SRM University AP

Department of Computer Science and Engineering.

Software Engineering Project Report on

"Filling Station Management System Report"

N.Sree Aravind Bhaskar
AP19110010196
CSE B

Table of contents:

1.Abstract:

The project is to develop a web application to calculate, store and retrieve the stock and sales details of a filling station on a daily basis. The target audience for this project are the fuel station managers. Our project in which we use full stack development will be of much use for the managers who calculate the sales on a daily basis and record the information for various purposes. With the growing dependency on machines, with the help of our project we would like to bring ease in the work of the fuel station managers. With every work being done digitally, we came up with this idea of developing a web application for fuel filling stations. Our project idea also assures that the calculations made are error free to maximum extent when compared to human-made calculations. Through our web application efficient calculations are done to store the sales, stock and retrieve the data of the fuel when necessary.

2.Introduction:

We are developing a web application for fuel filling stations. By this project, the dealers of the fuel stations can calculate the sales on a daily basis and store the records for various purposes. We can retrieve the data of the fuel whenever needed. In addition to the current functioning of fuel stations, we are implementing a slot booking system where the dealers can place an order to transport fuel from refinery storage. This report defines maintenance attribute requirements of fuel filling stations. This project would like to bring ease in the work of the fuel station dealers. This software facilitates the dealers to crosscheck all the necessary records whenever they want to tally the input given to the fuel stations with the outcomes. Here, all the records related to the stock are digitized and the dealers can book their slot in advance. This makes it easier for the dealers to see a clear transaction

without any losses. Since the stakeholders here are dealers, they can take the necessary precautions for the preventive maintenance.

3.Literature Review:

Sumaiya and Syed devised a strategy for managing lines that employs artificial intelligence (AI). This is done to automatically calculate the refilling time by recognising the vehicle type and estimating the tank size. So that the drivers of the vehicles in the queue may see how much time each vehicle has remaining and choose which queue to join accordingly **[1]**.

Aishwarya, Lajari, Leena, and Sonawane created a system that can construct a prepaid card for a petrol bunk system as well as a petroleum distributing system utilizing RFID technology. Fuel stations are currently operated manually. We can reduce the number of manual labor by adopting this technology **[2]**.

Gnanavel, Deepak, Praveen, and Jason have created a technique that assists in avoiding any human errors as well as the dishonest actions that a culprit laborer engages in throughout his work. The goal of the project is to turn the entire procedure conducted by human laborers at a Filling Station into an automated digitized system to eliminate little errors and cheating by the laborers **[3]**.

Petrol pumps are operated manually, according to Arpita Nayal, Mahima Gaur, Tanisha Kashyap, and Vartika Shukla, using a controlling device that performs several jobs. These petrol pumps are time-consuming, demand more manpower, are prone to errors, and there is a chance of many human errors. Furthermore, petrol stations cannot be located in remote places. The paper's major goal is to address all of these issues by developing an automated gasoline delivery system

using RFID technology. A user can use an RFID-based prepaid card to access petrol at such pumps using this technique. When filling the tank from the fuel dispenser, the user must first enter the amount and then position the RFID card near the RFID reader. The Arduino Uno then reads the data from the RFID reader and conducts the operation as required by the client, deducting the amount from the user's card. As a result, the RFID-based Automated Petrol Pump would improve the current system by decreasing human work and offering an auto directed mechanism to complete duties in a timely manner. These systems are both time-saving and dependable**[4]**.

The Petrol Pump Management System was developed to keep track of daily records of various fuels such as petrol and diesel at gas stations. This project will include information on how to find out information about various petrol pumps. This system is made up of many forms and was developed using various computer languages such as ASP and Net. Admins can use this system to keep track of how much petrol, diesel, and compressed natural gas (CNG) were sold on any given day, week, or month. Admins can also examine which employee sold how much diesel or petrol using the sales module. It can also verify the overall amount of oil purchased, employee attendance, and the day's performance at the Petrol Station.
Using this computerized design of the Petrol Pump System module, the admin can keep track of all employee details such as name, address, phone number, and any other document that is easily accessible in the system. Admin can also verify the employee's joining time and remuneration. The Petrol Pump Management System provides reports on sold Petrol files, personnel details files, and more. This is a project to computerize the day-to-day operations of a petrol pump**[5]**.

4.System Requirements:

User Interface Requirements

The system requirements for our project are listed below:

Our website's various web pages are as follows:

- ➢ Login page
- ➢ Home page
- ➢ Stock calculation page
- ➢ Records page
- ➢ Slot booking page
- ➢ Payment gateway page

Hardware requirements

The following are the web application's minimum hardware requirements:

- ➢ A desktop or laptop computer with internet access
- ➢ Mouse
- ➢ Keyboard
- ➢ 512 MB of RAM 9

Software requirements

- ➢ Functioning OS
- ➢ Web browser

Communication requirements

- ➢ HTTPS
- ➢ TCP/IP
- ➢ SMTP

Capacity:

The software can handle a large number of users and is scalable thanks to the use of Node JS.

Scalability:

To improve capacity, we're employing nodeJS to serve a large number of clients.

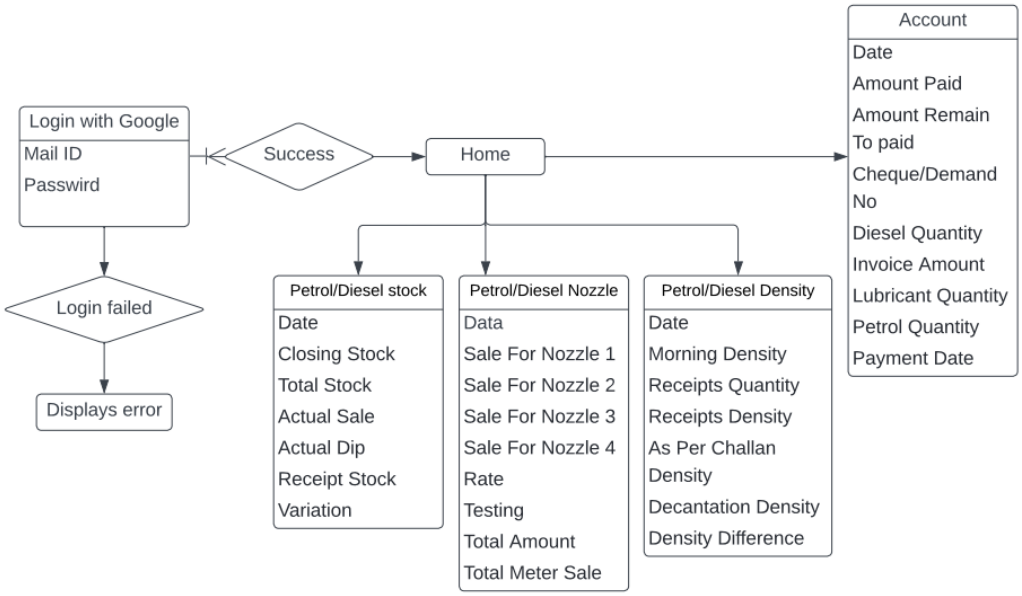
Security:

- ➢ The database protocols will provide the user data with basic security.
- ➢ The password must meet specific criteria defined by the administrator in order to be secure.

Quality:

The primary goal of this full stack web application is to provide complete services with no abnormalities or inefficiencies. Standard practices, such as the effective use of comment lines, are used to keep all of the programming logic consistent. Every single aspect of the programme will be used and tested.

ER Diagram:



5.Proposed scheme:

The proposed scheme for our project is the “Filling Station Management System”. In this project, we decided to implement some functionalities which will be useful for the dealers of filling stations. We came up with adding a calculation section. This calculation section is divided into diesel and petrol calculations which further divided into three more sections that calculates stock, sale from nozzles and density. It tells us how much stock was used and how much stock is left that day.

We decided to add a records section, which stores all the sales happening on a daily basis. We will store some random data which happened in the last few days and the remaining data will be added automatically when the sales calculation is completed. For example if we want to see the sales that happened last week, we will enter the date then the data will be displayed.

