



Sri Lanka Institute of Information Technology

FUEL SUPPLY MANAGEMENT

Project Proposal
Information Technology Project (IT2080)

Group 02

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Table of Contents

1. Background	1
2. Problem and motivation	1
2.1. Problem Statement	1
2.2. Motivation	2
3. Aim and objectives	2
3.1. Aim	2
3.2. Objectives	2
4. System Overview	3
4.1. System Overview Diagram	3
4.2. System Functions	3
4.2.1. User Management	3
4.2.2. Salary Management	4
4.2.3. Fuel Management	4
4.2.4. Staff Management	5
4.2.5. Vehicle Management	5
4.2.6. Attendance Management	6
4.2.7. Essential Service Management	6
4.2.8. Notice Management	6
4.2.9. Payment Management	7
5. Literature Review	8
6. Methodology	9
6.1. SE Related Methods	9
6.2. Tools	9
6.3. Technologies	9
6.4. Project Plan	10
6.5. Work Breakdown Structure	10
7. References	13

List of Figures

Figure 1: System Overview Diagram	3
Figure 2: Gantt Chart.....	10

List of Tables

Table 1: Tasks.....	10
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1. Background

The inflation in Sri Lanka caused the country a major economic crisis ever recorded in history due to it the crisis has become an international issue, Now, therefore, there's been a major scarcity and a drop-down in energy resources and food supply. Due to this the fuel supply in the country had collapsed and has been regarded as a grave shortage. Therefore, the fuel is in great demand and the drivers suffer a lot to get fuel there have been deaths recorded too by waiting in the queue and even the system occurs of a black market in fuel. Therefore, our team has come up with a solution by creating a web app to get an improvement in fuel supply management and reduce waiting in the queue and also give limitations for the drivers to reduce black market corruption.

The proposed system will allow users to register by using their NIC, E-mail, Name, and Contact Number and also give their vehicle details. And the system validates and gives the specific user their fuel limitations with the QR code. If the user is an essential service or an industrial sector user the user needs to submit special documents and requirements to submit.

2. Problem and motivation

2.1. Problem Statement

- Due to the large queues, it might be time-consuming to physically deal with supplying fuels for clients
- The massive storage that might be needed when managing a file-based system
- Unauthorized access to records may cause a dilemma in managing fuel supply detail in this critical time
- Data might duplicate and cause inconvenience in supplying fuel Struggle to obtain reports at a given time
- Errors may occur when manually calculating and generating reports
- Manual reports may create confusion about how the company functions as a unit

2.2. Motivation

- Due to the high level of fuel demand, it is time-consuming and inefficient to maintain physical records of fuel distribution and consumption. This system makes this process much more convenient by automating the process of supplying fuel which will eventually create a much fast, safe, and user-friendly environment

3. Aim and objectives

3.1. Aim

Our main aim is to create a user-friendly fuel supply management application in order to distribute fuel among the public in a fair manner. Which would eventually result in the decrease of massive queues lined up outside gas stations, where numerous numbers of deaths were even reported.

Also, we aim to reduce the fraud in distributing fuel to clients as well as reducing riots caused by various activities occurred in these long queues such as inappropriately skipping in lines

3.2. Objectives

- To make people aware of this application and educate them about the process of fuel distribution.
- To get a detailed understanding about the fuel crisis by performing thorough literature survey.
- To convince people to use online systems by simplifying the user-experience
- To make sure the activities of fuel distribution is transparent and easy
- To get monthly reports about fuel distribution, users, and staff etc.

