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AUTOMOBILE MANAGEMENT SYSTEM

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ABSTRACT

In Today's world with so many cars, models in the market, it is hard to find out which car has a high maintenance cost/index that is authentic source. Problem statement in Description o System that shows the health and Maintenance Index of various components of car models or car parts based on multiple factors. This will help new buyers to understand the maintenance costs of a certain model and probability of which car part requires more often servicing /change, OEM's to understand which part is requiring frequent change and needs to be recalled and made better in the new models. Vehicle maintenance patterns across car models by mileage, usage , age of the vehicle , regional patterns across dealers, service stations and car manufacturer .Purpose and who will benefit o Consumers so they know which car has a higher maintenance and maintenance index. o Car Manufacturers , so they know which parts are getting serviced often based on the part change • How does it help the nation o Better understanding for consumers on which car to purchase with low Vehicle Maintenance Index o Govt has better understanding of car maintenance index before approving cars on the Road (ARAI Authority)

Practical and reasons why this idea could be a challenge from Implementation o Data Challenge : Build a dealer/service station network , OEM, consumers who can feed data into the system –without data this solution will not work o Ability to integrate this solution easily with the current systems which can collate the data o Marketing challenge : Owner within the Govt to take this ahead and invest this product o Political : OEM's might not want such a system to be developed. Domain Bucket , Transport , Vehicles • Technology Bucket o Integration across systems –Integration platform across systems with security model for data extraction o Analytics & Data Science (if possible) -Bigdata/Hadoop, AI / ML o Data Aggregation o Visualization

1. INTRODUCTION

More than two-third of automotive customers indicate that Service Convenience is a determining in selecting a brand or purchasing from a Specific dealership. Consequently, Customer Service and service management is of vital relevance to ensure ongoing Customer

loyalty and retention and ultimately, dealer Profitability. Dealer Business Management enables efficient Service order Processing and billing designed for any given number of orders per day. It includes Service requests and Scheduling, Optimization of techicans, tools, and parts as well as their deployment and scheduling. User friendly interfaces provides ease of use and the integration technology ensure a seamless and smooth business process into OEM channel System, including ,job and Package Catalogs, Vehicle history files, Warranty Systems, etc. Service monitoring and analysis increases the Visibility in Overall fixed Operations and helps increases service Capacity, utilization, efficiency and decrease de-operating cost. Recreation Vehicle service technician inspect, test, service and replace every system installed in a recreation Vehicle with the exception of the dry. Both intervals are equally important for properly marinating your Vehicle Remember all Toyota dealerships offer a broad range of Parts and Service. The Driver and Vehicle Licensing Agency, the Driving Standards Agency and the Vehicle and OperatorServiceAgencyProvideServicesfor42milliondrivers. The Vehicle and Operator Services Agency(VOSA) [3] Provides a range of licensing, testing and enforcement services with the aim of improving the roadworthiness standards of Vehicles ensuring the Compliance of operators and drivers, and Supporting the independent Traffic Commissioner.

2. LITERATURESURVEY

The purpose of this research is to support decision-making for solving design issues in the development phase of complex systems supported by numerical simulation. We conducted our studies in a multinational car manufacturer. The first part of the research was devoted to identifying the difficulties encountered in the issue resolution process with a particular focus on decision-making issues, methods, and tools. A qualitative study, conducted with 11 experts and on 40 decision problems, highlighted that decision-makers choose from a set of process alternatives rather than artifact alternatives. The consequences of these process alternatives, such as recalculating, integrating information, waiting for the technical definition of the vehicle to evolve, etc., are not explicit. We identified the lack of a rigorous framework as an opportunity. The second part was therefore to propose a framework to support design decisions. Concurrent engineering, resource constraints, and project management issues have often been overlooked in Decision-Based Design literature. Attempting to bridge this gap, we designed the

