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WhatsApp Chatbot for Electric Bike Showroom Inquiry Portal

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ABSTRACT:The electric bike business requires novel consumer engagement solutions, driving the creation of an intelligent WhatsApp chatbot for showroom encounters. The chatbot uses Laravel PHP (backend), HTML, CSS, and JavaScript (frontend) to overcome conventional communication obstacles in car sales[11]. Through intelligent query resolution and automatic messaging, the system offers real-time customer help around-the-clock[2]. Customer preference tracking, test ride booking, and fast product information transmission are important features. By responding consistently and accurately to several simultaneous inquiries, the chatbot expedites sales processes. WhatsApp Business API and a strong backend system are integrated by technical architecture to facilitate smooth data management and communication. Complex query interpretation and API limitations are obstacles that are lessened by sophisticated natural language processing methods[1]. Future improvements will concentrate on predictive analytics, multilingual help, and AI-driven solutions.

The productivity of the chatbot is further increased by the integration of analytics and user feedback methods, which enables ongoing enhancements depending on consumer interactions[7]. The system is able to improve responses and suggest pertinent goods and services by gathering and examining user inquiries, preferences, and patterns of behavior[9]. Sales and consumer engagement can also be increased by using chatbot-driven marketing efforts, such as personalized discounts and promotional offers[10]. Secure and reliable transactions are guaranteed by improved security methods, such as end-to-end encryption and authentication techniques. The WhatsApp chatbot's innovations not only revolutionize interactions in showrooms but also establish a standard for AI-powered customer support in the electric bike sector[6].

KEYWORDS: WhatsApp Chatbot, Electric Bikes, Customer Engagement, Web Development, Laravel, Real-time Communication, Automated Support, Sales Optimization, API Integration, Digital Transformation

I. INTRODUCTION

The market for electric vehicles is changing quickly, and electric bikes are becoming a more environmentally friendly mode of transportation. The changing digital expectations of contemporary consumers are difficult for traditional car sales and customer service methods to satisfy[6]. Innovative communication solutions that can offer immediate, thorough client engagement are required due to this technical gap..

With its enormous global user base, WhatsApp offers the perfect platform for communication for creating a sophisticated customer service system[3]. A chatbot can overcome the current communication barriers in electric bike showrooms by incorporating cutting-edge web technology, providing responsive and accessible customer service around-the-clock[4].

The suggested WhatsApp chatbot makes use of contemporary web development tools, such as Laravel PHP for the backend and HTML, CSS, and JavaScript for the front end[11]. Real-time communications, automated query resolution, and smooth customer service are made possible by this technological integration.

The creation of a WhatsApp chatbot especially for questions about electric bike showrooms is the main goal of this study. Customers may get vital information from the chatbot, such as bike specs, costs, financing possibilities, and showroom locations[8]. The chatbot improves the entire customer experience and drastically cuts down on response times by automating these exchanges.

II. PROBLEM STATEMENT

Customers usually ask a lot of questions about bike types, prices, financing choices, and availability at electric bike stores. Conventional approaches to answering these questions, such as phone calls and in-person meetings, are frequently ineffective and result in lengthy wait periods and more work for showroom employees[5]. Customers may consequently encounter delays in acquiring pertinent information, which could adversely affect their decision-making process and overall showroom experience.

In order to overcome these obstacles, an automated solution is needed to increase response efficiency and streamline customer interactions. An efficient solution for responding to questions quickly and improving client happiness is a WhatsApp chatbot. Electric bike showrooms can streamline operations, cut down on manual labor, and give prospective customers a smooth, convenient, and easy-to-use communication channel by combining chatbot technology with WhatsApp[2].

A unified and easily accessible platform for client inquiries is also necessary to prevent missed sales opportunities and uneven information distribution[7]. Multiple customer inquiries may be too much for showroom employees to handle at once, which could lead to uneven responses and lost leads. Language hurdles and varying client preferences can make the investigation process more difficult. Showrooms may serve a wide range of customers and improve overall business productivity by implementing an intelligent WhatsApp chatbot that guarantees consistent, precise, and timely responses[4].