Also we decided to implement a slot booking system which is useful for the dealers when the stock in the tank is finished and they can book a slot and in that slot

timings the fuel will be delivered from refinery storage. They can select a slot booking option and the system will ask for how much quantity is required and then the dealer will enter his requirement and place the order.

The login page will appear first to the user, the user will be able to login to the website using the google account. Then the user will be redirected to the home page which contains several options like diesel/petrol calculation, records, slot booking etc. The user can select diesel/petrol stock, nozzle and density which he wants to calculate. If the user wants to calculate how much stock is used and how much stock is left, he will enter the details which are asked and the website will calculate and display the variation. This whole data will be stored as a record for that day. So when the user goes to the records page, this data will be displayed. If the user wants to check the data of previous days, then the user can enter the date of the required data and the data will be displayed if it is in the database. Suppose the fuel in the tanks are finished or the quantity is less, then the user can go to the slot booking page which will be below the records page option and this page will display a few options like how much quantity of fuel is required, when the fuel should be delivered (date & time). After entering all these details the user can place an order, when the user places an order payment page will be displayed and asks user to pay using credit/debit or pay in cash, after selecting the payment method the order will get placed and will be delivered in the slotted time. This is how the user can interact with the application.

Calculations :

We have two Fields in this application which involves :

1. **Diesel** : In this field we will calculate the variation in Diesel stock , Diesel sale from nozzles and Diesel Density .

    - **Diesel stock** : In this section we will take yesterday's opening stock and receipt stock as input and calculate total stock .

      Total stock = opening stock + receipt stock

      Total stock : Total stock is the sum of opening stock and recipients .
      Opening stock **:** Yesterday's sale will be calculated today. So the dealer should enter yesterday's opening stock to calculate yesterday's sale.
      Receipts : If any refill of tank happens

      Then we calculate closing stock from totalStock and actualSale . We will take the actual sale as input .

      Closing Stock = Total Stock - Actual Sale

      Closing Stock : Closing stock refers to the value of stock that we get by subtracting actual sales from total stock .
      Actual Sale : Actual sale refers to the original sales that happened in a day

      Then we calculate variation from Actual Dip and Closing Stock . We will take Actual dip as input .

      variation = ActualDip - Closing Stock
      Variation : Variation is the difference between the actual closing stock and the Actual Dip .

Actual Dip : Actual Dip is the actual stock available in the tank by the end of sale day.

- **Diesel Nozzle** : In this section we will take sales from each nozzle as input and output the total meter sale .

  totalMeterSale = saleForNozzle1 + saleForNozzle2 + saleForNozzle3 + saleForNozzle4

  Total meter sale : Sum of sales happened from every nozzle

  Then we will take rate as input and multiply that with total meter sale and we will get total amount

  totalAmount = totalMeterSale * rate

- **Diesel Density** : we will calculate the density difference using Receipts Density and As Per Challan Density

  densityDifference = Receipts Density - As Per Challan Density

  Density Difference : It is the difference between Receipts Density and As Per Challan Density
  Receipts Density : It is the density of Receipt
  As Per Challan Density : It refers to the density which should be there in a receipt density .

2. **Petrol** : In this field we will calculate the variation in Petrol stock , Petrol sale from nozzles and Petrol Density .

   - **Petrol stock** : In this section we will take yesterday's opening stock and receipt stock as input and calculate total stock .

     Total stock = opening stock + receipt stock

Total stock : Total stock is the sum of opening stock and recipients .
Opening stock **:** Yesterday's sale will be calculated today. So the dealer should enter yesterday's opening stock to calculate yesterday's sale.
Receipts : If any refill of tank happens

Then we calculate closing stock from totalStock and actualSale . We will take the actual sale as input .

Closing Stock = Total Stock - Actual Sale

Closing Stock : Closing stock refers to the value of stock that we get by subtracting actual sales from total stock .
Actual Sale : Actual sale refers to the original sales that happened in a day

Then we calculate variation from Actual Dip and Closing Stock . We will take Actual dip as input .

variation = ActualDip - Closing Stock
Variation : Variation is the difference between the actual closing stock and the Actual Dip .
Actual Dip : Actual Dip is the actual stock available in the tank by the end of sale day.

- **Petrol Nozzle** : In this section we will take sales from each nozzle as input and output the total meter sale .

  totalMeterSale = saleForNozzle1 + saleForNozzle2 + saleForNozzle3 + saleForNozzle4

  Total meter sale : Sum of sales happened from every nozzle

Then we will take rate as input and multiply that with total meter sale and we will get total amount

