



International Journal of Research Publication and Reviews

Journal Homepage: www.ijrpr.com ISSN 2582-7421

A Web-Based Automobile Service Management System with Mileage-Based Maintenance Reminders

Miss Payal Sunil Bhadange

Computer Application, Dr. B. V. Hiray College of Management and Research Center, Malegaon, Nashik, Maharashtra

Email: payalbhadange681@gmail.com

ABSTRACT

An automobile service center is a system that manages a customer records, vehicle records, vehicles complete details and appointments of the customer history of the vehicles services, history of a spare parts that has been used to vehicle and the billing of service. When we used to keep the manual record of the whole information and paper records using manually it may be more difficult to find the previous records of vehicles, customers etc. And even we may use excel to keep records but it may also cause to find the accurate records and can make difficult to retrieve and keep consistent. So this paper proposes a design oriented web based automobile service management system that can manage the workflow of workshop and provides the efficient mileage based maintenance reminders. This proposed system involves the customer, service-staff and the administrator roles and also the registration of the vehicles and the appointment requests that has been sent from customer, to keep vehicles service records and inventory and invoice management. The module estimates the next due mileage from the last recorded service mileage and then configure to the service interval, while supporting the date based intervals when required by the manufacturer guidance. The design focuses on odometer validation, and the role bases access control, audit trails and mobile friendly access without requiring an OBD-II device. The related search has already explores the mileage based guidance, web based reminders and IOT enables scheduling. The contribution of the proposed system is therefore an low complexity workflow, it is not a claim of a new prediction algorithm. The system has not yet been implemented or evaluated the expected benefits and a future evaluation and plan are described without presenting the anticipated values as the measure results.

Keywords: Automobile service management, web application, maintenance reminder, odometer validation, service history, appointment scheduling

1. INTRODUCTION

Vehicle servicing supports vehicle reliability, safety, and operating life. A service centre coordinates customer requests, vehicle intake, technician work, parts usage, labour, invoices, and communication. When these activities are recorded separately or manually, staff may need to search several records to confirm previous work, appointment status, or parts availability. This can create administrative effort and inconsistent records.

A web-based system can provide a shared interface for customers and workshop staff. Customers may submit appointment requests and review service history, while authorized staff update work progress, parts usage, and completed service records. A maintenance reminder based on recorded odometer readings and service intervals is another useful feature, but it is a rule-based aid rather than a diagnosis of vehicle condition.

This paper proposes a design for a web-based Automobile Service Management System intended to consolidate routine workshop operations and provide understandable maintenance reminders. It is a proposal: no software implementation, workshop deployment, user survey, or performance experiment is claimed.

2. PROBLEM STATEMENT

The main issue here is the nature of workshop data that lives in many places – customer records, service history the appointments book, parts inventory listings and billing statements.

A messy workflow makes it hard to know where a vehicle is now to look at past repair work on that vehicle or to tell a customer when the next service will happen.

Also the risk of input is obvious such as creating many copies of one record writing wrong odometer numbers or leaving updates incomplete.

There are hidden dangers too. For example if two technicians write miles when they each work on the same vehicle the system may create two copies of the same service record.

When a technician manually enters information that another technician already entered the new entry can contain mistakes, such as a wrong odometer reading since the service. Therefore a computer application can help by reducing error through automation.

Scope : Routine service management, not diagnostics. The workshop assumes owners and/or technicians will write odometer reading values. The workshop assumes service intervals come from vehicle-specific information.

Research question : What does it take to develop a web-based tool that brings together the workshop records uses recorded odometer readings and follows service interval rules set by the owner or manufacturer to give clear service reminders that link directly to the service history and appointment needs?

3. OBJECTIVES

Aim: Design a tool for managing car services that connects all workshop activities and ties mileage reminders to the service history and appointment schedule of each customer.

Objectives:

1. Identify what customers employees and administrative people need.
2. Design a set of integrated vehicle/service/appointment/inventory/billing records.
3. Define the rules, for mileage/date reminders.
4. Define validation and authorization checks.
5. Propose ways to judge success based on accuracy ease of use, reliability and performance.

4. REVIEW OF LITERATURE

Previous studies have highlighted the importance of systems for improving business operations in the automotive service industry. Several researchers have proposed automated service management systems to overcome the limitations of processes.