III. SCOPE

The project's scope encompasses comprehensive features:

- **Instant Query Handling:** The chatbot reduces response times and boosts efficiency by automatically answering often requested client questions[1].
- **Product Information Retrieval:** Customers can quickly obtain comprehensive information about the characteristics, cost, and availability of electric bikes[12].
- **Booking Inquiry Management:** The chatbot gathers basic booking information when customers ask questions about test rides or service reservations[8].
- **Language Support:** The system's multilingual capabilities allow for more inclusive and localized contact with a wide range of clients[3].
- **Integration Features:** The chatbot easily integrates with backend systems, guaranteeing effective workflow management and real-time data synchronization[11].
- **Analytics and tracking:** By recording and examining user interactions, chatbot effectiveness is enhanced and important insights into consumer preferences are obtained[15].

IV. PROPOSED SYSTEM

A chatbot built on WhatsApp is the suggested solution for automating consumer questions for an electric bike store. It combines front-end and back-end elements to improve user interaction, deliver real-time responses, and expedite showroom processes[2].

Frontend Technologies:

- Developed using **HTML, CSS, and JavaScript** for a responsive UI.
- Ensures smooth interaction via **WhatsApp Web API**[10].
- Provides a user-friendly experience for inquiries and booking requests.

Backend and Database:

- Built on **Laravel (PHP)** for handling chatbot logic and API communication.

- Stores customer inquiries, responses, and booking requests in a **MySQL database**.
- Integrates with the **WhatsApp Business API** for real-time query handling.

V. METHODOLOGY

Requirement Analysis: To guarantee a user-centric design, determine showroom requirements, customer inquiries, and chatbot capabilities[4]. Prioritize features by conducting market research and getting feedback from stakeholders.

System Design: Establish a solid architecture by defining frontend (HTML, CSS, JavaScript), backend (Laravel, MySQL), and WhatsApp API connectivity[11]. Assure flexibility and scalability for upcoming improvements.

Creation and Execution:

- **Frontend:** Develop a conversational flow that is easy to use and an intuitive WhatsApp interface for smooth conversations[5].
- **Backend:** Use Laravel to create chatbot logic that ensures seamless API interactions and real-time response handling[11].

Database: To ensure effective record-keeping, safely store booking information, answers, and queries. For security, use access control and data encryption.

Testing & Integration: To guarantee seamless chatbot operations, carry out user acceptability, integration, and unit testing. Find and fix any possible issues to improve the user experience.

Deployment and Monitoring: Start the chatbot, keep an eye on its performance, and examine user interactions to make improvements over time. Update the system frequently in response to analytics and user input.

Architecture Diagram:

The **WhatsApp Chatbot for an Electric Bike Showroom** follows a modular **client-server architecture**, integrating multiple components for seamless communication and automation

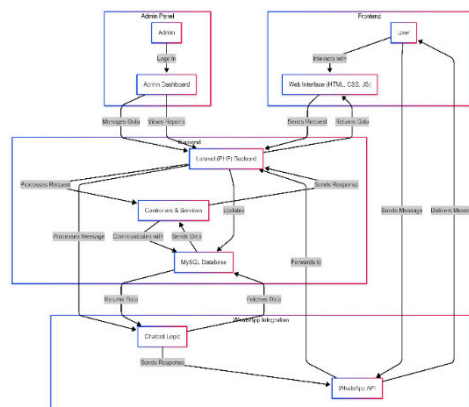


Fig 5.1: Architecture Diagram

Data Flow Diagrams (DFD):

1. **Level 0 DFD:**The diagram depicts a bike management system in which users submit inquiries through the WhatsApp API, which then relays messages to a Laravel backend that retrieves information from a MySQL database and provides responses. Administrators oversee bike data, guaranteeing that the backend is equipped with current information for user inquiries.

