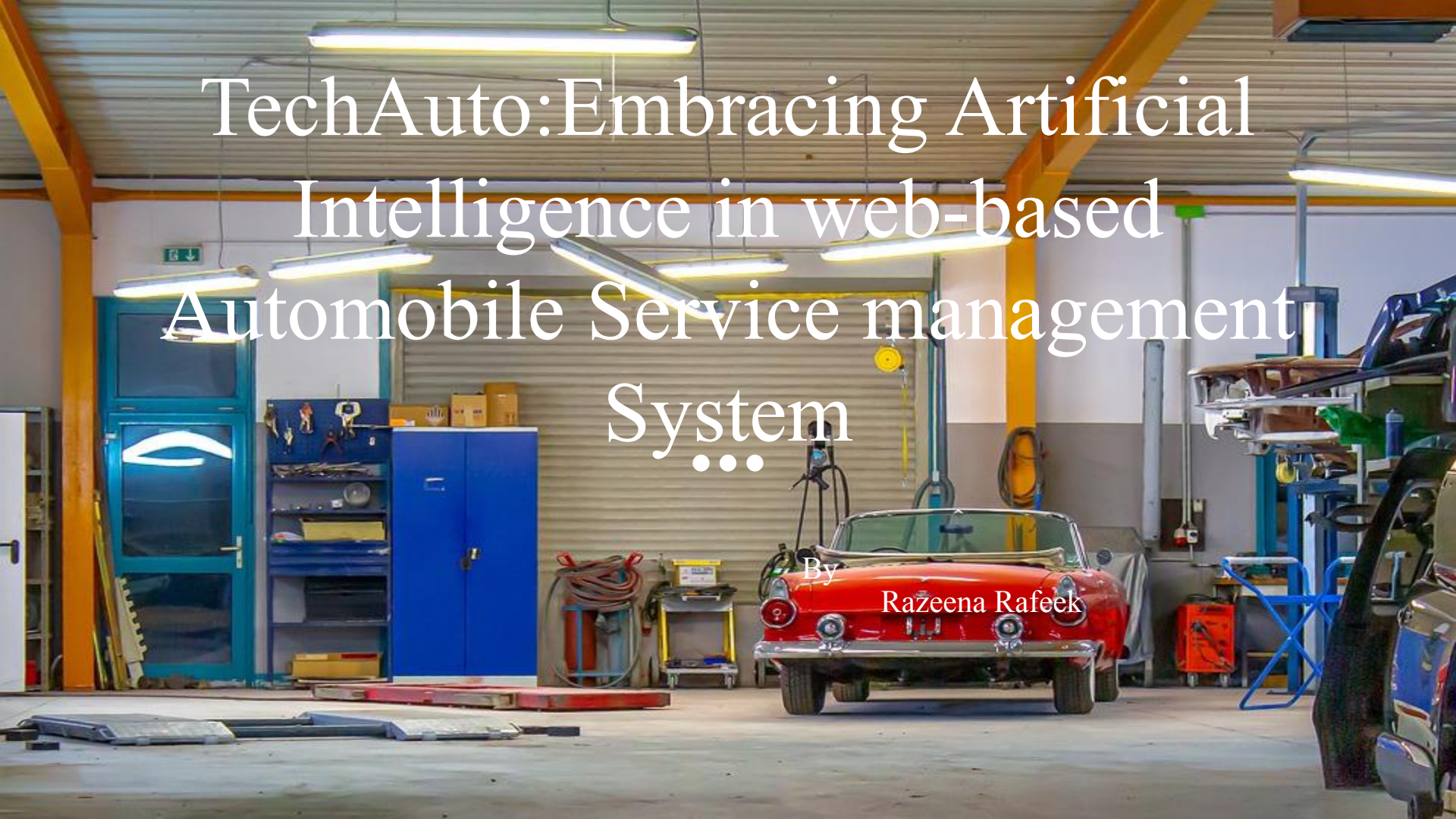


TechAuto: Embracing Artificial Intelligence in web-based Automobile Service management System

By

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Introduction

As the global automotive industry is progressing towards the future of mobility, Garage Chains are due for a major overhauling. With the advent of digitisation, customer expectations have shot up and now they demand a seamless experience even in the aftersales automotive ecosystem. The Online Management System for Automobile Services is a progressive step in the field of service centres and garages. Any car user can make use of this website to locate and communicate with the service centres or garages in their vicinity. This website uses innovative technology that connects you with a Mechanic at the tap of a button.

Our system offers a host of ground breaking innovations in garage management software and garage management systems that are instrumental in redefining the entire digital journey of the customer when it comes to the maintenance and garage chains landscape.

→ Categorization and prediction of demand of spare parts

A modern automobile is composed of around about 30,000 parts.components that bust over time ,need to be replaced during the maintenance process.Therefore,spare parts are needed at the right place,in the right quality and quantity ,for replacement of broken parts to keep the automobile working

Manager Can see the report of predicted spare parts needed with needed quantity and available quantity. From here managers can generate auto purchase order. Spare Parts demand prediction is done using artificial neural networks model

Artificial Intelligence

Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

The ideal characteristic of artificial intelligence is its ability to rationalize and take actions that have the best chance of achieving a specific goal. A subset of artificial intelligence is machine learning, which refers to the concept that computer programs can automatically learn from and adapt to new data without being assisted by humans. Deep learning techniques enable this automatic learning through the absorption of huge amounts of unstructured data such as text, images, or video.

Existing system

The Garage Management System till now was not able to record the service details of vehicles. It was done manually. The inventory of spares is done manually. There was no maintenance history of all the vehicles that were serviced in the garage. The service dates had to be tracked manually and that was a difficult task.

In existing system when the various car parts wear out they are fetched then and there according to need. sometimes the needed spare parts may not be available which causes difficulties to people who drive cars.

