WheelDeal – Car Management System

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December 6, 2023

1 Introduction

1.1 Project Overview

”WheelDeal” is a sophisticated car management system offering users a seamless experience from registration to car-related transactions. It provides an intuitive interface for managing car brands, types, models, and individual vehicles. Users can navigate through personalized home pages, access car-related sections, and initiate purchases through a streamlined transaction process. The system simplifies user interactions, ensuring efficient management of car data and facilitating smooth transactions within a user-friendly environment.

1.2 Project Scope

”WheelDeal” manages car data, user accounts, and transactions. It covers user registration, car info handling (brands, types, models), and a streamlined buying process. The goal is a user-friendly system for smooth car management and purchases.

1.3 Functions

- Register User.
- Login User.
- Filter and Search Cars.
- Car Management.
- User comment.

1.4 Technology Stack

”WheelDeal” uses HTML, CSS, and JavaScript for its user-friendly frontend, while PHP powers the secure backend. MySQL stores and manages car data, user information, and transactions, ensuring a seamless experience throughout the system.

2 Background

2.1 Project Origins

”WheelDeal” emerged from a need to simplify car management and transactions. The project aimed to create an intuitive platform for car dealings.

2.2 Vision

The project envisioned a user-friendly interface where users could effortlessly explore car listings, access detailed vehicle information, and conduct secure transactions. Users can act as both buyers and sellers simultaneously.

3 Problem Statement

Creating a smooth and simple experience from signing up to finishing a purchase, blending different car-related tasks without confusion.

3.1 Challenges in Development

We encountered challenges in user authentication, integrating the database with the backend, and ensuring synchronized updates on the frontend. Additionally, maintaining log files for transaction posed difficulties.

3.2 Objectives

- User-Centric Design: Prioritize an intuitive interface for easy navigation.
- Efficient Transactions: Develop a smooth process for buying and selling cars (transaction applied on deletion of car).
- Comprehensive Car Details: Provide in-depth vehicle specifications for informed decisions.

4 Project Breakdown

4.1 Entity-Relationship Diagram (ERD)

4.1.1 Design Rationale

Explains the design choices and relationships depicted in the ERD, providing insights into the data model.

4.1.2 Key Entities and Relationships

Highlights the crucial components like Users, the vehicle list, transaction records, logs, and brand list, illustrating their interconnections within the system.