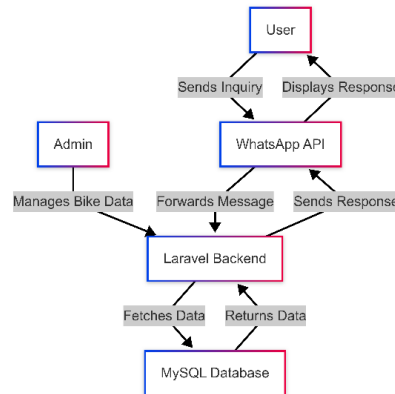


Fig 5.2.1: Level 0 DFD

- Level 1 DFD:** Users submit query through WhatsApp, and the Laravel backend handles these requests by retrieving or modifying information from a MySQL database before sending replies. Administrators oversee bike information and user inquiries to maintain the system's accuracy and provide precise responses.

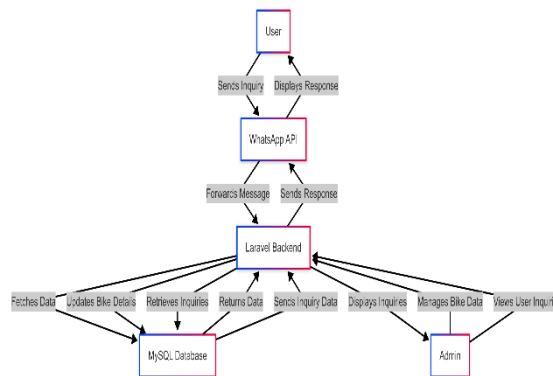


Fig 5.2.2: Level 1 DFD

Use Case Diagram:

Users engage with a WhatsApp chatbot to ask questions, make reservations, and verify bike availability, while the Laravel backend manages these requests by fetching or modifying information in a MySQL database.



Fig 5.3: Use Case Diagram

Activity Diagram:

A system that manages user communications and booking requests is depicted in this diagram, processing them via the proper channels. Users, administrators, and a database collaborate to handle reservations and messages.

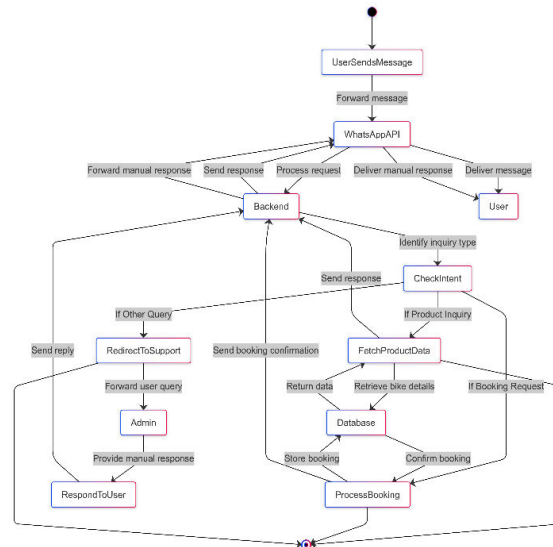


Fig 5.4: Activity Diagram

Flow Chart:

The WhatsApp Chatbot Booking Process for an Electric Bike Showroom is depicted in this diagram. When a consumer sends an inquiry, the chatbot starts the process by greeting them and offering a range of service alternatives. Periodic Maintenance, Warranty Repair, Insurance Claim, Minor Service, and Other Services are among the services that the user chooses. Following the selection of a service, the chatbot asks the user to confirm a time slot. After that, the system completes and validates the reservation, guaranteeing a seamless and automated procedure. This chatbot improves client interaction, speeds up response times, and streamlines service scheduling, all of which increase showroom productivity.

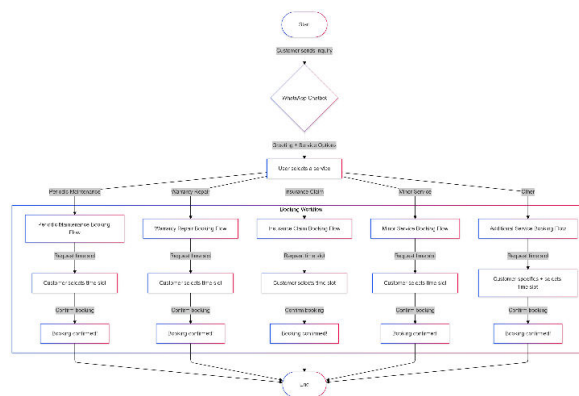


Fig 5.5: Flow-Chart

VI. IMPLEMENTATION

1. WhatsApp Integration & Chat Interface:

Users can use WhatsApp, which offers a recognizable messaging experience, to start chats with the chatbot. The chatbot responds to initial pleasantries and displays menu choices for questions about bikes, prices, specs, and general assistance.