IRDS framework. Through IRDS, we propose to make explicit the process alternatives, to gather economic data and expert forecasts in a decision model based on prescriptive decision theory, including the maximization of the expected utility and the economic value of imperfect information. The third part of the research is related to the impact of uncertainty on the data collection process and on the overall decision outcomes. This has been done through proposing a sensitivity analysis performed with available data before data gathering through an elicitation process. The impacts on the decision-making process and information exchanges between stakeholders, as well as the resources consumed by the new practices we proposed, have also been studied on a more superficial level. This work was particularly deployed and tested on 5 case studies. The validation of this approach requires to collect further empirical evidence to support the hypothesis that better decisions are made in the long run. We are confident that our research will serve as a base for future studies on the design and implementation of frameworks addressing industrial challenges.

The vehicle maintenance and service system is an automation of the various vehicle services needed by a vehicle user in a mobile application [7]. This application provides vehicle service reminders while offering vehicle-related solutions. The vehicle maintenance and service system provide repair cost estimates to help mitigate the challenges vehicle users face for vehicle repairs and maintenance. This project work contains a review of existing systems related to the proposed system and the prototype development methodology used to develop the system. It also provides the design of the system using the Unified Modeling Language as well as testing of the system [8]. The examination of the literature uncovered several empirical evidence areas, and the resulting discussion provides the basis for the design and implementation of the vehicle maintenance and service system.

With the rapid advancement of sensor and network technology, there has been a notable increase in the availability of condition-monitoring data such as vibration, temperature, pressure, voltage, and other electrical and mechanical parameters. With the introduction of big data, it is possible to prevent potential failures and estimate the remaining useful life of the equipment by developing advanced mathematical models and artificial intelligence (AI) techniques [8]. These approaches allow for quick and appropriate maintenance actions. In this scenario, this paper presents a systematic literature review of statistical inference approaches,

stochastic methods [9], and AI techniques for predictive maintenance in the automotive sector [10]. It provides a summary of these approaches, their main results, challenges, and opportunities, and supports new research works for vehicle predictive maintenance [11].

3. PROBLEM STATEMENT

The existing system is a manual one in which users maintain books to store information such as product details, distributor details, purchases, sales details, and accounts for every month. It is very difficult to maintain historical data. The following are the disadvantages of the existing system: It is difficult to maintain important information in books. More manual hours are needed to generate required reports [12]. It is tedious to manage historical data, which requires much space to keep all the previous years' ledgers, books, etc. Daily sales and purchases details must be entered into books, which are very difficult to maintain.

3.1 DISADVANTAGES

Increased Repair Costs: When vehicles are not maintained regularly, small issues can become bigger problems that require expensive repairs. Over time, the costs of these repairs can add up, leading to increased expenses and reduced profits.

Decreased Safety: Vehicles that are not properly maintained are more likely to experience mechanical failures or breakdowns while on the road. This can endanger the safety of drivers and passengers, as well as the safety of other drivers on the road.

Reduced Vehicle Lifespan: Regular maintenance can help extend the lifespan of a vehicle. When vehicles are not maintained properly, they may require replacements sooner than expected, which can result in significant expenses.

4. PROPOSEDSYSTEM

The DISTRIBUTORS MANAGEMENT TOOL is a software application that avoids more manual hours that need to be spent in record-keeping and generating reports. This application keeps the data in a centralized way, which is available to all the users simultaneously. It is very easy to manage historical data in the database. No specific training is required for the distributors to use this application. They can easily use the tool that decreases manual hours spent for normal things and hence increases the performance. It is very easy to record the information of online sales and purchases in the databases.

4.1 ADVANTAGES

Reduced Repair Costs: By addressing small issues before they become bigger problems, organizations can help reduce repair costs over time. This can help save money and increase profitability.

Extended Vehicle Lifespan: Regular maintenance can help extend the lifespan of vehicles, reducing the need for replacement and saving money in the long term.

Improved Resale Value: Vehicles that have been well-maintained and have a documented maintenance history often have a higher resale value than those that have not. This can help organizations recoup some of the costs of their fleet of vehicles when it comes time to sell them.