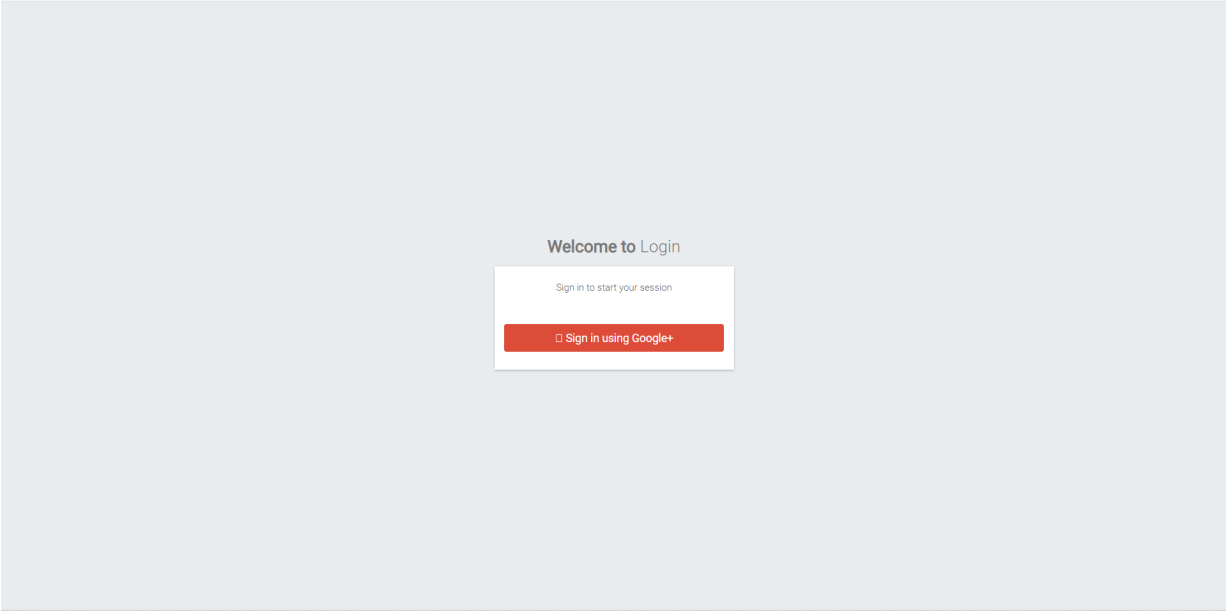
totalAmount = totalMeterSale * rate

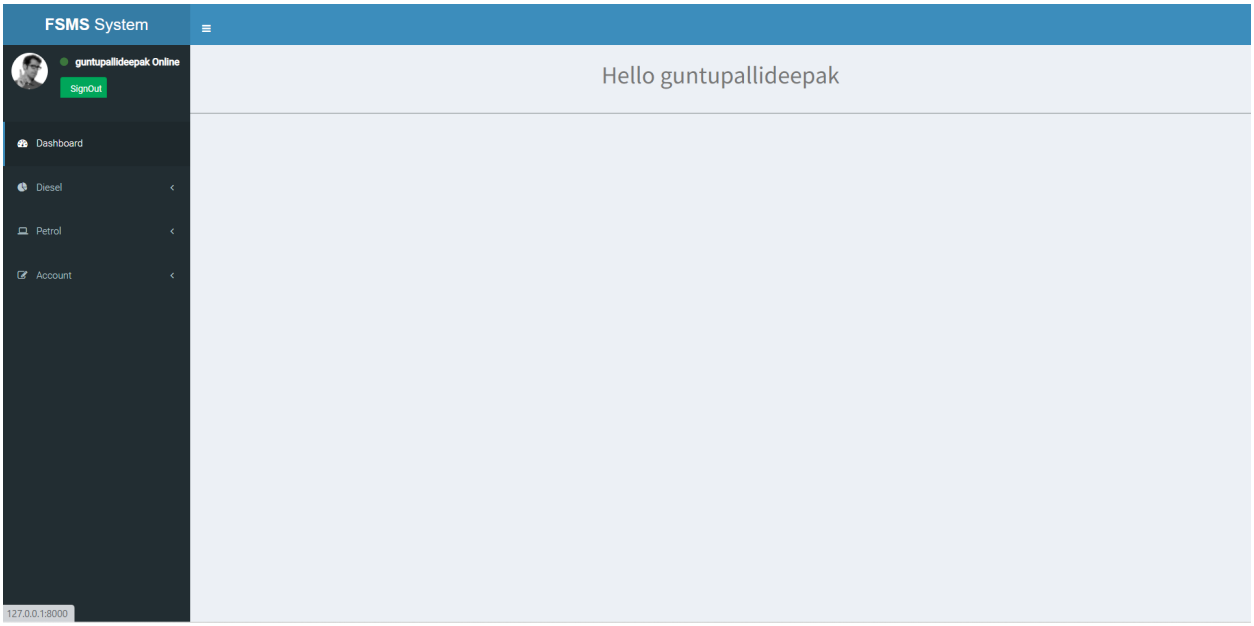
- **Petrol Density** : we will calculate the density difference using Receipts Density and As Per Challan Density

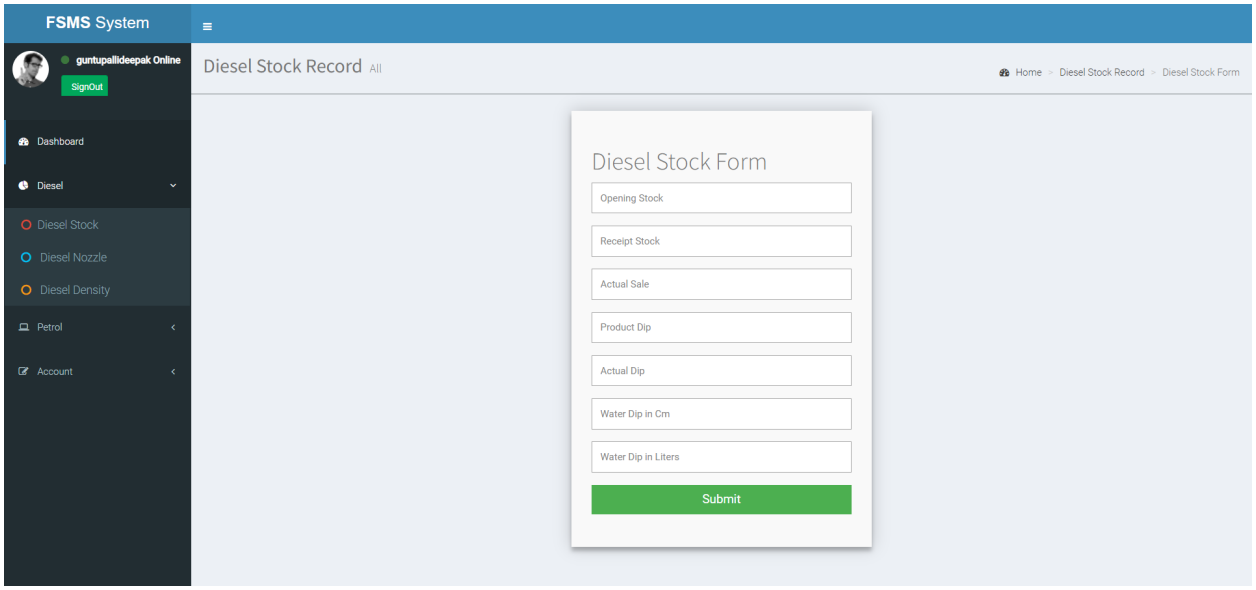
  densityDifference = Receipts Density - As Per Challan Density

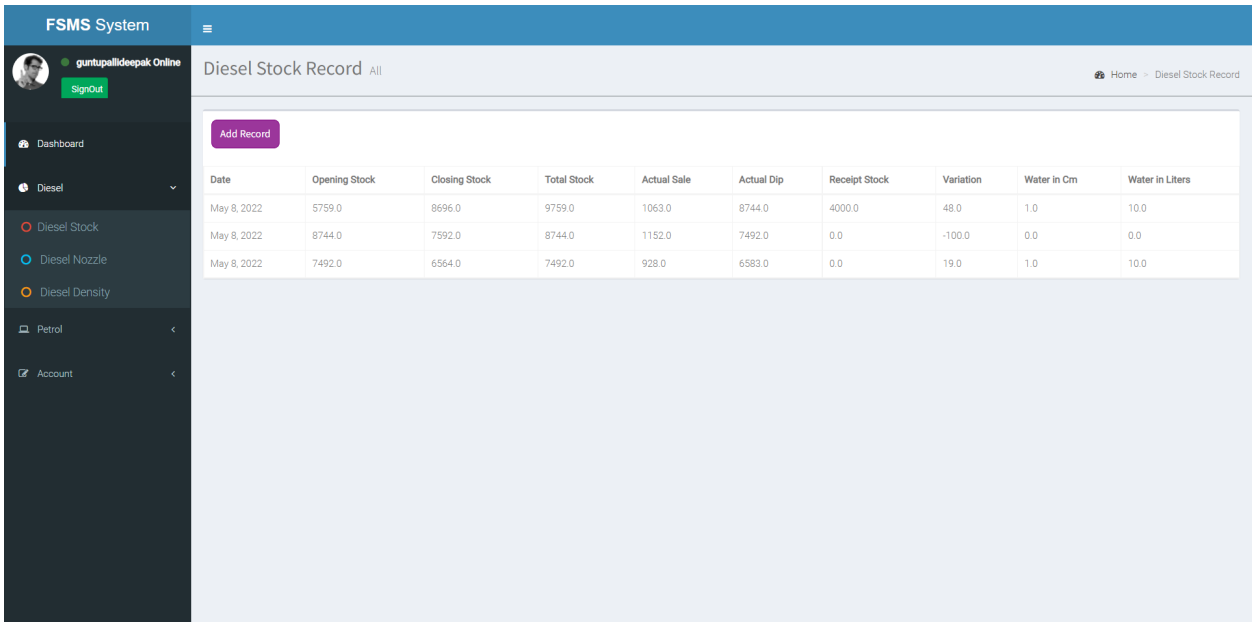
  Density Difference : It is the difference between Receipts Density and As Per Challan Density
  Receipts Density : It is the density of Receipt
  As Per Challan Density : It refers to the density which should be there in a receipt density .

