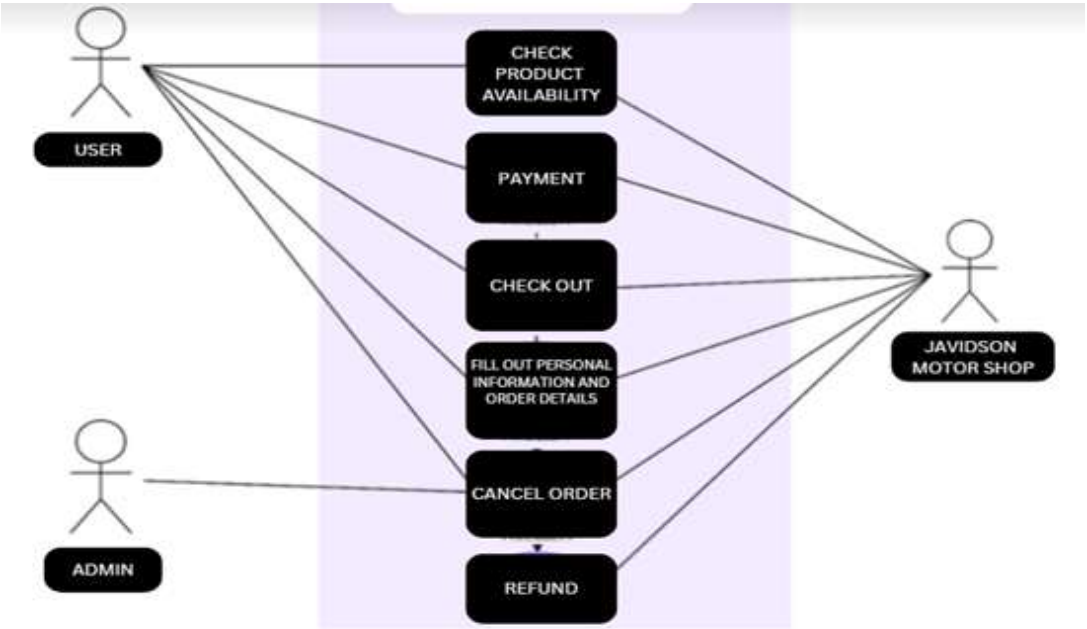
Primary data were gathered directly from Javidson Motorshop's management, staff, and customers through interviews, surveys, and observations. Interviews provided insights into the sales process, customer interactions, and common challenges in offering personalized product suggestions. Surveys and observations helped identify customer preferences, buying behavior, and browsing patterns, which served as the foundation for designing the recommendation system. After the system development, the personalized motorcycle product recommendation system was evaluated based on ISO 25010 standards. Its functionality, reliability, efficiency, usability, and portability were assessed to ensure it met user and business requirements effectively. The evaluation confirmed that the system could provide accurate recommendations, operate consistently, perform efficiently, and offer a user-friendly and portable experience.

Software Methodology

Figure 3: SDLC Agile Model

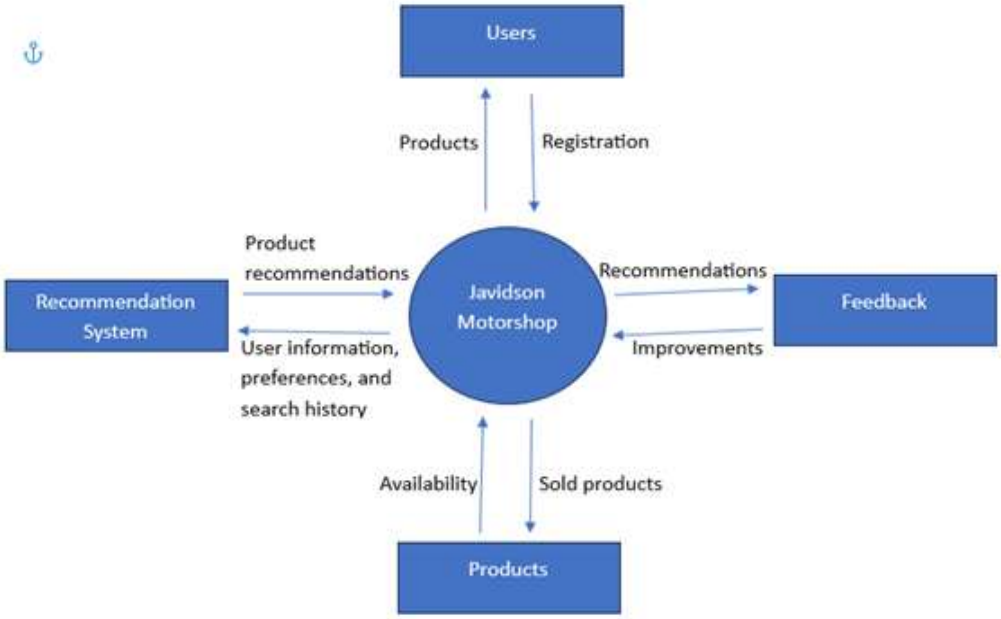
The development of the system follows the System Development Life Cycle (SDLC) using the Agile methodology to ensure a structured yet flexible approach. Each phase—planning, analysis, design, implementation, testing, and maintenance—plays a crucial role in building a robust and efficient system. The planning and analysis stages focus on gathering requirements and understanding user needs to guide effective system design. During the design and implementation phases, developers construct the system architecture, write code, and integrate features to achieve project goals. Finally, through continuous testing and maintenance, the team ensures the system remains stable, reliable, and adaptable for long-term use.