Drawbacks of existing system

- Personal should be available for all seasons regardless of the customer flow.
- Efficiency and productivity of the workers cannot be scientifically tested.
- Availability of spare parts is uncertain.

Proposed system

Proposed system is Tech Auto. It is an Online Management System for Automobile Services is a progressive step in the field of service centres and garages. Any car user can make use of this website to locate and communicate with the service centres or garages in their vicinity.

- Enhance customer relations
- Simplify stock control
- Improve mechanic efficiencies
- Monitor performances

The system includes:

- ❖ Garage Management Solutions: help garage chains to utilize their services for high efficiency with a larger objective of providing a delightful customer experience. It facilitates almost everything right from extensive searches, appointment booking, parts ordering to even report generation.
- ❖ Time Registration is a kiosk-based application used for optimizing operational efficiency by tracking mechanic's workload. It manages work hours spent on each task that is allocated centrally in the garages.
- ❖ Online Workshop Planner (OLP) is an extensively integrated centralized platform for managing all the garages bookings and other services. It synchronizes with garage planners for better management.

- ❖ A mobile and tablet application that helps mechanics to access information at their workplace and execute work orders. It provides information related to maintenance and repairs to the mechanics and facilitates them to set their availability, schedule repairs, track or order spare parts.
- ❖ Emergency App A one of a kind mobile app specifically created for roadside assistance, automatic emergency alerts and response. It instantly sets emergency management plans, location reporting & personalized message directed to emergency response centres.
- ❖ Mechanic training platform A training platform to enable technical, sales and management training for garage personnel

Features of proposed system

- Auto service reminders
- Auto marketing campaigns
- Employee productivity assessment
- Spare part demand prediction
- Auto status information alerts
 - Auto purchase order generation
- Employee work scheduling
- Sales prediction
- Forecast Workload

- Auto service registration
- Emergency one click assistance
- Monitor quality of work
- Auto Feedback system
- Employee rating system

Modules

prediction of demand of spare parts

Manager Can see the report of predicted spare parts needed with needed quantity and available quantity. From here managers can generate auto purchase order. Spare Parts demand prediction is done using artificial neural networks model. A multi-layered perceptron (MLP) neural network has been used for forecasting occurrence of demand. If result coming from the ANN equals zero, it means that the predicted quantity of demand equals zero. However, if the result coming from the ANN equals one, it means that the quantity of the demand is nonzero and its value needs to be calculated.

Inventory management and billing

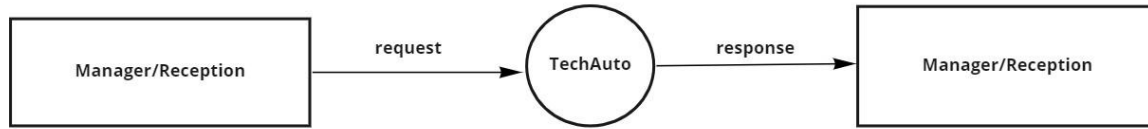
- Create new product ,edit details of existing product
- block/unblock a product
- register/edit/delete vendor details
- Stock update - enter stock update details based on new supply
- Mark Damage product/stock adjustment
- Create purchase order based on demand prediction/view status of purchase order
- Mark vendor payments ,view vendor payment details, view balance statement
- Create/view/edit category

Customer management

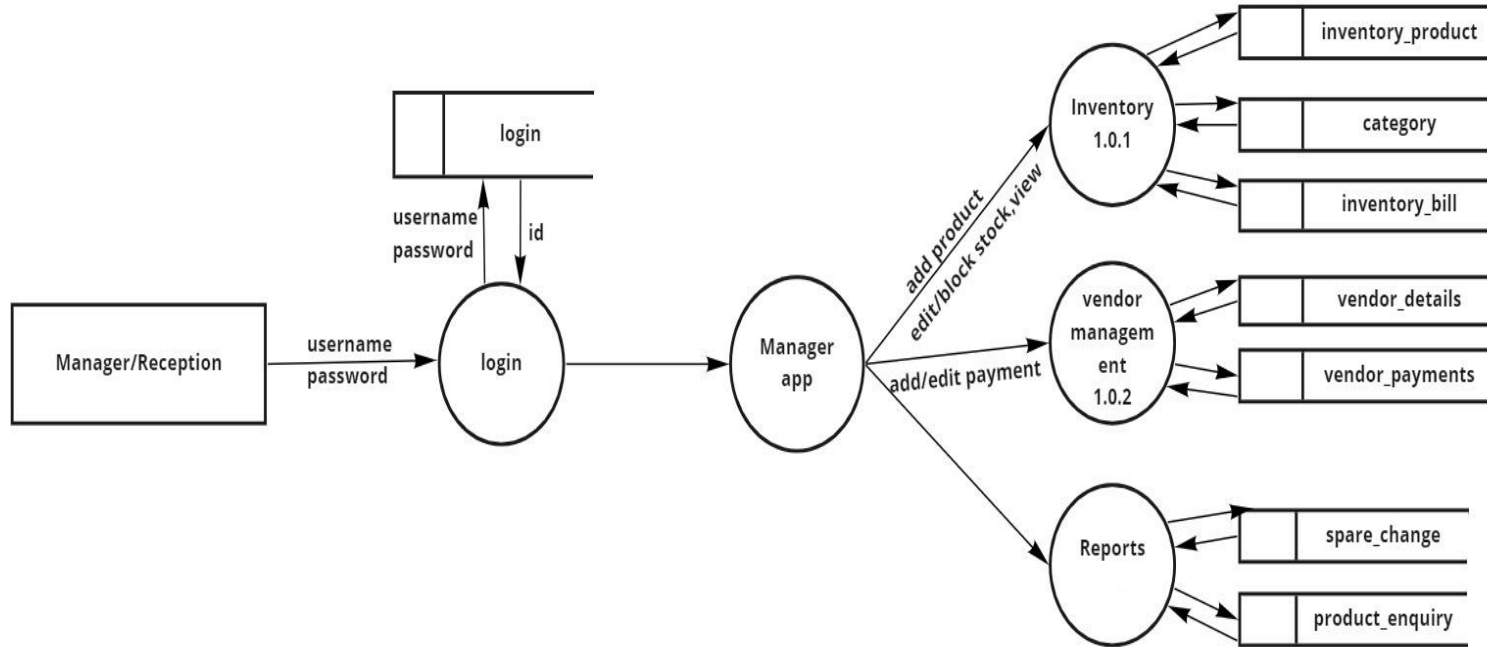
- add/edit customer details
- Customer enquiry details update
- Customer segmentation: Common characteristics in customer segments can guide how a company markets to individual segments and what products or services it promotes to them. K-means clustering is a popular unsupervised machine learning algorithm method, used for segmentation. after perform customer segmentation, algorithm find similar characteristics in each customer's behaviour and needs. Then, those are generalized into groups to satisfy demands with various strategies. Moreover, those strategies can be an input of the
 - Targeted marketing activities to specific groups
 - Launch of features aligning with the customer demand
 - Development of the product roadmap
- Auto Marketing campaign based on customer group

