**SOFTWARE REQUIREMENTS SPECIFICATION**

**For**

**Car Rental System**

Prepared By:

Harismita R

Shreenithii S J

Srinithi S

**1.Introduction**

**1.1 Purpose**

This application streamlines car rentals with features such as transparent billing, detailed vehicle listings, and effortless reservation processes. Billing and payment processing ensure seamless financial transactions, while the vehicle listing provides comprehensive details for user convenience. The user-friendly interface enhances the overall experience, with intuitive reservation confirmation and transparent pricing. Access control safeguards sensitive information, and flexible payment methods cater to diverse user preferences. The application focuses on efficiency, aiming to optimize the car rental process through streamlined data handling and enhanced user experience

**1.2 Scope of Development project**

The development project for the car rental management application is designed to deliver a comprehensive and user-friendly platform. Key objectives include the implementation of essential features such as detailed vehicle listings, an intuitive reservation system, transparent billing processes, and secure payment handling. The focus is on creating a positive user experience, with specific attention to streamlining the reservation confirmation process for optimal user satisfaction.

The project scope also encompasses defining a robust technology stack and architecture, ensuring seamless integration with payment gateways, and establishing efficient data handling practices. A well-structured timeline with key milestones is established, taking into account any budgetary, time, or resource constraints. Scalability considerations and future enhancement possibilities are integral components, reflecting a forward-thinking approach to the application's long-term effectiveness.

Regular reviews and adjustments will be made to align with evolving project requirements and stakeholder expectations, ensuring a successful and impactful car rental management solution.

**1.3 Definitions, Acronyms and Abbreviation**

JAVA -> platform independence SQL-> Structured query Language ER-> Entity Relationship

UML -> Unified Modeling Language

IDE-> Integrated Development Environment SRS-> Software Requirement Specification

**1.4 References**

* Khaled, Mr Shah Mostafa, Shamsil Arefin, Datta Sree Rajib Kumar, and Ariful Hossain Tuhin. "Software Requirements Specification for Online Car Rental

System." (2015)

* Carroll, William J., and Richard C. Grimes. "Evolutionary change in product management: Experiences in the car rental industry." Interfaces 25, no. 5 (1995): 84-104
* Fink, Andreas, and Torsten Reiners. "Modeling and solving the short-term car rental logistics problem." Transportation Research Part E: Logistics and

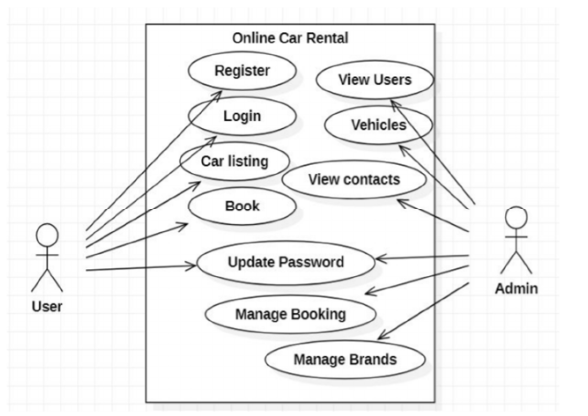
Transportation Review 42, no. 4 (2006): 272-292.

* Waspodo, Bayu, Qurrotul Aini, and Syamsuri Nur. "Development of car rental management information system." In Proceeding International Conference on

Information Systems For Business Competitiveness (ICISBC), pp. 101-105. 2011

**2 . Over All Descriptions**

2.1 . User case Diagram



This is a broad level diagram of the project showing a basic user case diagram. The users can be either drivers or common people . This System will provide a search functionality to facilitate the search of resources. This search will be based on various categories availability or the duration. Further the admin can add/update the resources and the resource users from the system. The users of the system can request issue of cars for which they would have to follow certain criteria.

**User classes and characteristics:**

User:

Each user is identified by a unique User ID and has associated attributes such as a username, securely stored password, email address, phone number, and a user type indicating whether they are a regular user, business user, administrator, or part of customer support.

Vehicle:

Vehicles within the system are uniquely identified by a Vehicle ID and have associated attributes including make, model, year, license plate number, rental rate per day, availability status, and features like GPS or air conditioning.

Reservation:

Reservations are uniquely identified by a Reservation ID and are linked to a specific user through a User ID and a vehicle through a Vehicle ID. Attributes include reservation start and end dates and times, total cost, and status (confirmed, pending, cancelled).

Billing Transaction:

Each financial transaction is uniquely identified by a Transaction ID and is associated with a specific user (User ID) and reservation (Reservation ID). Attributes include transaction date and time, amount, payment method, and transaction status.

Administrator/Manager:

Administrators and managers have unique identifiers (Admin ID) along with attributes such as a username, securely stored password, email address, and phone number.