Figure 4: Use Case Diagram



UML Diagram: diagram illustrates the system's structural and behavioral design, showing how different components interact within the personalized recommendation system. It includes use case, class, and sequence diagrams that define user interactions, data flow, and system processes. This visual representation ensures clear communication between developers and stakeholders, promoting organized and efficient system development.

Figure 5: Data Flow Diagram



Data Flow Diagram (DFD): presents the logical flow of information within the recommendation system, from user input to product recommendation output. It highlights how data is processed through components such as the user profile, feature matcher, and recommendation engine. The DFD ensures a clear understanding of data movement, system boundaries, and functional relationships among processes.

Database Function: The database serves as the central repository that stores user profiles, motorcycle specifications, and detailed product information for analysis and recommendation. It supports data retrieval for TF-IDF processing and descriptive analytics, ensuring accurate and efficient generation of personalized suggestions. The database design prioritizes data integrity, scalability, and quick access to enhance the overall system performance and reliability.

Respondents

A total of 101 respondents participated in the evaluation of the system based on ISO 25010 standards. The group consisted of 1 shop owner, 2 staff members, 88 users (motorists and IT/CS students), and 10 IT technical professionals. They assessed the system's functionality, reliability, efficiency, usability, and portability to ensure it met both user expectations and technical standards.

Development and Evaluation Procedure

Development Tools

Throughout the system's development, the following technologies and tools were used for version control, coding, testing, and deployment, which together defined the development environment:

- Development Environment Frameworks: PHP, HTML, CSS
- Database: MySQL Full-Stack
- Framework: Livewire Code
- Editor: Visual Studio Code
- Survey: Google Form

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Hardware Used / System Requirements The hardware listed below supported the development of the Personalized Motorcycle Product Recommendation System:

- Minimum Computer Specifications
- Processor: Intel or AMD, minimum 2.0 GHz Dual-Core
- RAM: 4 GB or higher
- Storage: 500 GB HDD or SSD
- Display: 720p resolution (1280 x 720 pixels) or higher
- Connectivity: Web browser with internet access

Evaluation Process

Evaluation is the process of completely appraising a product by acquiring and analyzing information about its actions, characteristics, and results. Forming opinions about the product, improving its efficacy, and assisting in related decision-making are the objectives. Patterson (1987). Two methods of evaluation were used in the study. While the second looked at the application's overall usefulness and technical performance, the first concentrated on gauging user happiness and simplicity of use. Despite using two approaches, the assessment is conducted using a single evaluation form that is based on ISO 25010 standards. The system is assessed in this study to meet the ISO 25010 requirements, including:

Functionality

- Accuracy of Functionality: Are all product details, prices, and inventory accurate?
- Completeness of Functions: Can users browse, search, add to cart, and complete checkout?

Reliability

- Availability: Is the website accessible 24/7 without downtime?
- Fault Tolerance: Does the system recover gracefully from unexpected errors?

Efficiency

- Response Time: Does each page load within an acceptable time?
- Resource Utilization: Is the website optimized to use minimal server and bandwidth resources?
- Scalability: Can the system handle a large number of concurrent users?

Usability

- Learnability: Can a first-time user navigate the site easily?
- Operability: Are interactive elements like buttons and forms intuitive and responsive?
- User Interface Aesthetics: Is the design clean, appealing, and brand-consistent?

Portability

- Installability: Can the website be deployed easily on another server or host?
- Adaptability: Can the system be customized for new locations or services?

Data Analysis Plan

The statistical instruments employed in the study to guarantee precise and insightful analysis of the gathered data are described in this part. The study employed the following statistical tools: 1. The weighted mean A statistical method for gauging the degree of agreement or disagreement among different questionnaire questions or assertions is the weighted mean, sometimes referred to as the average mean. Each item's weighted mean is determined by multiplying its weighted points by the matching frequency or sample size, then adding the results. Next, this sum is split by the total number of responders.