Data Flow Diagram

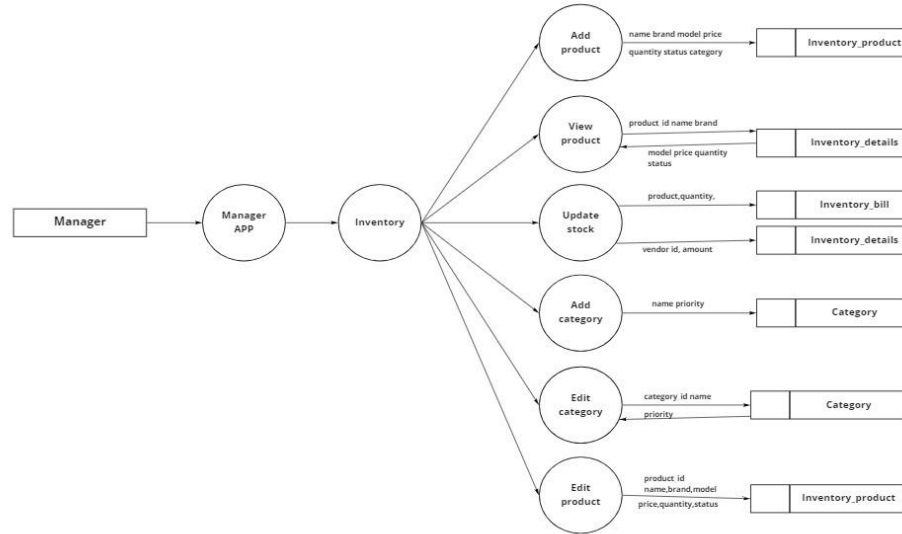
Level 0 :