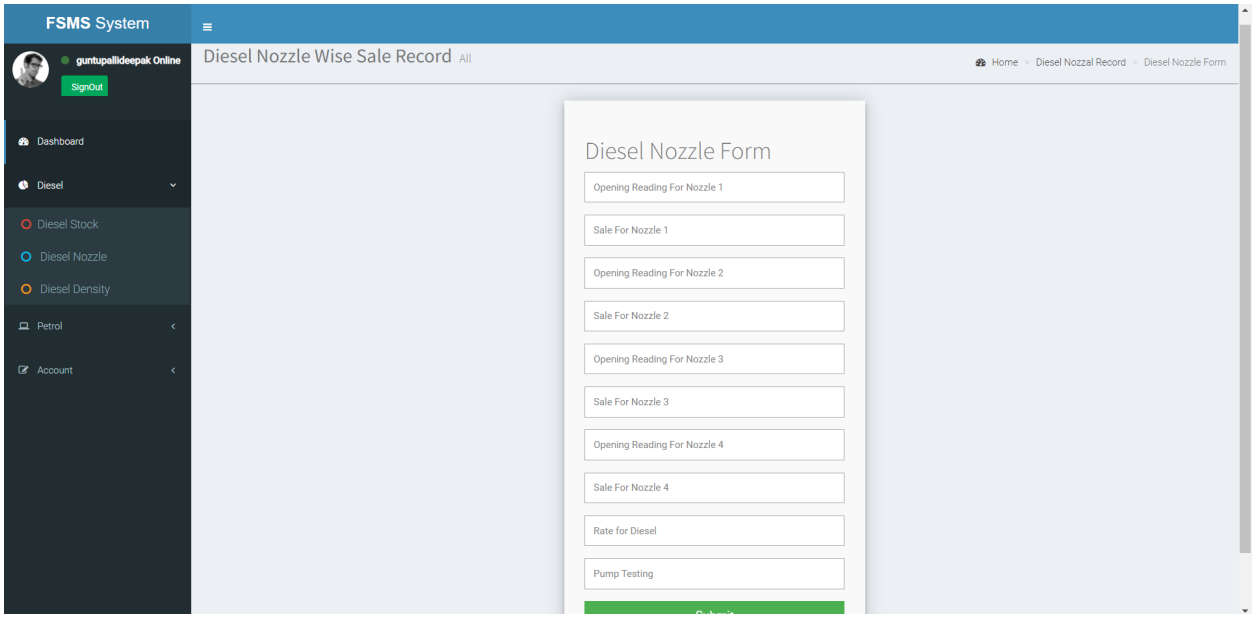
6.Results/Screenshots:

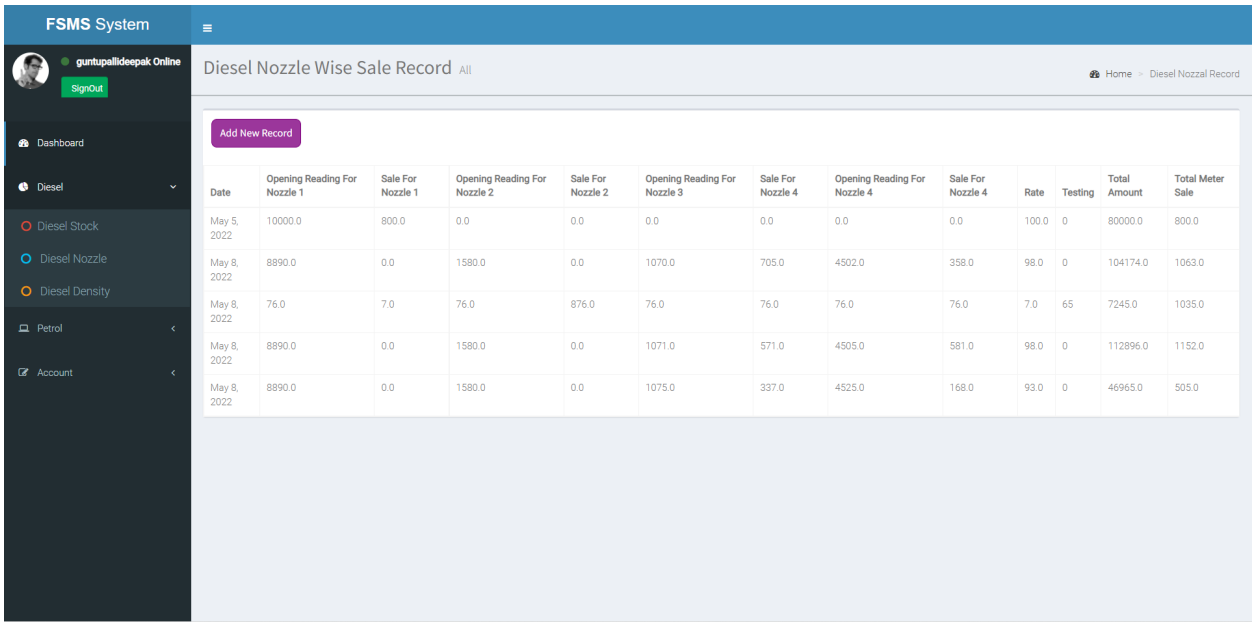




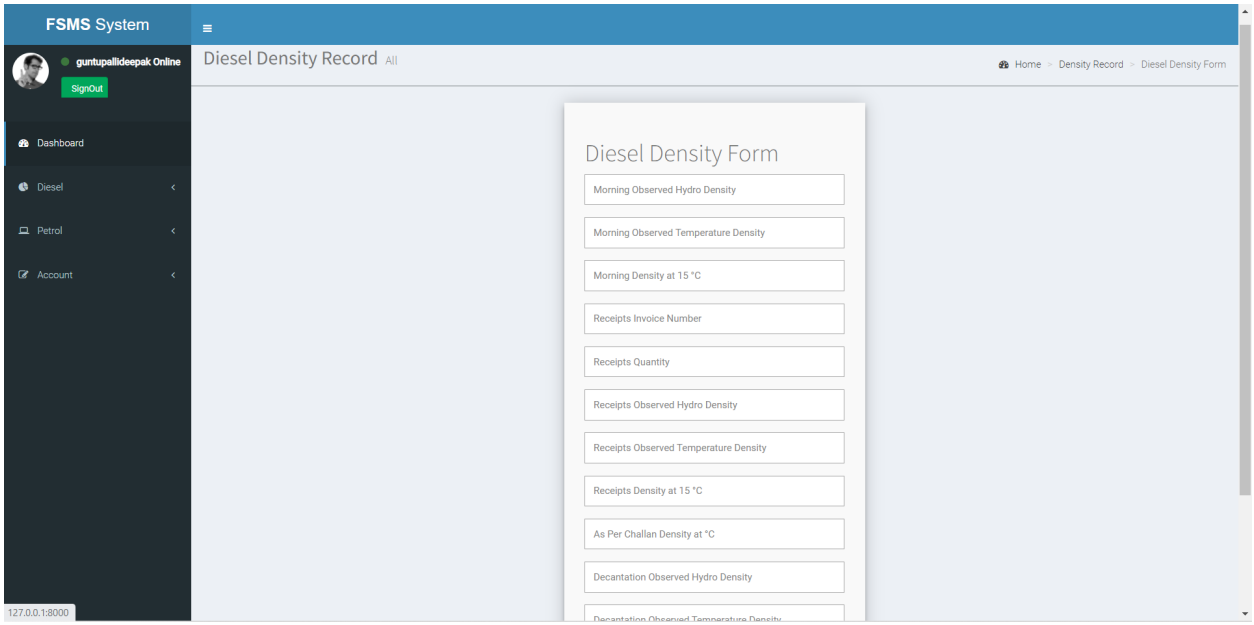

FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Diesel Stock
Diesel Nozzle
Diesel Density
Petrol
Account
Diesel Stock Record All
Home > Diesel Stock Record > Diesel Stock Form
Diesel Stock Form
Opening Stock
Receipt Stock
Actual Sale
Product Dip
Actual Dip
Water Dip in Cm
Water Dip in Liters
Submit