Increased Efficiency: Vehicles that are well-maintained are often more efficient, leading to lower fuel costs and increased productivity. This can help organizations save money and increase profits.

5. SYSTEM ARCHITECTURE



6. IMPLEMENTATION

6.1 ADMIN

In this application, the admin module allows admins to log in directly with the application. After a successful login, the admin can perform operations such as viewing all users, adding services, viewing services, and logging out.

6.2 SERVICES

In this application, the services module requires the admin to add services. Only after the admin adds services can users access their homepage. After a successful login, users can perform operations such as adding car details and logging out.

6.3 USER

In this application, the user module requires users to register with the application. After registration, users can access their homepage upon successful login. They can then perform operations such as viewing their profile, searching for car details, analyzing graphs, and logging out.

7. EXPECTED RESULTS





| AUTOMOBILE MANAGEMENT | | | | | |
|-----------------------|--|----------------|--------------|-------------------|--------|
| | | VIEW ALL USERS | ADD SERVICES | VIEW ALL SERVICES | LOGOUT |

View All Users

| Name | Email | Mobile | Address | Delete |
|---------|------------------|------------|-------------|--------|
| Revathi | arra10@gmail.com | 9182239499 | secundrabad | Delete |

| AUTOMOBILE MANAGEMENT | HOME | VIEW ALL USERS | ADD SERVICES | VIEW ALL SERVICES | LOGOUT |
|-----------------------|------|----------------|---|-------------------|--------|
| ADM | | N | Add S Service Name Service Mobile Service Addre Service Email | Add Server | |

| AUTOMOBILE MANAGEMENT | | | | | |
|-----------------------|------|----------------|--------------|--------|--|
| | HOME | VIEW ALL USERS | ADD SERVICES | LOGOUT | |
| | | | | | |

View All Service Center Details

| Service Name | Email | Mobile | Address | Delete |
|--------------|------------------|------------|---------|--------|
| Revathi | arra10@gmail.com | 1234567890 | hyd | Delete |
| Arra | arra01@gmail.com | 9703284647 | hyd | Delete |

| AUTOMOBILE MANAGEMENT |
|-----------------------|
|-----------------------|



Vehicle Maintenance

Inspecting vehicle engine and mechanical/electrical components to diagnose issues accurately inspecting vehicle computer and electronic systems to repair, maintain and upgrade Conducting routine maintenance work aiming to vehicle functionality and longevity



ADD CAR DETAILS LOGOUT

ADMIN SERVICE USER

HOME

Contact Us

AUTOMOBILE MANAGEMENT

SELECT CARS Choose Company Name Choose Company Name Choose Company Name MARUTISUZUKI TATA KIA TOYOTA Choose Variants Choose Variants Choose Variants Submit

HOME



LOGOUT

AUTOMOBILE MANAGEMENT

| Choose Comp | any Name 🗸 |
|--------------|------------|
| Choose Comp | any Name |
| Choose Comp | any Name |
| MARUTISUZUKI | |
| TATA | |
| KIA | |
| τογότα | |

Choose Variants

HOME

| AUTOMOBILE MANAGEMENT | | НОМЕ | ADMIN | SERVICE | USER |
|-----------------------|-----------|------|---|---|---|
| UserName Password | Arjun | | AU M Inspec diagn electri routin longer | TOMO ANA cting vehicle ose issues a onic system e maintenar vity Read More | DBILE GEENEENT a engine and mechanical/electrical components to accurately inspecting vehicle computer and s to repair, maintain and upgrade Conducting nee work aiming to vehicle functionality and |

| AUTOMOBILE MANAGEMENT | |
|-----------------------|--|
| | |

Welcome To : Revathi

SELECT CARS

SELECT CARS Get Details

AUTOMOBILE MANAGEMENT

ANALYSIS GRAPH LOGOUT HOME SEARCH CAR

HOME SEARCH CAR ANALYSIS GRAPH LOGOUT

Welcome To : Revathi

SELECT CARS



8. CONCLUSION

The package was designed in such a way that future modifications can be done easily. The following conclusions can be deduced from the development of the project:

The automation of the entire system improves efficiency. It provides a friendly graphical user interface, which proves to be better compared to the existing system. It gives appropriate access to authorized users depending on their permissions. It effectively overcomes the delay in communications. Updating of information becomes much easier. System security, data security, and reliability are the striking features. The system has adequate scope for modification in the future if it is necessary.