A vehicle-management approach provides maintenance information based on mileage and time. Divides guidance into stages [1]. Vehicle-management approach supports combining distance-based and time-based reminders; vehicle-management approach also means mileage-based reminders themselves should not be claimed as a novel invention.

A web-based automobile service reminder system intends to help owners manage vehicle and service information [2]. The paper reports a usability evaluation using the Website Analysis and Measurement Inventory (WAMMI) establishing work on browser-accessible service reminders.

An IoT-based decision-support system uses vehicle sensor data, a scanner, an IoT gateway, a web server and a dashboard for maintenance recommendations [3]. Garage management applications have also been described as supporting stock, repair estimates, service history and repair-time tracking.

Than claiming no comparable system exists the system focuses on a transparent workflow for workshops that may not have sensor integration. The system combines odometer entry and validation configurable service intervals, service-history updates and appointment requests. Whether the system combination offers benefits remains to be tested.

5. RESEARCH METHODOLOGY / RESEARCH DESIGN

The system has three roles. Customers can create a profile register vehicles enter mileage view service history and reminders and request appointments. Service staff can review requests, record inspection and repair details update job status, record parts and labour and mark services completed.

Administrators manage permissions, service categories, service intervals and system settings.

Functional requirements include authentication; vehicle profiles; odometer entry and validation; appointment requests and status tracking; service jobs and history; inventory updates; invoice calculation; mileage/date reminders; and reports. Notifications may initially appear in the dashboard with email or SMS considered later.

Non-functional requirements include an interface, data consistency, clear status messages, maintainable code, secure authentication, backup and recovery and an acceptable response time under the expected project workload. These non-functional requirements have not been tested.

The architecture has three layers. The presentation layer provides customer, staff and administrator screens. The application layer enforces permissions validates inputs calculates reminder status manages appointments and processes service and billing updates. The data layer stores users, vehicles, odometer readings, service types and intervals, appointments, service records, inventory, parts usage and invoices in a database.

Suggested entities are User(user_id, name, contact, password_hash, role); Vehicle(vehicle_id, user_id, registration_no, make, model, year); OdometerReading(reading_id, vehicle_id, reading_km, recorded_at, recorded_by); ServiceType(service_type_id, name); ServiceInterval(interval_id, service_type_id, interval_km, interval_months, source_note); Appointment(appointment_id, vehicle_id, requested_date, status); ServiceRecord(service_id, vehicle_id, service_date, odometer_km, work_summary, labour_cost, parts_cost); InventoryItem(item_id, name, quantity, unit_cost); PartsUsage(usage_id, service_id, item_id, quantity); and Invoice(invoice_id, service_id, subtotal, tax, total, payment_status).

Primary and foreign keys should maintain integrity. Registration numbers should be checked for duplicates according to business rules. Service completion should create a service record, than merely changing a display label. Important changes should record who made them and when.

6. PROPOSED WORK

Next due mileage is service mileage plus configured service interval. Example only: if a service was recorded at 10,000 km and the configured interval is 5,000 km the next due mileage is 15,000 km. The interval must come from the vehicle manufacturer's maintenance schedule or a qualified service professional; this example is not a recommendation.

Let M be the accepted odometer reading D be the calculated next due mileage and W be a configurable warning window. The status is "Not due" when M is below D minus W "Due when M is at least D minus W but below D and "Due" when M is at least D. The warning window is a configurable parameter that should be evaluated rather than assumed optimal.

If guidance specifies both mileage and time the reminder should use the earlier of those points. The system should display the source or note for the configured interval. Must not present a reminder as a substitute for the owner's manual.

Odometer readings must be numeric and non-negative. If a new reading is lower than the accepted reading for the same vehicle the system should reject it or request authorized review instead of silently overwriting the previous value. Corrections should be audited. A reminder should be marked completed after an authorized user saves the corresponding service record.

The workflow is: (1) customer signs in and selects a vehicle; (2) customer or staff enters the odometer reading; (3) the system validates and saves it; (4) the reminder module calculates due status; (5) the customer may request an appointment; (6) staff review and confirm an available slot; (7) staff record work, parts and labour; (8) an invoice is generated from stored line items; and (9) the service record is saved and the next reminder recalculated.

Appointment requests are not confirmed until staff or a scheduling component confirms a slot. A future scheduling extension could consider job urgency, repair duration, mechanic skills, bay capacity and parts availability. A priority score should not be treated as validated until its weights and results are tested against workshop constraints.