Customer Support Representative:

Customer support representatives are uniquely identified by a Support Rep ID and have associated attributes including a username, securely stored password, email address, and phone number.

Fleet Management:

Fleet management entities are uniquely identified by a Fleet ID and are associated with specific vehicles through a Vehicle ID. Attributes include maintenance schedule, last maintenance date, and mileage.

Security/Compliance:

Security and compliance entities have unique identifiers (Security/Compliance ID) and attributes such as access control settings, compliance status, and security protocols.

Operating environment:

The car rental application is configured to operate in a Windows environment, providing users with a seamless experience on Windows devices. The web-based application is accessible through popular browsers like Google Chrome and Microsoft Edge. The backend server runs on a Windows Server operating system, utilizing technologies such as Internet Information Services (IIS) and server-side scripting languages like ASP.NET or Node.js. Data is stored in a Microsoft SQL Server database, taking advantage of Windows-compatible relational database management systems. Developers use Windows-compatible tools like Visual Studio for coding, debugging, and testing. Optional integration with Microsoft Azure cloud services offers scalability and additional features. Security measures include Windows authentication, access control, and secure communication protocols

Assumptions:

Internet Connectivity:

The application assumes users have a reliable internet connection for accessing and using its features. Offline functionality may be limited.

User Device Compatibility:

It is assumed that users have devices (computers, smartphones, or tablets) that are compatible with the application's supported web browsers or mobile apps.

Data Accuracy:

The accuracy of vehicle information, availability, and pricing relies on the assumption that the data provided by the car rental company is accurate and up-to-date.

User Security Awareness:

Users are assumed to be aware of basic security practices, such as keeping login credentials secure, to ensure the protection of their accounts.

Payment Processor Reliability:

The application assumes the reliability of third-party payment processors for seamless financial transactions. This includes assumptions about the security and functionality of these processors.

Legal and Regulatory Compliance:

It is assumed that the car rental company adheres to legal and regulatory requirements related to user data protection, payment processing, and any other relevant laws.

Dependencies:

Web Browser or Mobile App Dependency:

The application depends on users accessing it through web browsers (like Google Chrome, Mozilla Firefox) or mobile apps (iOS, Android). Changes in browser or mobile operating system features may impact the application.

Database System Dependency:

The proper functioning of the application depends on the reliability and performance of the chosen database system (e.g., Microsoft SQL Server). Changes to the database structure or issues with database connectivity can affect the application.

Server Dependency:

The application depends on the stability and proper configuration of the server environment, such as Windows Server. Server outages or misconfigurations may disrupt service.

Payment Gateway Dependency:

The application relies on third-party payment gateways for processing financial transactions. Changes to these gateways or disruptions in their services can impact the application's payment functionality.

Cloud Service Dependency (if applicable):

If the application uses cloud services (e.g., Microsoft Azure), its availability and scalability depend on the reliability and proper configuration of these services.

Data Accuracy Dependency:

The application depends on the accuracy of data provided by the car rental company. Any discrepancies in vehicle information, availability, or pricing may affect user experiences.

Compliance Dependency:

The application is dependent on the car rental company adhering to legal and regulatory requirements. Changes in regulations may necessitate updates to the application.

User Education Dependency:

The effectiveness of security features relies on users being educated about best practices. The application depends on users' understanding of security measures to protect their accounts.

Software and hardware requirements:

For the software, it includes a web-based application with compatible front-end and back-end technologies, mobile application development tools if applicable, security features such as SSL/TLS certificates, and integration with payment processing gateways. The application may utilize cloud services and should be compatible with various operating systems.

On the hardware side, the server infrastructure requires sufficient processing power, memory, and storage, with considerations for security measures. The database server needs to meet specifications for the chosen database system, and client devices, whether desktop or mobile, must have adequate resources for a smooth user experience. Networking requirements involve a stable internet connection for both server and client communication, and backup and redundancy measures are essential for data protection and system availability.

Data requirements:

The car rental application necessitates the management of various data entities to function effectively. Key data requirements include user information such as ID, username, and contact details, vehicle details such as make, model, and availability status, reservation specifics like dates and costs, billing transactions with payment details, administrator and customer support representative credentials, fleet management data for vehicle maintenance, and security/compliance information. These data elements form the backbone of the application, facilitating user interactions, reservation processes, billing transactions, fleet maintenance, and overall security and compliance measures

**4. System Features**

* Users can search for available vehicles based on criteria such as dates, vehicle type, and location.
* Real-time availability status and pricing information.
* Intuitive booking process with options to modify or cancel reservations.
* Integration with a calendar system to visualize vehicle availability over time.

**5. Other Non-functional Requirements**

**5.1 Performance Requirement**

 These performance requirements are essential to ensure that your car rental management application delivers a fast, reliable, and scalable experience for users. Adjust these criteria based on the specific needs and expected usage patterns of your application. 