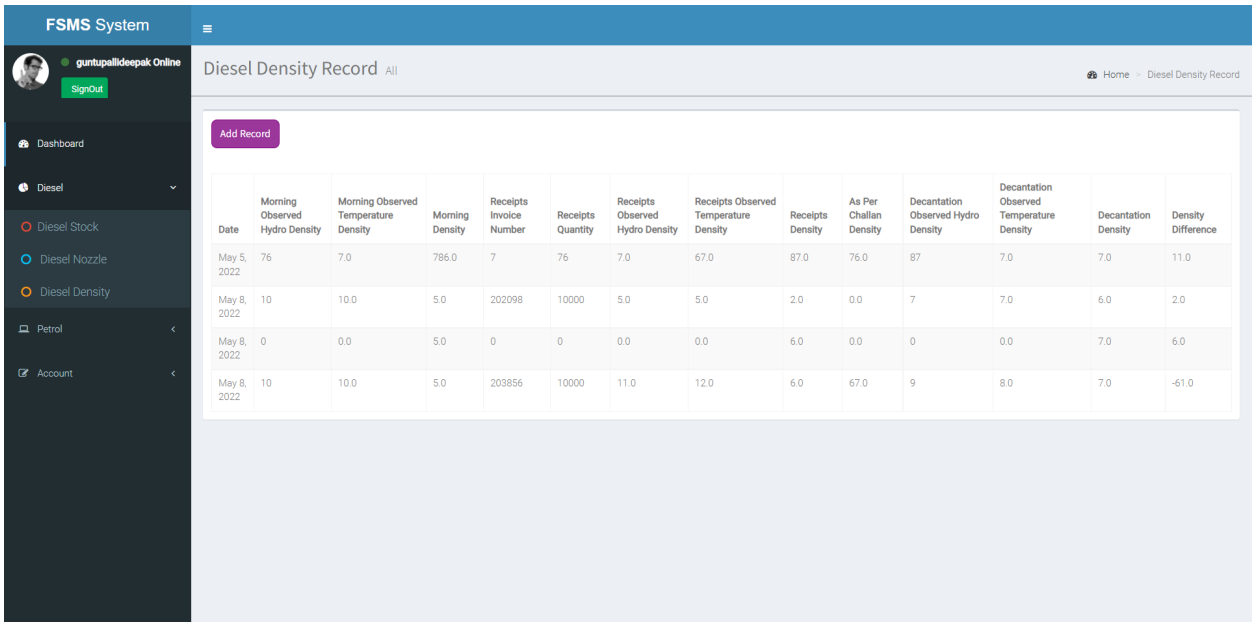

FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Diesel Stock
Diesel Nozzle
Diesel Density
Petrol
Account
Diesel Stock Record All
Home > Diesel Stock Record
Add Record
Date
Opening Stock
Closing Stock
Total Stock
Actual Sale
Actual Dip
Receipt Stock
Variation
Water in Cm
Water in Liters
May 8, 2022 5759.0 8696.0 9759.0 1063.0 8744.0 4000.0 48.0 1.0 10.0
May 8, 2022 8744.0 7592.0 8744.0 1152.0 7492.0 0.0 -100.0 0.0 0.0
May 8, 2022 7492.0 6564.0 7492.0 928.0 6583.0 0.0 19.0 1.0 10.0



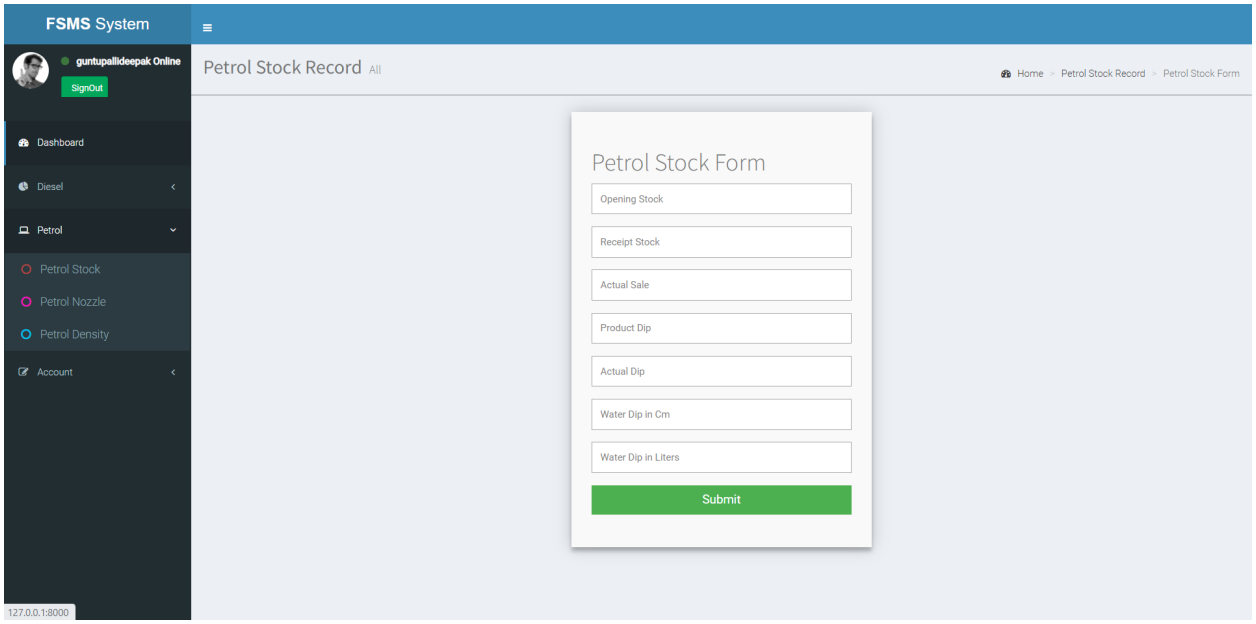


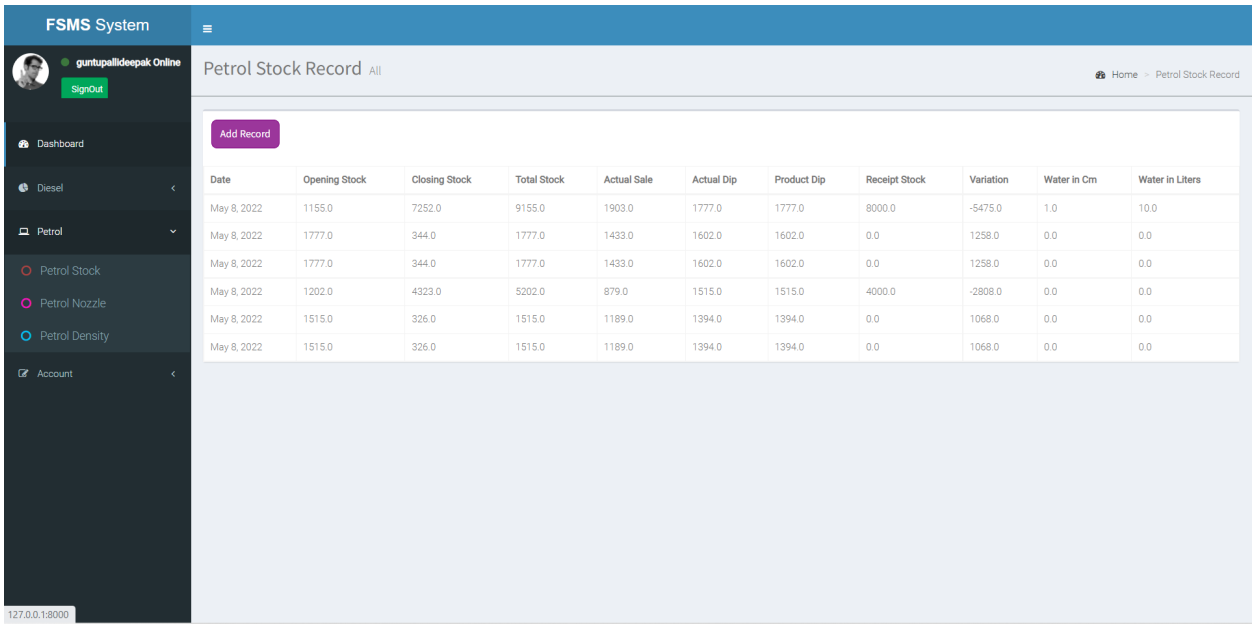
Date	Opening Reading For Nozzle 1	Sale For Nozzle 1	Opening Reading For Nozzle 2	Sale For Nozzle 2	Opening Reading For Nozzle 3	Sale For Nozzle 4	Opening Reading For Nozzle 4	Sale For Nozzle 4	Rate	Testing	Total Amount	Total Meter Sale
May 5, 2022	10000.0	800.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0	80000.0	800.0
May 8, 2022	8890.0	0.0	1580.0	0.0	1070.0	705.0	4502.0	358.0	98.0	0	104174.0	1063.0
May 8, 2022	76.0	7.0	76.0	876.0	76.0	76.0	76.0	76.0	7.0	65	7245.0	1035.0
May 8, 2022	8890.0	0.0	1580.0	0.0	1071.0	571.0	4505.0	581.0	98.0	0	112896.0	1152.0
May 8, 2022	8890.0	0.0	1580.0	0.0	1075.0	337.0	4525.0	168.0	93.0	0	46965.0	505.0