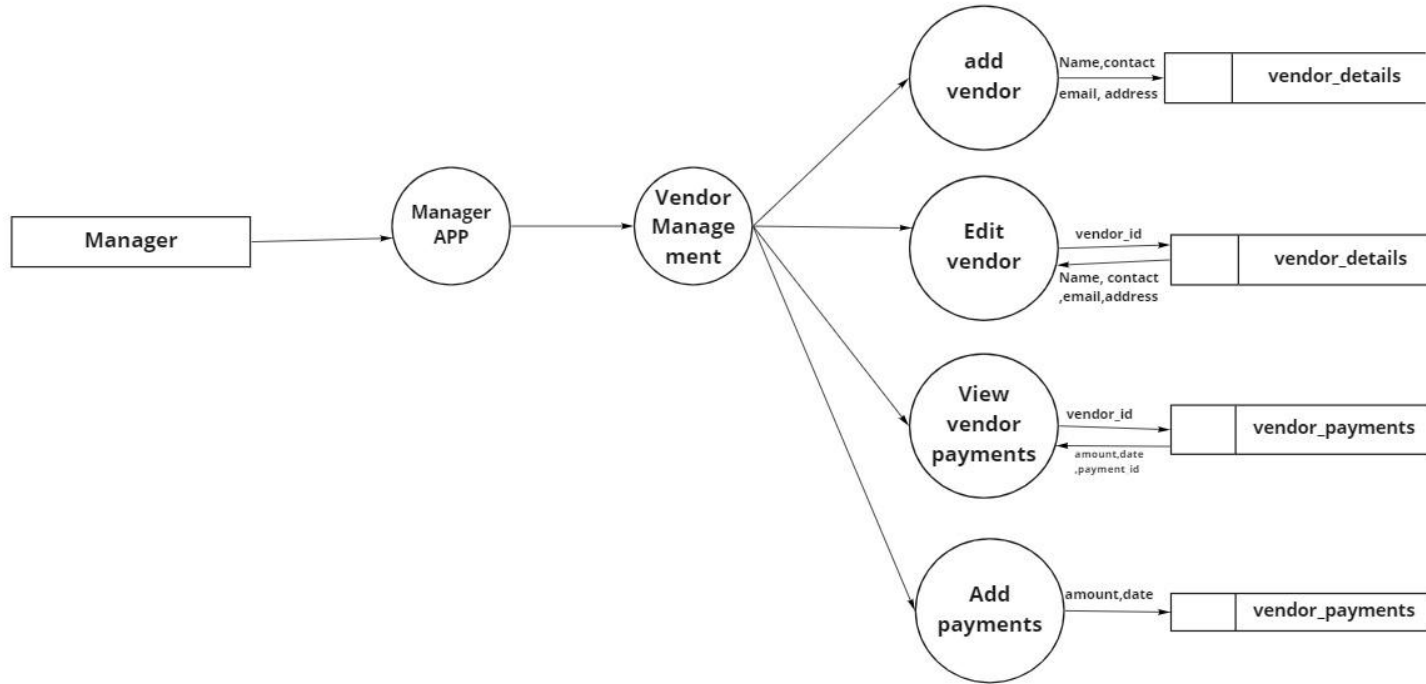
Level 1



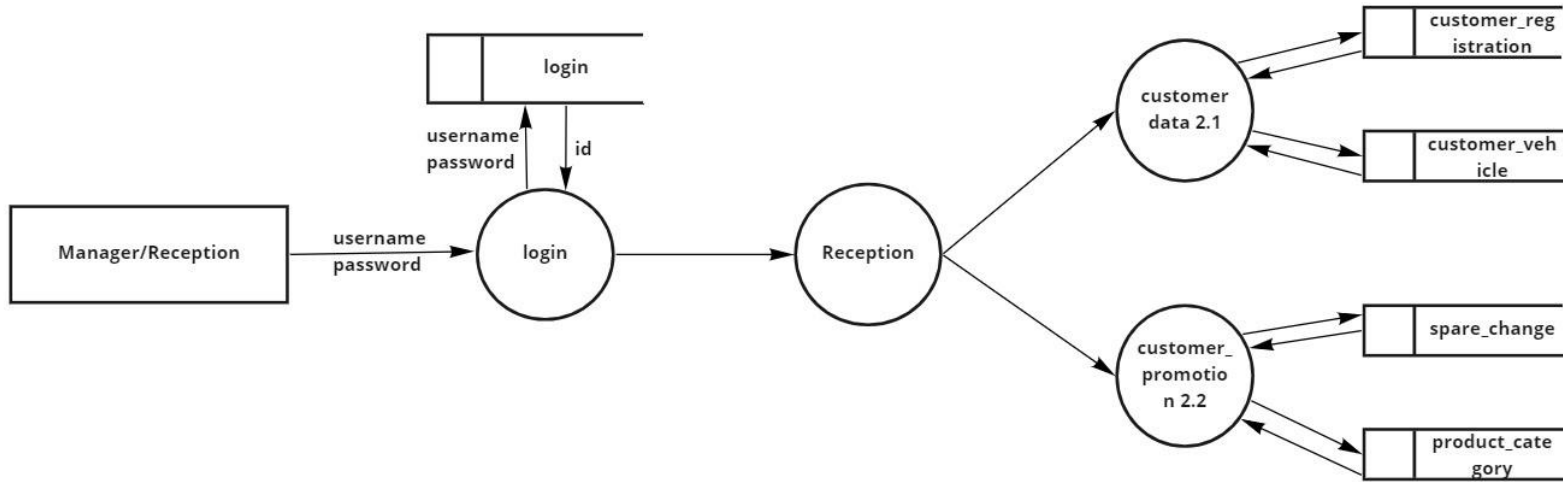
Level 1.0.1 Manager (Inventory management)



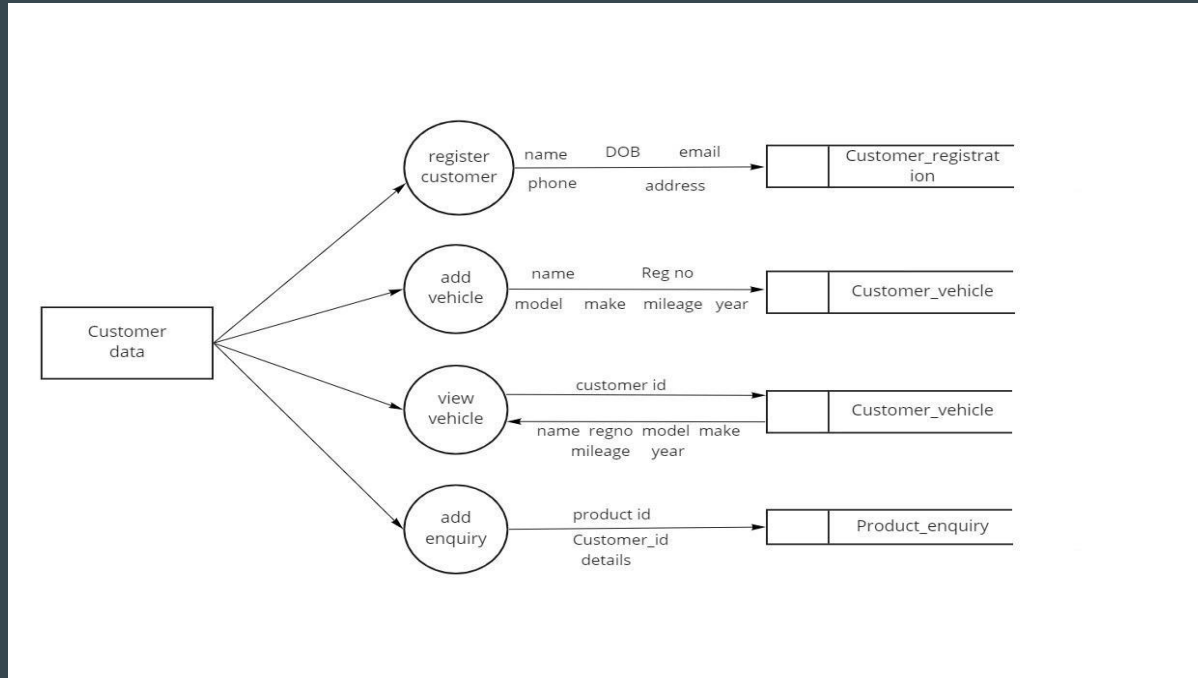
Level 1.0.2 Manager (Vendor management)