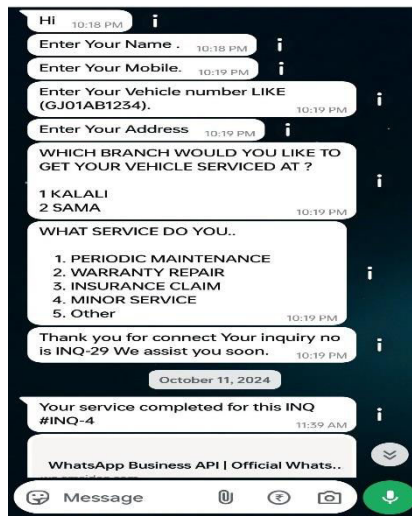
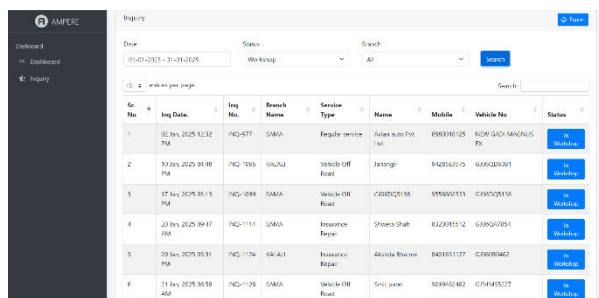


Fig 6.1: Chat Interface

2. Inquiry Management System:

The Inquiry Management System effectively monitors service requests by recording pertinent data such as vehicle information, client information, branch locations (SAMA, KALALI), and unique inquiry numbers (INQ-XXX). Regular service, vehicle off-road, and insurance repair are among the several service kinds it manages. It also keeps track of each inquiry's progress in real time during its entire lifecycle.



Sr. No	Inq. Date	Inq. No.	Branch Name	Service Type	Name	Mobile	Vehicle No.	Status
1	02 Nov 2025 12:32 PM	INQ-077	SAMA	Regular service	Adnan Ahsan Pvt	980090125	NEW SHAI ANGENUS P1	Workshop
2	09 Nov 2025 06:48 PM	INQ-089	KALALI	Vehicle Off Road	Jarangi	942054215	609028701	Workshop
3	07 Nov 2025 08:15 PM	INQ-089	SAMA	Vehicle Off Road	GIRIDHAR	9755800111	008020418	Workshop
4	20 Nov 2025 09:47 AM	INQ-111	SAMA	Insurance Repair	Shweta Shah	932097512	009020751	Workshop
5	20 Nov 2025 05:31 PM	INQ-124	KALALI	Insurance Repair	Ashwika Bhanu	949101127	009000482	Workshop
6	21 Nov 2025 08:58 AM	INQ-128	SAMA	Vehicle Off Road	Shri aneel	928840282	018485217	Workshop

Fig 6.2: Inquiry Management

3. Locate Charging Stations:

The inquiry process is organized into four stages: In Workshop (Blue) for cases that are still pending, Confirmed (Turquoise) for appointments that have been planned, Completed (Green) for inquiries that have been resolved, Inquiry pending state (Yellow) and Rejected (Red) for requests that have not been approved. This system's colour coding guarantees effective tracking and speedy visualization.