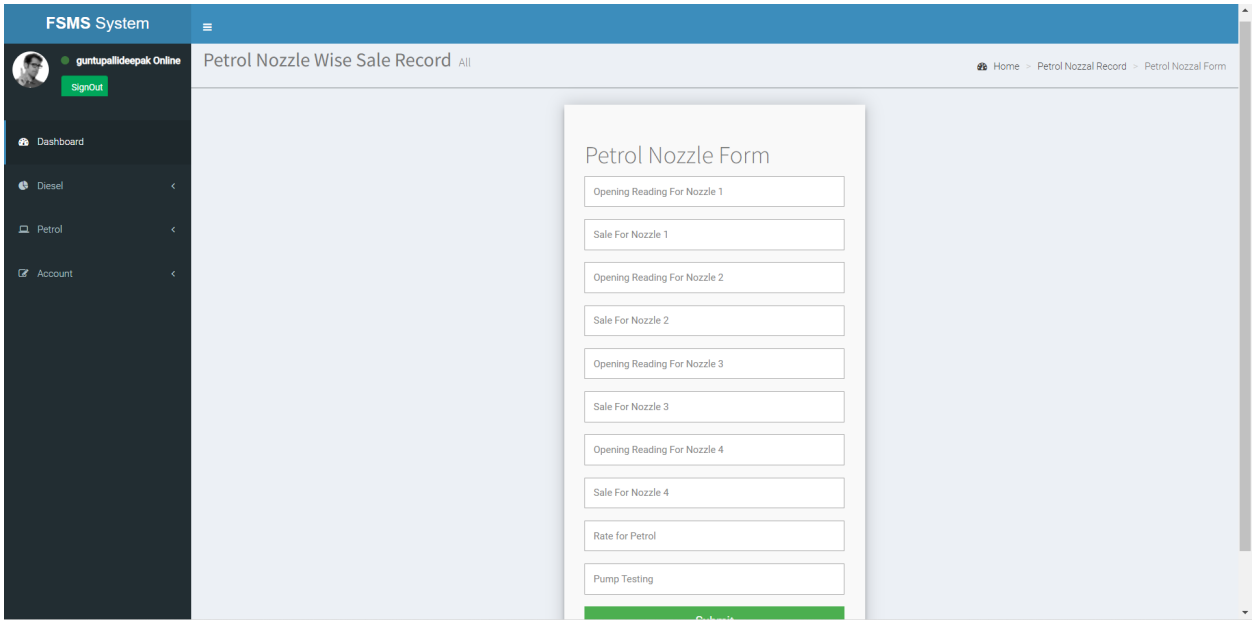


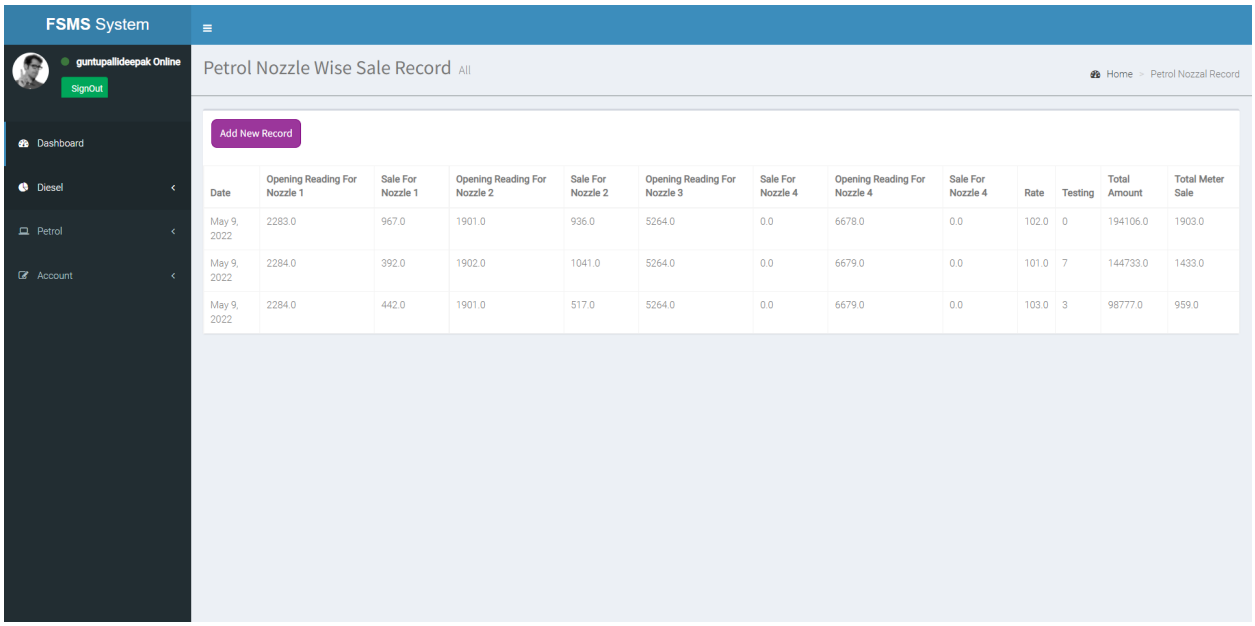


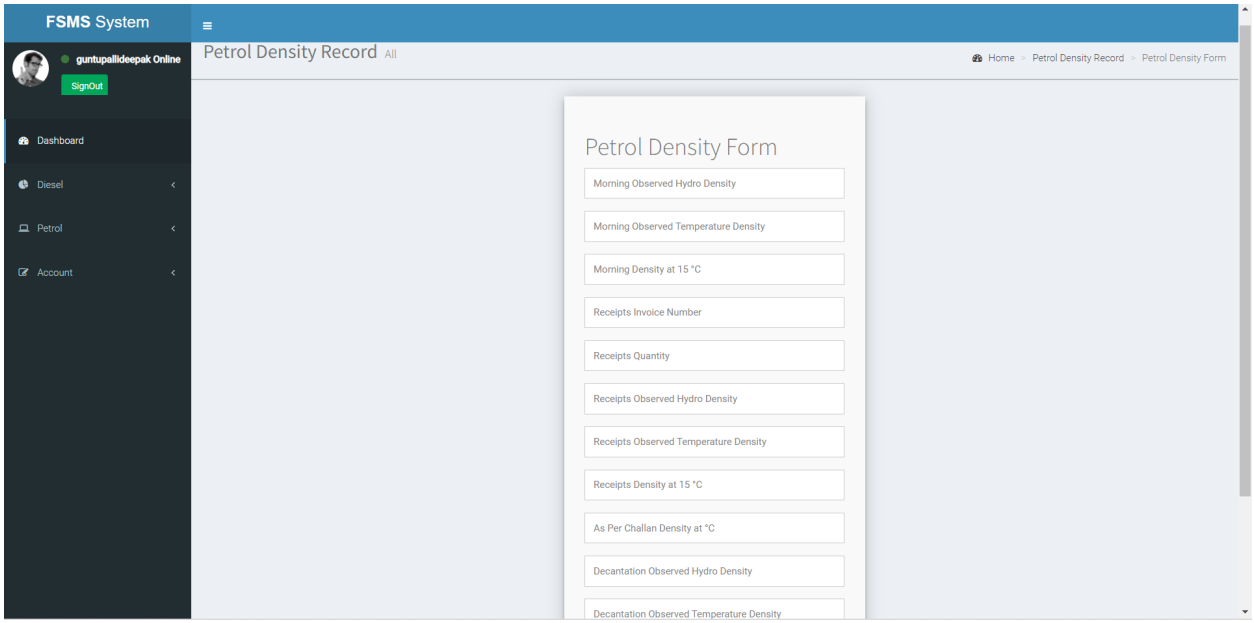
Date	Morning Observed Hydro Density	Morning Observed Temperature Density	Morning Density	Receipts Invoice Number	Receipts Quantity	Receipts Observed Hydro Density	Receipts Observed Temperature Density	Receipts Density	As Per Challan Density	Decantation Observed Hydro Density	Decantation Observed Temperature Density	Decantation Density	Density Difference
May 5, 2022	76	7.0	786.0	7	76	7.0	67.0	87.0	76.0	87	7.0	7.0	11.0
May 8, 2022	10	10.0	5.0	202098	10000	5.0	5.0	2.0	0.0	7	7.0	6.0	2.0
May 8, 2022	0	0.0	5.0	0	0	0.0	0.0	6.0	0.0	0	0.0	7.0	6.0
May 8, 2022	10	10.0	5.0	203856	10000	11.0	12.0	6.0	67.0	9	8.0	7.0	-61.0