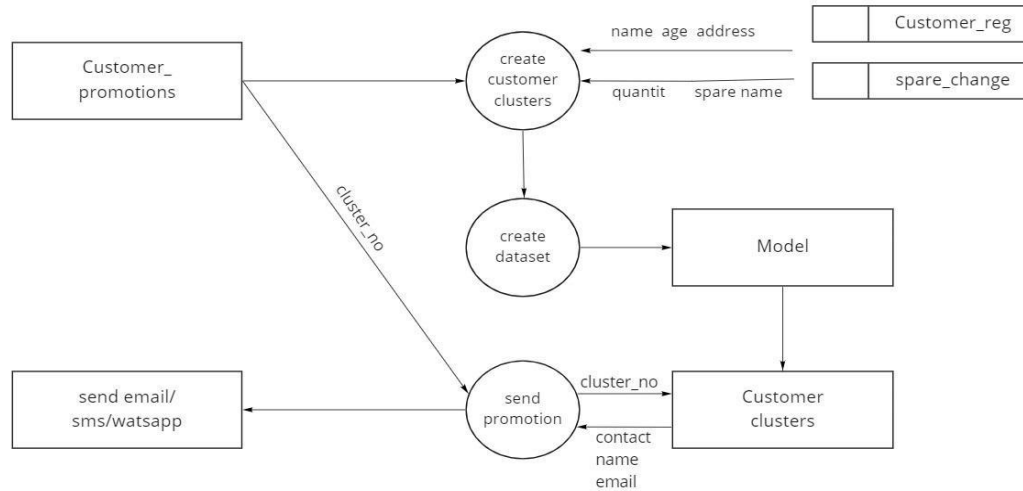
Level 1.1 (Reception)



Level 1.1.1 Reception (Customer data)



Level 1.1.2 (Customer promotion)



Tables

Table number: 1

Table name: Inventory product		primary key: product id	
Description: details of inventory product			
Field	datatype	constraint	size
Product id	int	Primary key	
Name	varchar		50
Brand	varchar		50
Price	double		
Quantity	int		
Description	varchar		50
Status	varchar		20
Category id	int	Foreign key	

Table number: 2

Table name: Category **primary key:** Category id

Description: details of Category

Field	Datatype	constraint	size
Category id	Int	Primary key	
Name	Varchar		50
Priority	Varchar		50

Table number: 3 |

Table name: vendor details **primary key:** vendor id

Description: details of vendor

Field	datatype	constraint	size
Vendor id	int	Primary key	
Name	varchar		30
Contact	varchar		15
Email	varchar		40
Address	varchar		40

Table number: 4

Table name: Inventory bill		primary key: Inventory id	
Description: details of inventory bill			
field	datatype	constraint	size
Inventory id	int	Primary key	
Vendor id	int	Foreign key	
Total	double		
date	date		
Amount given	double		

Table number: 5

Table name: Inventory details		primary key: Inventory details id	
Description: details of inventory details			
field	Datatype	constraint	size
Inventory details id	Int	Primary key	
Inventory id	int	Foreign key	
Product id	int	Foreign key	
quantity	int		
Amount	double		

Table number: 6

Table name: vendor payments **primary key:** payment id

Description: details of vendor payment details

field	datatype	constraint	size
Payment id	int	Primary key	
Vendor id	int	Foreign key	
Amount	double		
date	date		

Table number:7

Table name: spare change primary key: spare change id			
Description: details of spare change details			
field	datatype	constraint	size
Spare change id	int	Primary key	
Vehicle id	int	Foreign key	
Product id	int	Foreign key	
date	date		
Quantity	int		
Reason	varchar		100

Table number:8

Table name: product enquiry		primary key: Enquiry id	
Description: details of product enquiry details			
field	datatype	constraint	size
Enquiry id	int	Primary key	
Details	text		
Product id	int	Foreign key	
Customer id	int	Foreign key	
date	date		

Table number:9 Customer

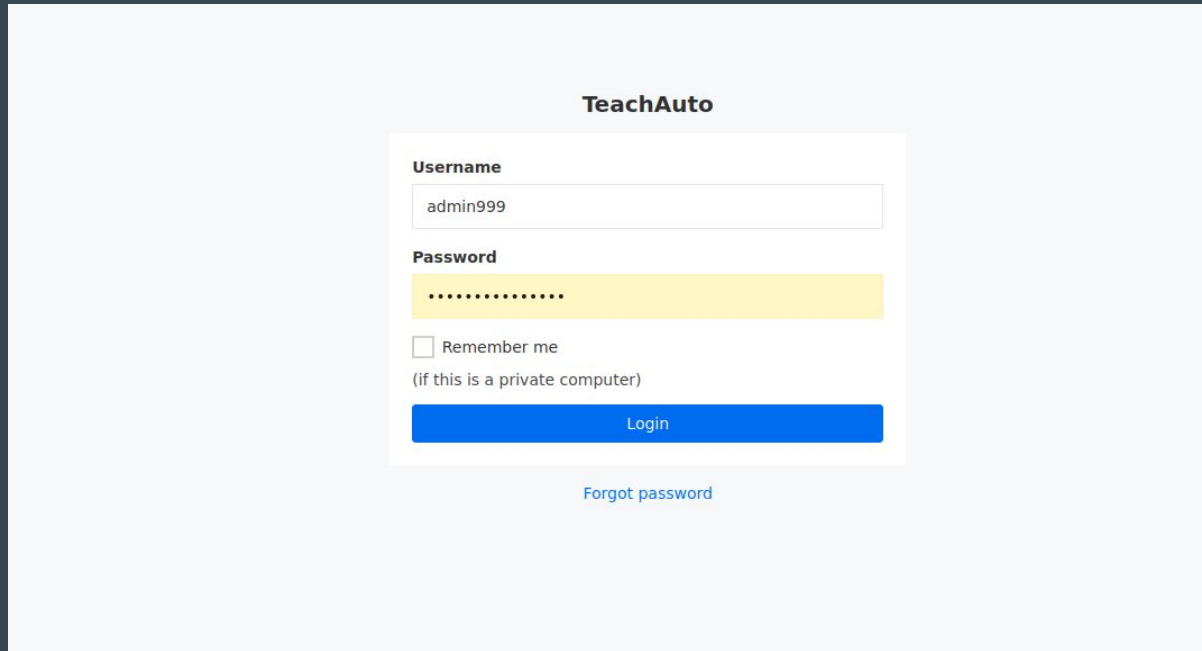
Table name: Customer		primary key: customer id	
Description: details of customer			
field	datatype	constraint	size
Customer id	int	Primary key	
Name	varchar		30
DOB	date		
Email	varchar		30
Address	text		
Phone	varchar		15