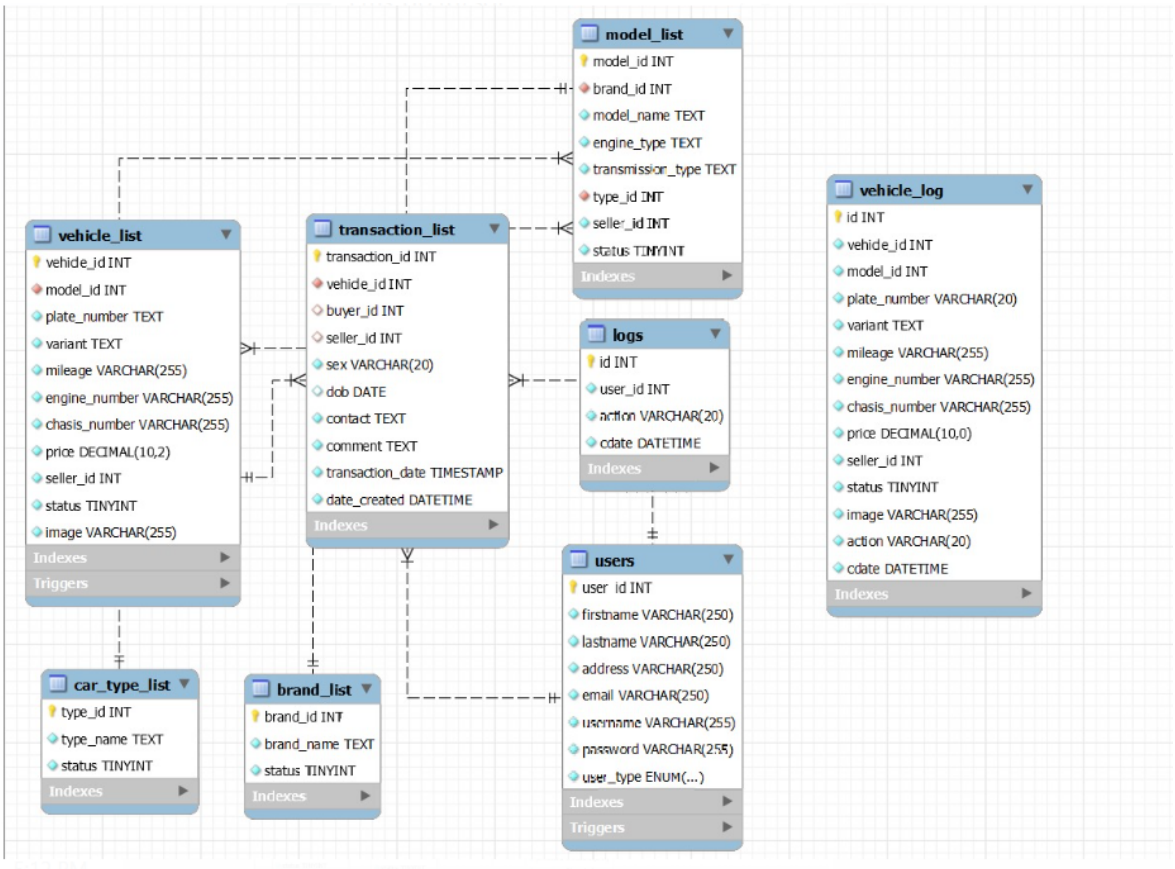

Figure 1: ER Diagram

4.2 Relational Schema up to 3NF

4.2.1 Normalization Process

Details the normalization process undertaken to achieve the Third Normal Form, ensuring data consistency and reducing redundancy.

4.2.2 Table Descriptions

Provides detailed descriptions of each table in the relational schema, including primary keys, foreign keys, and attributes.

Already in 1NF												
Vehicle_id	model_id	Plate_no	Variant	Mileage	Engine_no	Chasis_no	Price	Seller_id	V_Status	Image	Model_id	BrandId
Modelname	engine_type	Transmission_type	Type_id	M_Status	Type_name	user_id	F_name	L_name	address	email	user_name	password
user_type	transaction_id	buyer_id	sex	DOB	Contact	Comment	Transaction_date	Date_Created	Brand_name	B_status	C_Status	

Identifying Functional Dependencies												
Transaction_id	>>	buyer_id	sex	DOB	Contact	Comment	Transaction_date	Date_Created	vehicle_id	model_id	plate_no	variant
		mileage	engine_no	chasis_no	Price	Seller_id	V_Status	Image				
model_id	>>	BrandId	Modelname	engine_type	Transmission_type	Type_id	M_Status	Type_name	C_Status	Brand_name	B_status	
User_id	>>	f_name	L_name	address	email	username	password	user_type				
type_id	>>	type_name	status									

2NF												
Transaction_id	buyer_id	sex	DOB	Contact	Comment	Transaction_date	Date_Created	vehicle_id	model_id	plate_no	variant	mileage
	engine_no	chasis_no	Price	Seller_id	V_Status	Image						
model_id	BrandId	Modelname	engine_type	Transmission_type	Type_id	M_Status	Type_name	C_Status	Brand_name	B_status		
User_id	f_name	L_name	address	email	username	password	user_type					
type_id	type_name	status										

3NF												
Transaction_id	buyer_id	sex	DOB	Contact	Comment	Transaction_date	Date_Created	vehicle_id				
Vehicle_id	model_id	plate_no	variant	mileage	engine_no	chasis_no	Price	Seller_id	V_Status	Image		
model_id	BrandId	Modelname	engine_type	Transmission_type	Type_id	M_Status	Type_name	C_Status	Brand_name	B_status		
brand_id	Brand_name	B_status										
User_id	f_name	L_name	address	email	username	password	user_type					
type_id	type_name	status										

Figure 2: Normalization upto 3NF

4.3 Frontend

4.3.1 User Interface Design

Offers an intuitive user interface, focusing on easy navigation and clarity. With clean layouts and logical organization, users seamlessly interact with car information and transactional features, ensuring an efficient and enjoyable experience.

4.3.2 Component Overview

User profiles display user information, enabling registration and profile management. Car listings showcase available cars with details for browsing and filtering. Car details page provides comprehensive information about selected cars. Transaction forms enable users to initiate purchases or inquiries. Navigation & interactive elements facilitate smooth user movement and actions within the platform.

4.4 Backend

4.4.1 Server Architecture

Details the architecture of the backend server, focusing on PHP.

4.4.2 Authentication and Authorization

Involves ensuring secure access and actions within the system. Authentication verifies user identities during login, while authorization controls the permissions and levels of access granted to authenticated users(buyers and sellers), safeguarding data and functionalities based on user roles and privileges.

4.5 Database Connectivity

4.5.1 Connection Establishment

”WheelDeal” swiftly establishes secure connections between its frontend and backend, ensuring seamless data transfer and smooth user interactions within the system.

4.5.2 Transaction Management

”WheelDeal” employs transaction management to maintain data consistency. If a vehicle is deleted during a purchase, rollback mechanisms ensure the transaction reverts to its original state, securing the purchase process against disruptions caused by changes in the vehicle list.

5 Conclusion

5.1 Achievements

Ensuring smooth user experiences from registration to transactions. Integrated intuitive design, efficient transactions, and detailed vehicle data for enhanced usability.

5.2 Lessons Learned

We gained expertise in linking databases to our backend, incorporating triggers, managing log files, executing CRUD operations, and restoring deleted transactions through rollback procedures.

5.3 Future Enhancements

We aim to introduce diverse payment methods and enable real-time updates on our site. Additionally, we plan to integrate an admin role to oversee user operations effectively. Furthermore, we intend to incorporate car rental options into our platform.