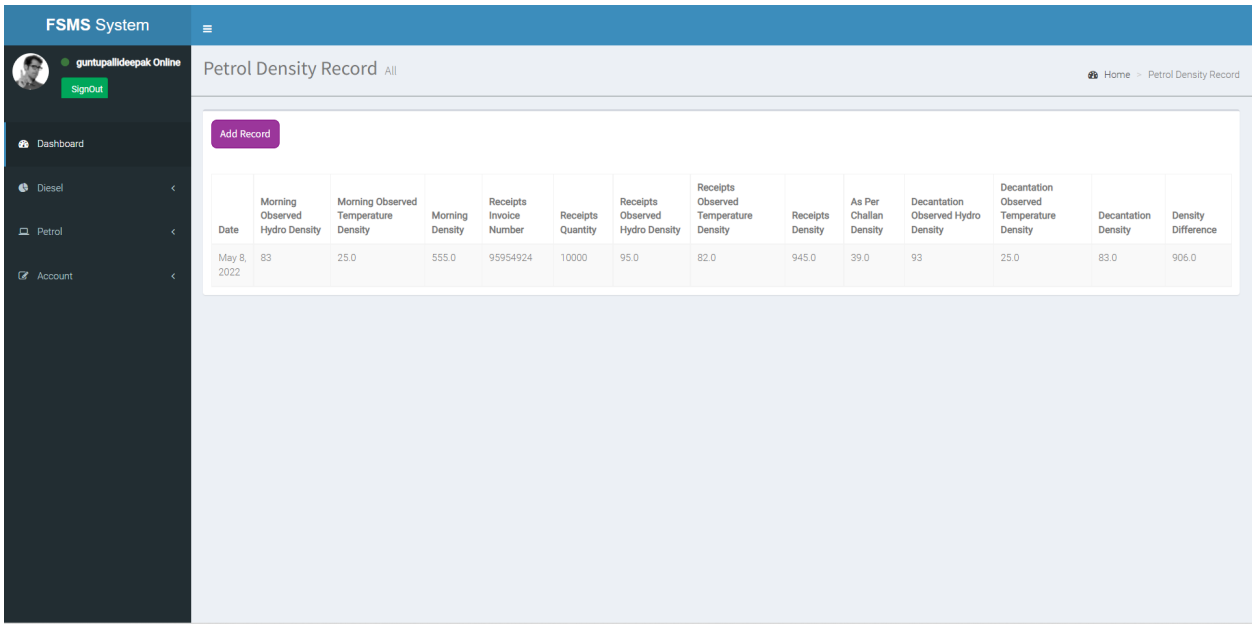

FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Petrol
Petrol Stock
Petrol Nozzle
Petrol Density
Account
Petrol Stock Record All
Home > Petrol Stock Record > Petrol Stock Form
Petrol Stock Form
Opening Stock
Receipt Stock
Actual Sale
Product Dip
Actual Dip
Water Dip in Cm
Water Dip in Liters
Submit
127.0.0.1:8000

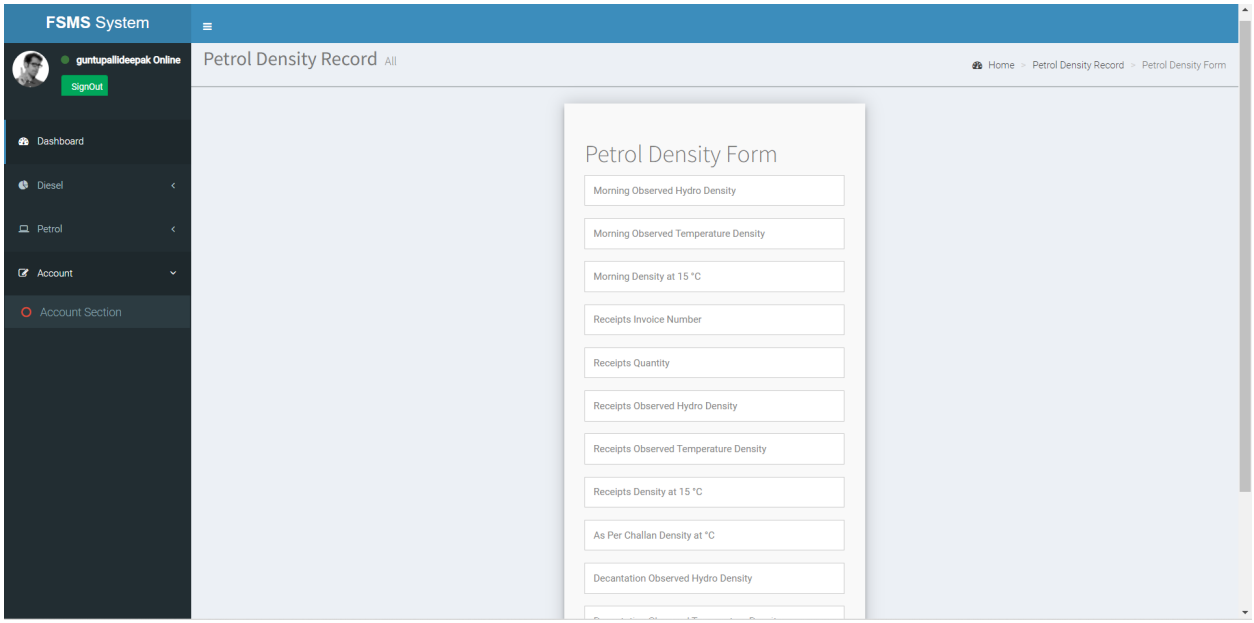

FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Petrol
Petrol Stock
Petrol Nozzle
Petrol Density
Account
Petrol Stock Record All
Home > Petrol Stock Record
Add Record
Date | Opening Stock | Closing Stock | Total Stock | Actual Sale | Actual Dip | Product Dip | Receipt Stock | Variation | Water in Cm | Water in Liters
May 8, 2022 | 1155.0 | 7252.0 | 9155.0 | 1903.0 | 1777.0 | 1777.0 | 8000.0 | -5475.0 | 1.0 | 10.0
May 8, 2022 | 1777.0 | 344.0 | 1777.0 | 1433.0 | 1602.0 | 1602.0 | 0.0 | 1258.0 | 0.0 | 0.0
May 8, 2022 | 1777.0 | 344.0 | 1777.0 | 1433.0 | 1602.0 | 1602.0 | 0.0 | 1258.0 | 0.0 | 0.0
May 8, 2022 | 1202.0 | 4323.0 | 5202.0 | 879.0 | 1515.0 | 1515.0 | 4000.0 | -2808.0 | 0.0 | 0.0
May 8, 2022 | 1515.0 | 326.0 | 1515.0 | 1189.0 | 1394.0 | 1394.0 | 0.0 | 1068.0 | 0.0 | 0.0
May 8, 2022 | 1515.0 | 326.0 | 1515.0 | 1189.0 | 1394.0 | 1394.0 | 0.0 | 1068.0 | 0.0 | 0.0
127.0.0.1:8000