Table number:10

Table name: Customer vehicle		primary key: vehicle id	
Description: details of Customer vehicle			
field	datatype	constraint	size
Vehicle id	int	Primary key	
Customer id	int	Foreign key	
Name	varchar		30
Reg number	varchar		30
Model	varchar		30
Make	varchar		30
Manufacturing year	varchar		10
Mileage	double		

Screenshots

login



The screenshot shows a login interface for 'TeachAuto'. It features a central white box on a light gray background. Inside the box, the title 'TeachAuto' is at the top. Below it are two input fields: 'Username' with the text 'admin999' and 'Password' with masked characters. There is a 'Remember me' checkbox and a 'Login' button. A 'Forgot password' link is located below the login box.

TeachAuto

Username

admin999

Password

.....

☐ Remember me
(if this is a private computer)

Login

[Forgot password](#)

Add product

Home

Inventory ▾

Vendor ▾

Customer ▾

Report ▾

Joshna ▾

Add Product

Name

Price

Quantity

Drop image here or click to upload.

Description

Select Model

Select Brand

Select status

Submit

Product list

☰

Home

Inventory ▾


Vendor ▾

Customer ▾

Report ▾

✉

🔔

Joshna ▾

☰

Search...

🔍

Home / View Products

Product List

Add Product

No	Name of Product	Status	price	quantity	Model	Brand	Setting
1	Hopkins 47345 4 Wire Flat Adapter	Active	\$12	10	67309	Hopkins	<div><div></div><div></div></div>
2	Castrol 03128C Edge 5W-30 Full Synthetic Motor Oil, 5 Quart	Disabled	\$50	0	Castrol oil 33	Castrol	<div><div></div><div></div></div>
3	Shell Spirax S6 AXRME SAE 75W-90 GL-5	Active	\$20	28	shell s6	shell	<div><div></div><div></div></div>
4	Triax HD Gear Premium LS 80W-90, GL-5	Active	\$24	28	GL-5	Triax	<div><div></div><div></div></div>

Previous

1

2

3

Next

Update stock

HomeInventory ▾Vendor ▾Customer ▾Report ▾

update stock

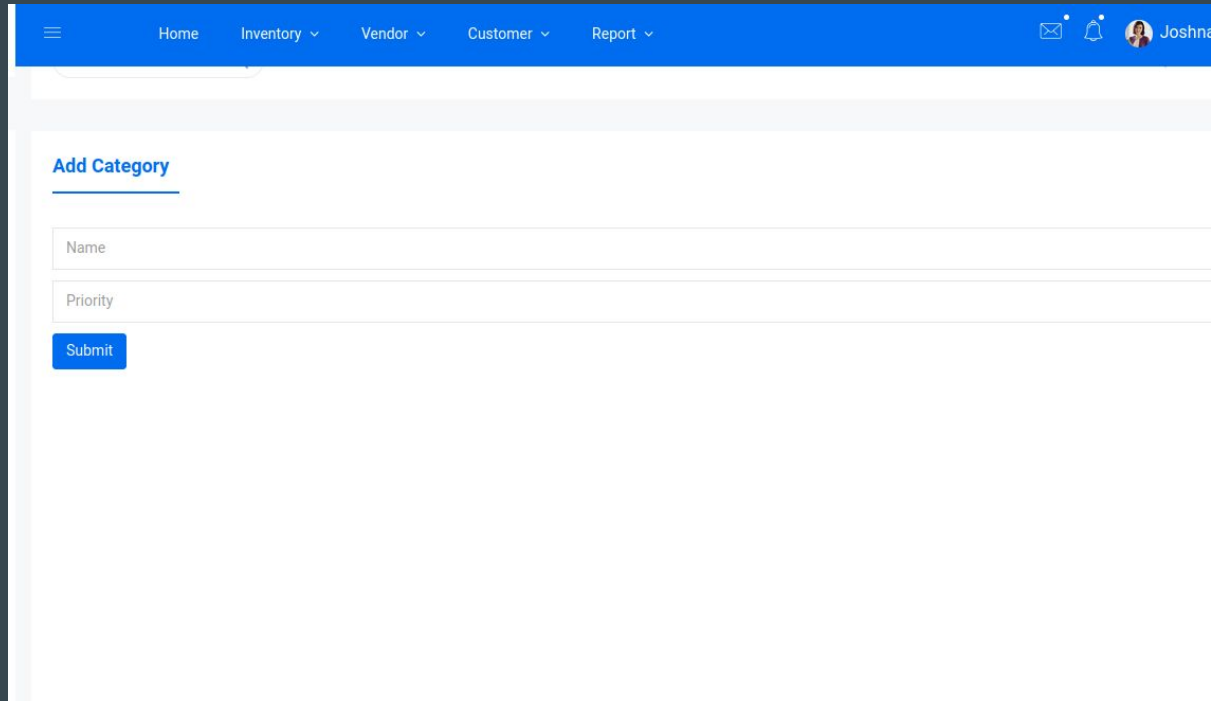
Add Row

Guta Agencies

No	Name	amount	quantity	Total
1	Castrol 03128C Edge High Mileag	\$25	100	\$2500
2	Shell Spirax S6 AXRME SAE 75W-	\$10	100	\$1000
Total:				\$3500