A basic invoice can be calculated as: Total equals parts labour subtotal plus applicable tax minus approved discount. The paper does not prescribe a tax rate. Inventory should be reduced when parts usage is confirmed and the system should prevent or flag stock according to workshop policy.

Security controls should include password hashing with an established algorithm, server-side authorization, parameterized database queries, protected sessions, input validation, least-privilege access, secure transport and regular backups. Customers should not be able to edit staff-approved service records or view another customers information. Audit entries should identify the user, time and change. A future implementation should define data retention, recovery and privacy practices appropriate, to its deployment.

7. RESULTS AND DISCUSSION

Because the system has not been implemented this section defines planned evaluation of results. Basic tests should cover account access, role permissions, vehicle creation, valid and invalid odometer entries decreasing readings, reminder thresholds, appointment state changes, service completion, invoice arithmetic, inventory updates and database consistency. A pilot could compare a defined period before and after deployment. Compare the proposed workflow with existing manual or spreadsheet processes. Candidate measures include median service turnaround time, appointment fulfilment rate, billing correction rate, inventory discrepancy rate, completeness of service records and customer or staff satisfaction. Definitions, observation periods, sample size and data collection procedures must be set before measurement. Workshop size, service mix, staffing and workload should be documented.

Usability can be evaluated using tasks such as registering a vehicle requesting an appointment finding service history and recording a completed service. Task completion, errors, time on task and participant feedback can be recorded. Any study involving people or identifiable data should follow ethical and privacy requirements. No performance values or improvement percentages are claimed here.

8. FINDINGS AND SUGGESTIONS

The expected outcome is a design that brings customer and vehicle records, appointments, service history, inventory and billing into one workflow. Mileage reminders may help users notice maintenance and provide a path to request an appointment. Centralized records may make past work easier for authorized staff to retrieve. These are expected benefits not demonstrated outcomes.

9. FUTURE SCOPE

Future work should implement a viable system and conduct basic and usability testing. A field pilot could assess outcomes against a documented baseline. Extensions include email or SMS notifications QR-linked service history, feedback, role-specific dashboards, backup restoration testing and optional OBD-II integration. Predictive maintenance should be considered only when suitable data are available and a model can be evaluated against a baseline. Scheduling optimization should be compared with workshop practice.

10. LIMITATIONS OF THE STUDY

Limitations include dependence on entered odometer readings, correctness of configured intervals and completeness of service history. The rule does not diagnose faults. Predict breakdowns. The system depends on a working server and database unless offline operation is implemented. This paper contains no deployed software, measured results, comparative study or validated cost estimate.

11. CONCLUSION

This paper proposed a web-based Automobile Service Management System that integrates workshop operations with transparent mileage-based maintenance reminders. The design covers user roles, vehicle profiles, odometer validation, appointments, service records, inventory, billing, security and a future evaluation plan. Existing research already addresses reminders, mileage-based guidance and sensor-supported maintenance; the proposed contribution is therefore framed as practical workflow integration rather, than entirely new technology. Implementation and empirical evaluation are necessary before conclusions can be drawn about efficiency, accuracy or customer satisfaction.

REFERENCES

- [1] H.-J. Kim, H.-J. Lee, and C.-G. Kim, "A Study of Vehicle Repair Management System based on Mileage," *Journal of Knowledge Information Technology and Systems*, vol. 11, no. 1, pp. 7–17, Feb. 2016. [Online]. Available: <https://journal.kci.go.kr/kkits/archive/articleView?artiId=ART002081819>
- [2] C. Raman, W. H. Wan Ishak, and F. M. Yamin, "Automobile Service Management and Reminder System," *Journal of Engineering Research and Education*, vol. 13, pp. 1–13, 2021. [Online]. Available: <https://ejournal.unimap.edu.my/index.php/jere/article/view/2033>
- [3] D. Siswanto, G. Priyandoko, A. Farid, and N. A. Wahyudi, "An IoT-Based Decision Support System for Real-Time Vehicle Maintenance Scheduling in the Fourth Industrial Revolution," in *Proc. Beyond Technology Summit on Informatics International Conference (BTS-I2C)*, 2024. doi: 10.1109/BTS-I2C63534.2024.10942271.
- [4] A. Patidar, S. Dosalar, and T. Varshney, "An Effective Garage Management System Web Application for Customer Service," *International Journal of Computer Applications*, vol. 183, no. 31, pp. 18–22, 2021. doi: 10.5120/ijca2021921699.