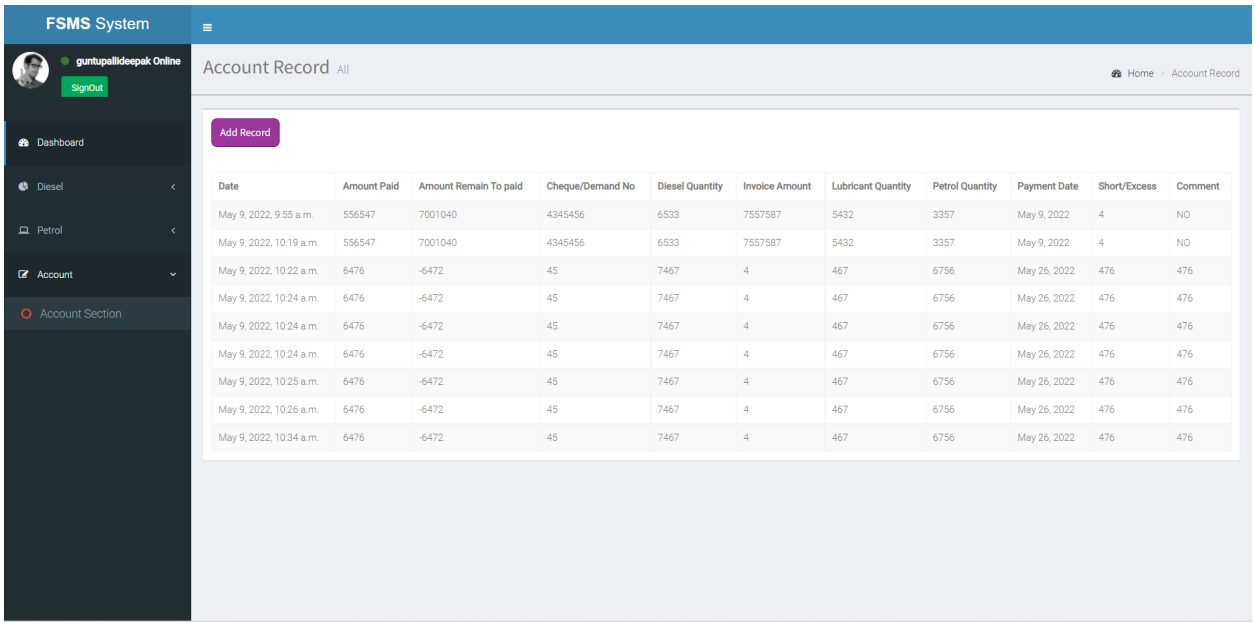

FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Petrol
Account
Petrol Nozzle Wise Sale Record All
Home > Petrol Nozzal Record > Petrol Nozzal Form
Petrol Nozzle Form
Opening Reading For Nozzle 1
Sale For Nozzle 1
Opening Reading For Nozzle 2
Sale For Nozzle 2
Opening Reading For Nozzle 3
Sale For Nozzle 3
Opening Reading For Nozzle 4
Sale For Nozzle 4
Rate for Petrol
Pump Testing


FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Petrol
Account
Petrol Nozzle Wise Sale Record All
Home > Petrol Nozzal Record
Add New Record
Date
Opening Reading For Nozzle 1
Sale For Nozzle 1
Opening Reading For Nozzle 2
Sale For Nozzle 2
Opening Reading For Nozzle 3
Sale For Nozzle 4
Opening Reading For Nozzle 4
Sale For Nozzle 4
Rate
Testing
Total Amount
Total Meter Sale
May 9, 2022 2283.0 967.0 1901.0 936.0 5264.0 0.0 6678.0 0.0 102.0 0 194106.0 1903.0
May 9, 2022 2284.0 392.0 1902.0 1041.0 5264.0 0.0 6679.0 0.0 101.0 7 144733.0 1433.0
May 9, 2022 2284.0 442.0 1901.0 517.0 5264.0 0.0 6679.0 0.0 103.0 3 98777.0 959.0


FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Petrol
Account
Petrol Density Record All
Home > Petrol Density Record > Petrol Density Form
Petrol Density Form
Morning Observed Hydro Density
Morning Observed Temperature Density
Morning Density at 15 °C
Receipts Invoice Number
Receipts Quantity
Receipts Observed Hydro Density
Receipts Observed Temperature Density
Receipts Density at 15 °C
As Per Challan Density at °C
Decantation Observed Hydro Density
Decantation Observed Temperature Density


FSMS System
guntupallideepak Online
SignOut
Dashboard
Diesel
Petrol
Account
Petrol Density Record All
Home > Petrol Density Record
Add Record
Date
Morning Observed Hydro Density
Morning Observed Temperature Density
Morning Density
Receipts Invoice Number
Receipts Quantity
Receipts Observed Hydro Density
Receipts Observed Temperature Density
Receipts Density
As Per Challan Density
Decantation Observed Hydro Density
Decantation Observed Temperature Density
Decantation Density
Density Difference
May 8, 2022
83
25.0
555.0
95954924
10000
95.0
82.0
945.0
39.0
93
25.0
83.0
906.0





Date	Amount Paid	Amount Remain To paid	Cheque/Demand No	Diesel Quantity	Invoice Amount	Lubricant Quantity	Petrol Quantity	Payment Date	Short/Excess	Comment
May 9, 2022, 9:55 a.m.	556547	7001040	4345456	6533	7557587	5432	3357	May 9, 2022	4	NO
May 9, 2022, 10:19 a.m.	556547	7001040	4345456	6533	7557587	5432	3357	May 9, 2022	4	NO
May 9, 2022, 10:22 a.m.	6476	-6472	45	7467	4	467	6756	May 26, 2022	476	476
May 9, 2022, 10:24 a.m.	6476	-6472	45	7467	4	467	6756	May 26, 2022	476	476
May 9, 2022, 10:24 a.m.	6476	-6472	45	7467	4	467	6756	May 26, 2022	476	476
May 9, 2022, 10:24 a.m.	6476	-6472	45	7467	4	467	6756	May 26, 2022	476	476
May 9, 2022, 10:25 a.m.	6476	-6472	45	7467	4	467	6756	May 26, 2022	476	476
May 9, 2022, 10:26 a.m.	6476	-6472	45	7467	4	467	6756	May 26, 2022	476	476
May 9, 2022, 10:34 a.m.	6476	-6472	45	7467	4	467	6756	May 26, 2022	476	476

7.Conclusion:

The whole report gives the idea of what our project is. We, in the report elaborated the idea through different sections. Started with an abstract which details the idea of our project - calculating, storing and retrieving the stock and sales details of a filling station on a daily basis. The stakeholders for this project are mentioned. It is important to record accurate sales amounts in the stock database to allow you to identify any lost fuel that may not be accounted for in the sales record. Variances can occur if amounts are incorrectly stored or simply missing from the records. The accuracy of the fuel pump meter affects the fuel supplied and sold. You may give out fuel every time you sell, it varies no matter how bad the meter readings are, you may be operating outside of legal limits. It is recommended to check the counter every year and reset it to zero if necessary. It is important to check the water in each tank and record the results weekly or ideally daily. Inconsistencies in adjustment data may indicate possible water ingress. Due to problems, it is advisable to check the water in the tank when checking the gain. So, by taking every variable into consideration and correcting the maximum of the problems, we have calculated all the sales with varying stock and digitalized all the data.

8.References:

[1] Al Mahrooqi, S. S., & Ali, S. Z. (2019, January). Petrol Pump Queue Management System for Sultanate of Oman Using Artificial Intelligence Technique. In *2019 China-Qatar International Workshop on Artificial Intelligence and Applications to Intelligent Manufacturing (AIAIM)* (pp. 22-29). IEEE.

[2] Jadhav, A., Patil, L., Patil, L., & Sonawane, A. D. (2017). Smart Automatic Petrol Pump System. *International Journal for Science Technology and Management*, *6*(4), 348-351.

[3] R. Gnanavel, P. M. Deepak, B. P. Kumaar and J. Bakthakumar, "Computerized filling station management system," 2016 Second International Conference on Science Technology Engineering and Management (ICONSTEM), 2016, pp. 38-43, doi: 10.1109/ICONSTEM.2016.7560919.

[4] Arpita Nayal, Mahima Gaur, Tanisha Kashyap, Vartika Shukla, “Petrol Pump Automation System”, International Journal of Engineering Applied Sciences and Technology, 2020.

[5] Kurla Kumar Kranthi, “A Comprehensive Development of the Computerized System for Maintaining the Regular Records and Activities in the Petrol Bunk”, November-2019.