Submit

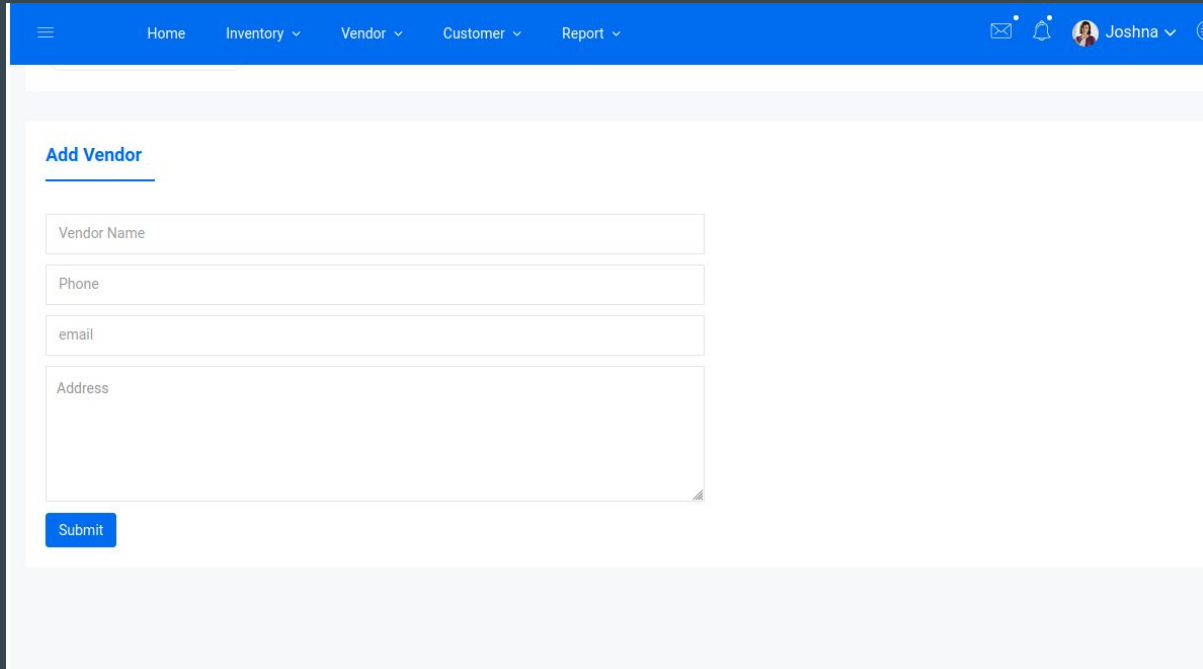
Add category



The screenshot displays a web application interface for adding a new category. At the top, there is a blue navigation bar with a hamburger menu icon on the left, followed by links to 'Home', 'Inventory' (with a dropdown arrow), 'Vendor' (with a dropdown arrow), 'Customer' (with a dropdown arrow), and 'Report' (with a dropdown arrow). On the right side of the navigation bar, there are icons for email and notifications, along with a user profile picture and the name 'Joshua'.

Below the navigation bar, the main content area has a light gray background. A white card is centered on the page, featuring the title 'Add Category' in blue text, which is underlined. Below the title, there are two input fields: the first is labeled 'Name' and the second is labeled 'Priority'. Both fields are empty and have a light gray border. Below these fields is a blue button with the text 'Submit' in white.

Add vendor



The screenshot displays a web application interface for adding a new vendor. At the top, there is a blue navigation bar with a hamburger menu icon on the left, followed by links to 'Home', 'Inventory', 'Vendor', 'Customer', and 'Report', each with a dropdown arrow. On the right side of the navigation bar, there are icons for email, notifications, and a user profile for 'Joshna' with a dropdown arrow. Below the navigation bar, the main content area has a light gray background. A white card is centered on the page, featuring the title 'Add Vendor' in blue text with a blue underline. Inside the card, there are four input fields: 'Vendor Name', 'Phone', 'email', and 'Address'. The 'Address' field is a larger text area. At the bottom left of the card, there is a blue 'Submit' button.