In quantitative research and evaluations, a Likert scale is a data gathering technique used to gauge people's

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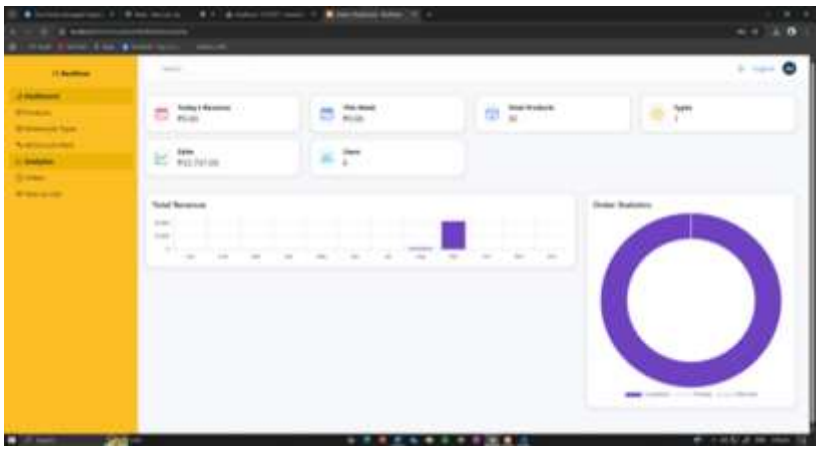
attitudes, beliefs, or views. In order to facilitate statistical analysis, it asks respondents a sequence of statements or questions, each of which has a set of response possibilities with numerical values assigned to them. A 4-point Likert scale is used in this study, with values allocated from 4 for "strongly agree" to 1 for "strongly disagree." Normally, a Likert scale goes from "strongly agree" to "strongly disagree." The table below shows the 4-point Likert scale used in the study.

The System

The study developed an application called RideSmart: A Personalized Motorcycle Product Recommendation System Using TF-IDF and Descriptive Analytics for JavidsonMotorshop, designed to provide customers with personalized motorcycle product recommendations. By utilizing TF-IDF and descriptive analytics, RideSmart analyzes customer preferences, purchase history, and product information to suggest the most suitable parts, accessories, or services, offering a more efficient and satisfying shopping experience. It also assists JavidsonMotorshop in understanding customer behavior by identifying buying trends, popular products, and demand patterns, helping improve inventory and marketing strategies. Built using Laravel (PHP Framework), Python, MySQL, HTML, and CSS, the system was assessed using ISO 25010 standards, ensuring quality in functionality, reliability, efficiency, usability, and portability.

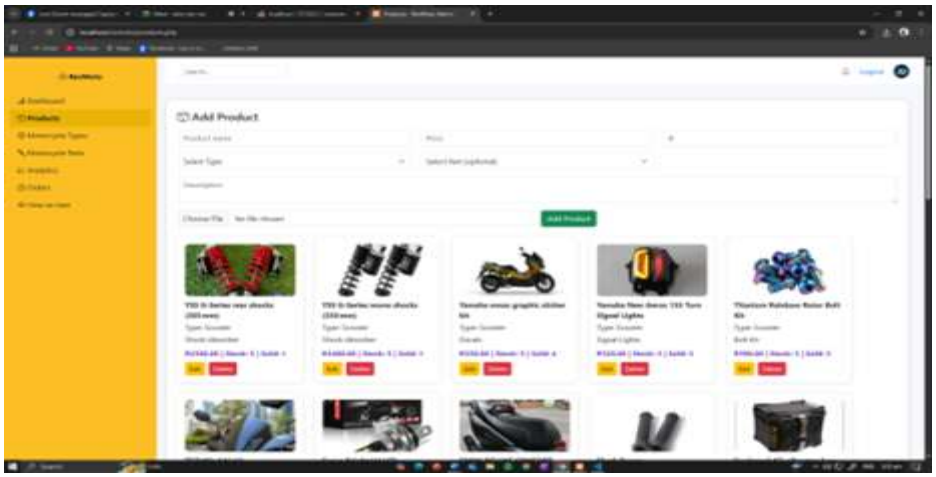
1. User Dashboard (Revenue Overview) – This interface displays the motorshop's revenue from the past few months, giving administrators a clear and organized view of financial performance. It helps in tracking sales trends and making data-driven business decisions.

Figure 1.



2. Product Management Panel – This section shows all available motorcycle products, allowing staff to easily monitor inventory, update product details, and manage stock levels efficiently to ensure smooth operations and customer satisfaction.