* The system should respond to user interactions (e.g., reservation, billing) within 2 seconds for optimal user experience.
* The application should support a minimum of 1000 concurrent users without significant degradation in performance.
* The system should be designed to scale horizontally to handle an increasing number of users and transactions.
* Scalability testing should be conducted to ensure smooth operation during peak usage periods.

**5.2 Safety Requirement**

1. **Data Security and Access Control:**

* Implement robust encryption for sensitive data and enforce strict access control measures to prevent unauthorized access.

1. **Backup, Recovery, and Auditing:**

* Regularly back up system data, establish a recovery plan for data loss, and maintain an audit trail for monitoring and incident investigation.

1. **Regulatory Compliance and Incident Response:**

* Ensure compliance with relevant regulations, conduct vulnerability assessments, and establish a clear incident response plan to address security breaches promptly.

**5.3 Security Requirement**

These security requirements are vital to establishing a resilient security framework for your car rental management application, ensuring the confidentiality, integrity, and availability of the system and its data. Adjust these requirements based on the specific security needs and potential risks identified during the development and testing phases

1. **Network Security:**

* Implement firewalls and intrusion detection/prevention systems to protect against unauthorized access and cyber threats.

1. **Secure Authentication and Authorization:**

* Enforce strong authentication mechanisms and authorization controls to ensure only authorized users can access and modify system functionalities.

1. **Data Encryption:**

* Apply end-to-end encryption for data transmission and encryption-at-rest for stored data to safeguard sensitive information.

1. **Secure APIs and Integrations:**

* Ensure secure communication and data exchange with third-party APIs, following industry best practices for integration security.

**5.4 Requirement attributes**

1. **Priority:**

* Assign priority levels (e.g., high, medium, low) to each requirement to guide development efforts and address critical features first.

1. **Dependency:**

* Identify dependencies between requirements to ensure that necessary functionalities are developed and tested in the correct order.

1. **Traceability:**

* Establish traceability links between requirements, design elements, and test cases to facilitate impact analysis and ensure comprehensive testing coverage.

**5.5 Business Rules**

The car rental management application adheres to a set of well-defined business rules to ensure operational consistency and regulatory compliance. These rules encompass reservation eligibility criteria, cancellation policies, guidelines for determining vehicle availability based on reservations and maintenance schedules, and pricing strategies influenced by factors such as vehicle type, demand, and rental duration. Additionally, the application enforces rules regarding late returns, penalties, mandatory insurance coverage, payment authorization procedures, and reporting guidelines for vehicle condition.

5.6 User Requirement

1. **User Registration and Authentication:**

* Users should be able to register accounts, providing necessary details, and authenticate securely through password or multi-factor authentication.

1. **Intuitive Reservation System:**

* The system should offer an easy-to-use interface for searching, selecting, and reserving vehicles, with real-time availability updates.

1. **Detailed Vehicle Information:**

* Users should access comprehensive details about each vehicle, including make, model, year, color, and condition, along with visual representations through images.

**6. Other Requirements**

**6.1 Data and Category Requirement**

* Capture and store user information, including names, contact details, and authentication credentials, adhering to privacy and data protection regulations.
* Maintain a comprehensive database of vehicle details, including make, model, year, color, registration information, and images.
* Store reservation details such as booking dates, selected vehicles, and customer preferences for tracking and reporting purposes.
* Securely store billing information, transaction records, and payment details, ensuring compliance with payment card industry standards.
* Keep records of vehicle maintenance schedules, service history, and upcoming maintenance requirements to ensure fleet reliability.

**6.2 Appendix**

The appendix includes supplementary information and resources related to the car rental management application. It encompasses:

1. **User Manuals:**

* Comprehensive user manuals detailing how to use the application, make reservations, manage accounts, and navigate various features.

1. **Technical Documentation:**

* Detailed technical documentation for developers, covering system architecture, APIs, data models, and integration points.

1. **Training Materials:**

* Training materials for users, support staff, and administrators to facilitate efficient onboarding and utilization of the application.

**6.3 Glossary**

This glossary provides definitions for key terms and terminology used throughout the documentation of the car rental management application:

1. **Reservation:**

* The act of booking a vehicle for a specified period, including the selected vehicle, dates, and customer details.

1. **Billing:**

* The process of generating invoices and managing payments for vehicle rentals.

1. **Vehicle Listing:**

* An organized display of available vehicles, including details such as make, model, and availability status.

1. **Pricing Model:**

* The structure and rules governing how rental prices are determined, considering factors like vehicle type, duration, and demand.

1. **Payment Gateway:**

* A secure service that facilitates online transactions by connecting the application to financial institutions for payment processing.

1. **Authentication:**

* The process of verifying the identity of a user, typically through a username and password or additional security measures.

1. **Audit Trail:**

* A chronological record of system activities, providing a trace of events for monitoring, analysis, and security purposes.