Sl. No	Inq No.	Inq Date	Branch Name	Service Type	Name	Mobile	Vehicle No	Status
1	INQ-988	01 Jan, 2025 11:41 AM	KALAU	Vehicle OH Road	ERANVELUJAKKURU	9432048390	G00082163	Completed
2	INQ-987	01 Jan, 2025 01:12 PM	SAMA	Insurance Repair	Prasanna M Karan	9172970611	G00087176	Completed
3	INQ-988	01 Jan, 2025 01:03 PM	KALAU	Vehicle OH Road	Ravindu K permy	9574126332	G00087857	Completed
4	INQ-989	01 Jan, 2025 01:13 PM	KALAU	Vehicle OH Road	Sarath jadar	8780170164	G00082384	Completed
5	INQ-972	01 Jan, 2025 01:07 PM	SAMA	Regular service	Surya Kishu todar	9684701684	G00082893	Completed
6	INQ-971	01 Jan, 2025 01:09 PM	SAMA	Regular service	Sulzer Rajeshan E	962871714	G00085932	Completed

Fig 6.3.1: completed

Sl. No	Inq No.	Inq Date	Branch Name	Service Type	Name	Mobile	Vehicle No	Status
1	INQ-1149	22 Jan, 2025 11:55 AM	KALAU	Vehicle OH Road	Iravan gnanesh	9904071688	G00082880	Confirmed
2	INQ-1172	25 Jan, 2025 09:32 AM	SAMA	Regular service	Hirshen	9103745585	G00085198	Confirmed
3	INQ-1174	22 Jan, 2025 11:33 AM	KALAU	Regular service	Mithushan sree	9001166811	G00082364	Confirmed
4	INQ-1176	25 Jan, 2025 01:16 PM	SAMA	Regular service	Ghanshyam Thakur	9103022205	G00087827	Confirmed

Fig 6.3.2: Confirmed

Sl. No	Inq No.	Inq Date	Branch Name	Service Type	Name	Mobile	Vehicle No	Status
1	INQ-108	31 Dec, 2024 04:05 PM	SAMA	Insurance Repair	Hrithi Chaudhary	8020018994	G00082993	Pending
2	INQ-417	16 Nov, 2024 06:58 PM	SAMA	Insurance Repair	Rishi	9075179170	G00083950	Pending
3	INQ-477	20 Nov, 2024 01:33 PM	SAMA	Insurance Repair	Pavani Madhu	8168710163	G00086805	Pending
4	INQ-517	31 Dec, 2024 11:02 AM	SAMA	Insurance Repair	Rajishan srinath Panar	9508886047	4506	Pending
5	INQ-1155	22 Jan, 2025 01:05 PM	KALAU	Insurance Repair	Yashu (a.k.a. No red city ka b.came to bus and ka b.c)	9136648335	G000862443	Pending
6	INQ-1175	25 Jan, 2025 06:17 PM	SAMA	Regular service	Shreshth Gaur	9028753329	G00083118	Pending

Fig 6.3.3: Pending

Sl. No	Inq No.	Inq Date	Branch Name	Service Type	Name	Mobile	Vehicle No	Status
1	INQ-986	01 Jan, 2025 11:29 AM	SAMA	Regular service	Tapanika C Nair	815527170	CM-18-6785	Rejected
2	INQ-985	04 Jan, 2025 10:45 AM	SAMA	Regular service	Hemir Karaga	8487318891	G00089001	Rejected
3	INQ-986	04 Jan, 2025 12:35 PM	SAMA	Insurance Repair	Rishi suran	7283990881	G00083630	Rejected
4	INQ-976	04 Jan, 2025 02:29 PM	SAMA	Insurance Repair	Agam dhan	9436221788	G00084286	Rejected
5	INQ-970	03 Jan, 2025 10:38 AM	SAMA	Vehicle OH Road	Madhushan gurur	995318881	G00084338	Rejected
6	INQ-970	03 Jan, 2025 06:28 PM	KALAU	Regular service	Ajithbin Mathy	9879566172	G00083930	Rejected
7	INQ-932	05 Jan, 2025 02:30 PM	KALAU	Regular service	Rajith V Athulas	9919191881	G00084713	Rejected
8	INQ-932	05 Jan, 2025 03:51 PM	SAMA	Regular service	Shreya Vinod	8326249581	835-124952	Rejected

Fig 6.3.4: Rejected

4.Admin Dashboard:

The "AMPERE" admin dashboard gives a summary of various inquiry or task statuses, such as pending, completed, rejected, confirmed, and workshop-related items. A logout option and a mobile number search feature are also included.