Figure 2.



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Assessment: Summary Of Respondents On The System.

Table 1.

Criteria (ISO25010)	Respondents (101)			
	Users (91) staff & owner included		Technical (10)	
	WM	VI	WM	VI
1. Functionality	3.53	Strongly Agree	3.53	Strongly Agree
2. Reliability	3.54	Strongly Agree	3.58	Strongly Agree
3. Efficiency	3.54	Strongly Agree	3.54	Strongly Agree
4. Usability	3.55	Strongly Agree	3.48	Strongly Agree
5. Portability	3.43	Strongly Agree	3.68	Strongly Agree
Overall Average Mean	3.52	Strongly Agree	3.56	Strongly Agree

The ISO 25010 evaluation table demonstrates that the Personalized Motorcycle Product Recommendation System was highly rated by 101 respondents, including both users and technical experts. All evaluated criteria—Functionality, Reliability, Efficiency, Usability, and Portability—received "Strongly Agree" ratings, indicating that the system performs its intended functions correctly and consistently. Users and experts both found the system efficient, completing tasks within acceptable time and resource constraints, while also being user-friendly and easy to navigate. Portability received slightly higher ratings from technical experts, suggesting confidence in the system's adaptability to different environments. Overall, the system's average ratings confirm it meets ISO 25010 quality standards and is considered highly acceptable by both user groups.

Ethical Considerations

The study guarantees the confidentiality and integrity of the data obtained from participants. Information provided by respondents is secure, and no personally identifiable information is shared without permission. Respondents are allowed to leave the study at any moment without facing any repercussions, in accordance with the principles of voluntary participation. Strict adherence to data security protocols guards against misuse and illegal access to information. Lastly, in order to preserve the study's integrity, all results are presented truthfully and accurately, free from prejudice or manipulation.

Summary

To provide more precise motorcycle part recommendations, a web-based application called the Personalized Motorcycle Product Recommendation System was created. The primary aim of this system is to precisely suggest to motorbike owners which parts are suitable with their vehicles. Users and technical respondents assess the application's acceptability and usefulness using the ISO 25010 evaluation format. Because this service develops an online recommendation system with an intuitive design, it is important for both motorbike users and motorshop owners. For the client, it lowers the chance of motorbike parts being incompatible.

CONCLUSION

In summary, the comparison of the technical and user respondents' assessments demonstrates that the system is thoroughly evaluated, placing equal weight on its technical performance and practical applicability. The user group highlighted the system's acceptance, usefulness, and benefits for day-to-day shop operations, pointing out

how it improves customer experiences and streamlines product searches. The technical respondents, however, concentrated on assessing the system's overall effectiveness, functionality, and dependability. They verified that the system's TF-IDF and analytics functions provide precise and pertinent recommendations. The results offer a well-rounded perspective because of the balanced representation, which includes 60% user respondents and 40% technical respondents. Overall, the results demonstrate that the system is not only sound technically but also advantageous and successful in practical applications, making it a useful tool for JavidsonMotorshop and other shops of a similar nature. They also highlight areas that could use more development and improvement.

RECOMMENDATION

To enhance RideSmart's capabilities, integrating hybrid recommendation models combining collaborative filtering with machine learning algorithms would significantly improve prediction accuracy beyond TF-IDF limitations. Incorporating real-time diagnostic data through VIN-based compatibility checking and continuous user feedback loops would strengthen personalization and system intelligence. Expanding implementation across multiple motorshops and diverse motorcycle brands would validate generalizability and robustness across varied market contexts. Developing mobile-responsive interfaces is essential for contemporary user accessibility and on-the-go purchasing scenarios. Finally, conducting rigorous comparative analyses against established recommendation systems using standardized metrics (precision, recall, conversion rates) would provide empirical validation of RideSmart's competitive advantage and justify broader industry adoption.

By improving the accuracy of its recommendations through more thorough and consistent product and user data management—such as incorporating frequent data updates and validation procedures—"RideSmart: A Personalized Motorcycle Product Recommendation System" should be improved in order to overcome its present limitations. The system should be improved to incorporate real-time technical diagnostics or integration with external diagnostic tools for more accurate and situation-specific recommendations in order to get beyond the dependence on universal compatibility. It may also be possible to incorporate features that take into consideration the user's degree of mechanical competence, providing both basic and advanced recommendations suited to various user profiles. Expanding the product database, adding language support for greater accessibility, integrating user comments into the suggestion process, and creating a mobile-friendly version of the system to increase usability and reach are additional potential enhancements. These improvements would optimize the system's total value for both technical and non-technical applications, in addition to improving its dependability.

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