9. FUTURE ENHANCEMENT

This application eliminates manual work and the associated problems. It provides an easy way to access information about various products available in supermarkets. My team and I have put in considerable effort to present an improved website compared to existing ones regarding various activities. However, we have identified areas for further improvement.

Currently, when requesting information about a particular product, the system displays the company, product ID, product name, and quantity available. After obtaining this information, users can access the product company's website with just a click on the product name.

To enhance user experience, we propose adding a search function. This feature would allow users to directly search for a specific product company from within the site. These are the two enhancements we are considering at present.

10. REFERENCES

[1]"Managementsystemstandards",Iso.org,2018.[Online].Available:https://www.iso.org/management-system-standards.html.[Accessed:08- Sep- 2018].

[2] "Online Sales and Inventory Management System", Cloudtech ERP |NetSuite ERP Software, CRM Software, Accounting SoftwareProvider Philippines, 2018. [Online]. Available:

http://www.cloudtecherp.com/sales-and-inventory-managementsystem/. [Accessed: 08- Sep- 2018].

[3] J. Medina, "Importance of Business Process Automation to SMEBusiness Today", Qlick Tech Blog, 2018. [Online]. Available:http://www.qlickcafe.com/blogs/qlick-solutions/importance-businessprocess-automation-sme-business-today. [Accessed: 08- Sep- 2018].

[4] "What is Service Management System? | Quadrant AlphaPhilippines", Quadrant Alpha Technology Solutions, Inc., 2018.[Online]. Available: https://quadrantalpha.com/what-isservicemanagement-system/. [Accessed: 08- Sep- 2018].

[5] "The Benefits of Web Based Applications and Systems", Dbnetsolutions.co.uk, 2018. [Online]. Available: <u>http://www.dbnetsolutions.co.uk/Articles/BenefitsOfWebBasedAppli</u>cations.aspx.

[Accessed: 08- Sep- 2018].

[6] Case Study: The Elva DMS Solution for the Car Dealer & RepairCentre Musa Motors. Elva DMS, 2018.

[7] "AUTOMOBILE SERVICE MANAGEMENT | MAXWORTH", Maxworth Systems, 2018.
[Online]. Available:http://www.maxworthsystems.com/solution/automobile-servicemanagement.
[Accessed: 08- Sep- 2018].

[8] A. Pringle, "How important is a used car's service history?", Autotrader.co.uk, 2018. [Online].
Available:https://www.autotrader.co.uk/content/advice/how-important-is-aused-car-s-service-history.
[Accessed: 08- Sep- 2018].

[9] V. Gurbaxani and S. Whang, "The impact of information systems onorganizations and markets", Communications of the ACM, no. 34, pp.59-73, 1991.

[10] J. Cambronero, N. Labadan, H. Labio, R. Redoña and B. Salarda,"Integrated Sales and Inventory Management System Implemented InThree-Tier Architecture", Cloud, vol. 1, no. 1, p. 35, 2010.

[11] V. Storey, R. Chiang and H. Chen, "Business intelligence and analytics: From big data to big impact", MIS Quarterly, vol. 36, no. 4,pp. 1165-1188, 2012.

[12] C. Dharmasiri, "Car dealer Management System for ChanotaAutomobiles.", Master, University of Colombo School of Computing,2016.

[13] S. Sivapirashanth, "AUTOMOBILE REPAIRS ANDMAINTENANCE INFORMATION SYSTEM FOR AUTO TECHENGINEERS", Bachelor, University of Colombo School of Computing, 2009.