8 Pending	793 Completed	314 Rejected	4 Confir	19 Working
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Type Mobile Number:

Fig 6.4: Admin Dashboard

VII. LIMITATIONS

Despite automating showroom inquiries and enhancing client engagement, the WhatsApp chatbot has the following drawbacks.

- Reliance on WhatsApp Business API:** The chatbot is dependent on WhatsApp's pricing and rules, which could restrict customization and raise operating expenses.
- Limited NLP Capabilities:** In the absence of sophisticated Natural Language Processing (NLP), the chatbot might not be able to comprehend complicated or unclear customer inquiries.
- Internet Connectivity Requirement:** Real-time conversations require a steady internet connection; any outage could interfere with chatbot operation.

4. **Scalability Issues:** Inadequate infrastructure optimization can result in performance problems while managing a large number of concurrent queries.
5. **Data Privacy & Security Risks :** Storing and processing customer information requires stringent security measures to prevent data breaches..
6. **Restricted Multi-Platform Support:** Because the chatbot is mainly made for WhatsApp cannot be integrated with Facebook Messenger or Telegram.

VIII. FUTURE WORK

Future developments will make the chatbot more effective, approachable, and able to handle complicated inquiries, which will simplify showroom operations and increase client satisfaction .Key areas of focus include:

1. **AI-Powered Query Handling** – Enhancing the chatbot with Natural Language Processing (NLP) for better understanding of warranty and service-related queries[1].
2. **Multi-Platform Expansion:** For greater accessibility, chatbot capability is being extended to Facebook Messenger, Telegram, and email[8].
3. **Real-Time Service Tracking :** Allowing customers to track their service status and receive updates on WhatsApp[10].
4. **Automated Claim Processing:** The process of automating warranty and insurance claim approvals through integration with insurance companies and service centers[7].
5. **Automated Claim Processing:** The process of automating warranty and insurance claim approvals through integration with insurance companies and service centers[15].
6. **Improved Customer Analytics:** By using data analytics, customer support can be improved and regular service concerns tracked.

IX. PERFORMANCE MATRIX

Metric	Description	Value
Response Time	Time taken to respond to customer inquiries	<2 seconds
Query Resolution Rate	Percentage of queries successfully answered by the chatbot	95%
User Satisfaction	Customer feedback rating based on chatbot interaction	4.7/5
Concurrent Query Handling	Number of simultaneous queries managed without performance drop	100+
Booking Success Rate	Percentage of successful test ride and service bookings	90%
Error Rate	Percentage of chatbot responses that failed to resolve queries	<5%

The outcomes show how the chatbot can respond quickly, effectively, and accurately, greatly cutting down on response times and raising customer happiness.

X. CONCLUSION

A WhatsApp chatbot that answers showroom questions automatically boosts customer service, decreases manual labor, and increases productivity. The system makes sure that client interactions are fast, accurate, and smooth by integrating Laravel for backend processing, MySQL for data storage, and the WhatsApp Business API for communication.

Customers can submit service requests, file warranty claims, verify product availability, and get real-time updates thanks to the chatbot's round-the-clock operation. While reducing response times, this automation improves customer happiness and operational efficiency. Its capacity to manage several inquiries at once also optimizes client interaction and streamlines showroom procedures.

Limited Natural Language Processing (NLP) capabilities and API dependencies are some of the chatbot's drawbacks, but future improvements like AI-driven query processing, predictive analytics, and multilingual support will increase its adaptability even more. Performance and accessibility will be improved by adding real-time service tracking, IoT integration, and multi-platform compatibility to its list of features.

All things considered, the chatbot drives the digital revolution of customer service by offering a scalable and effective answer to questions about electric bike showrooms. This chatbot creates the groundwork for a more intelligent, networked, and customer-focused sales and support system by integrating AI, automation, and data analytics.

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