Navigation: Home, Inventory, Vendor, Customer, Report

User: Joshna

Add Vendor

Vendor Name




Phone

email

Address

Submit

Edit vendor

 Home Inventory ▾ Vendor ▾ Customer ▾ Report ▾  

Edit Vendor

Guta Agencies LLC

+17334455298

gutachicago01@gmail.com

guta tower , chicago

Submit

Vendor payment

Home

Inventory

Vendor

Customer

Report

Joshna

vendor payments

Add payment

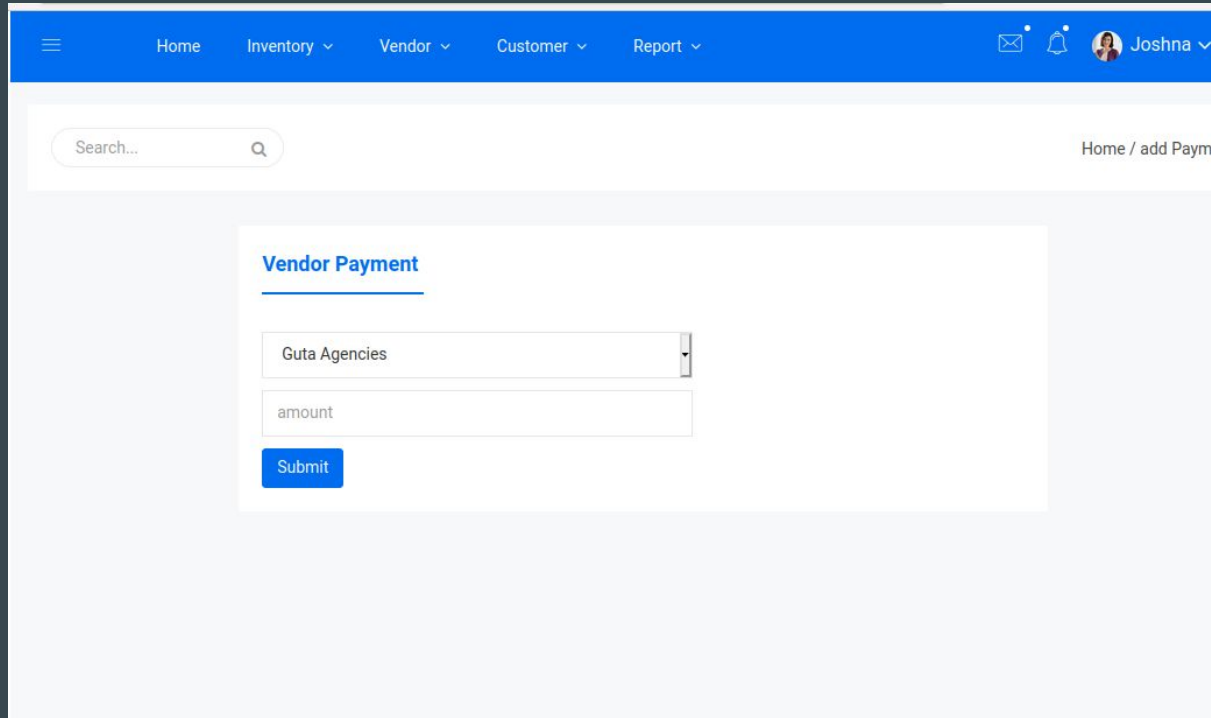
June- 2021

No	Name	amount	date
1	seeko Tradelinks	\$1420	10-06-2021
2	seeko Tradelinks	\$1500	12-06-2021
3	Guta Agencies	\$1500	12-06-2021

Previous

Next

Add payment



The screenshot displays a web application interface for adding a payment. At the top, a blue navigation bar contains a menu icon, links for Home, Inventory, Vendor, Customer, and Report, and user information for Joshna. Below the navigation bar is a search bar and a breadcrumb trail 'Home / add Payment'. The main content area features a 'Vendor Payment' form with a dropdown menu for 'Guta Agencies', a text input for 'amount', and a blue 'Submit' button.

Home / add Payment

Vendor Payment

Guta Agencies

amount

Submit

Add customer

☰

Home

Customer ▾

Service ▾

spares ▾

Billing ▾

Settings ▾

Add Customer

Name

Date of Birth

email

phone

Address

Submit

Add vehicle

☰

HomeCustomer ▾Service ▾spares ▾Billing ▾Settings ▾

+1962888309

🔍

Home / Add Vehicle

Add Vehicle

Name

Registration number


Select Brand

Select Model

Manufacturing year

kilometer

Register vehicle



Customer Name

Fly kin

Email ID

fly@gmail.com

Dob

08-10-1985

Phone

+1962888309

Address

Chicago.

View vehicle

☰

Home

Customer ▾

Service ▾

spares ▾

Billing ▾

Settings ▾

+1962888309

🔍


Home / view vehicle

View Vehicle

Registered vehicles of Fly kin

Add vehicle

No	Registration number	Brand	Model	year	km
1	NYC 5633	Chevrolet	BLAZER	2020	22132



Customer Name

Fly kin

Dob

08-10-1985

Email ID

fly@gmail.com


Phone

+1962888309


Address

Chicago.

Add enquiry

HomeCustomer ▾Service ▾spares ▾Billing ▾Settings ▾



+1962888309





Home / Add Enquiry

Add Enquiry

customer Name

product

Description

Submit

Spare prediction

<div><div><div>☰</div><div>Home</div><div>Inventory ▾</div><div>Vendor ▾</div><div>Customer ▾</div><div>Report ▾</div></div><div><div><div>✉</div><div>🔔</div><div>👤 Joshna ▾</div><div>☰</div></div></div></div>						
No	Product Name	predicted Demand	Available Quantity	PO Given	Need to Purchase	
1	Shell Spirax S6 AXRME SAE 75W-90 GL-5	110	20	50	40	
2	Triax HD Gear Premium LS 80W-90	50	5	0	45	<button>✕ Order</button>
3	Mann-Filter HU 816 X Metal-Free Oil Filter	150	80	70	0	
4	Bosch Ignition Coil 6-PACK	30	0	0	50	<button>✕ Order</button>
5	EPAuto CP430 Premium Cabin Air Filter	10	13	0	0	
6	Macrofiber Cabin Air Filter	50	30	30	0	

Send promotion

Home

Inventory ▾

Vendor ▾

Customer ▾

Report ▾

Joshna ▾

Home / Send promotions

Send Promotions

Select Customer Cluster

Select Media

Drop image here or click to upload.

Subject

Content

Submit

conclusion

The online management system for automobile services is a progressive step in the field of service centres and garages. Any car user can make use of this website to locate and communicate with the service centres or garages in their vicinity. This website uses innovative technology that connects you with a mechanic at the tap of a button. garage management solution facilitates almost everything right from extensive searches, appointment booking, parts ordering to even report generation. In this website managers can add products, vendor details, payments and can demand spare parts which is done by predicting the spare part requirement, from the previously collected customer data. reception can enter the customer details and vehicles details . clusters are formed in the basis of vehicle and priority. manager can give promotions to each cluster of customers easily.

Thank you