4. System Overview

4.1. System Overview Diagram

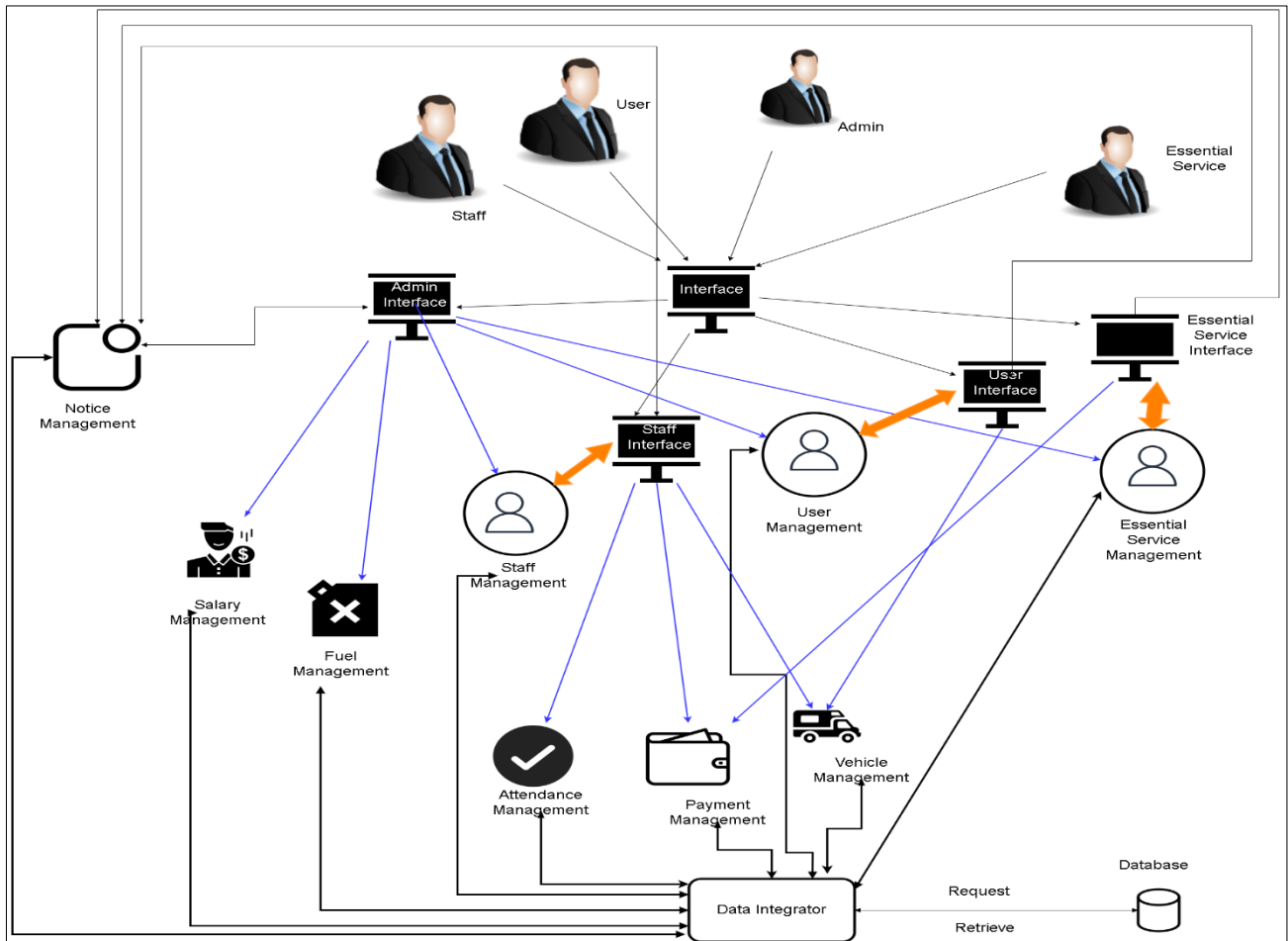


Figure 1: System Overview Diagram

4.2. System Functions

4.2.1. User Management

A user will be able to register to the website by providing the user details (Name, Address, email, NIC, password). An OTP will be sent to the email provided. The user needs to enter the OTP in order to verify the email. The User Management function allows the system to maintain user details. It also allows viewing fuel distribution places, Notices, and times. Users can update/ delete their user account.

4.2.2. Salary Management

This function mainly focuses on the employee's salary. All the details are retrieved from the staff database. The employee's starting salary is fixed, but they'll get an increment if they work overtime. So, to calculate the salary it's a must to have attendance collected from the attendance management system. So, the admin needs to collect the required data from the attendance management system. This function includes the ability to add, update and delete salary slips and details. Finally, reports are generated monthly which include the average, minimum and maximum salary.

4.2.3. Fuel Management

Fuel Management function allows to store and maintain the Fuel details on a Gas station. This function includes the ability to update, create, and delete the fuel details for the Gas Station. If the manager/admin included a new fuel type (92/95) to the gas station, then the table will be updated. The gas Station Manager can easily Identify the current fuel stock amount by searching the fuel ID and type. Current fuel stock will be reduced according to the sales. So, the Gas station Manager/admin can easily understand the fuel need. If the current fuel stock is low, the gas station manager/admin can refill it by paying an amount. Those amounts will be handled by payment management. If the fuel is refilled, the current fuel stock table, and refilled fuel amount table will be updated by the Gas station manager/admin. Next, the selling price of each fuel will be updated by searching for the unique ID/name and the type. And the fuel bought price will also be updated and saved by the Gas station manager/admin to see the income and the price-ups and lows. Finally, reports are generated monthly by including the fuel distributed amount.

4.2.4. Staff Management

This function allows the system to maintain the details of the staff. Admin can register a new staff to the system. There are two types of staff permanent staff and contract basis staff which have a covering constraint. When registering a staff admin wants to select the staff type, if the selected staff type is contract basis staff, then admin needs to mention the contract year of that staff in addition. The basic salary and OT rate per hour is fixed according to the staff type. After the successful completion of the registration, staff will receive an email with their username and password. Then staff will be able to log in to the system by using that credential. Admin can retrieve information about the existing staff and update the details. If staff is retired or resigned from the company, then admin can remove (delete) that staff from the system. Admin can search for staff by using staff id then the details of that staff will be visible to the admin. Also, admin can generate monthly reports to know the number of permanent staff and contract basis staff.

4.2.5. Vehicle Management

According to this function, After the user login, Users can be able to register their vehicles into the system. Users need to enter details (Chassis Number, Plate Number, Vehicle type, Fuel type, and Created Date) to register their vehicles. After that users can be able to see their vehicle details. After that users can select their vehicle and they need to enter the needed fuel for their vehicle and the system will display the QR code after that users need to show it to the gas station employee in order to get fuel for their vehicle. After a month users can make a request to renew their fuel limit. And users can be able to search their vehicles by entering plate numbers. If users wish to edit their vehicle details users can do that. If users wish to delete their vehicle details users can delete their vehicle details.

4.2.6. Attendance Management

The Attendance management lets the admin get the staff logbooks at the end of the month and gets the information to input the information like total days worked, total leave is taken, and total OT with the attendance ID and use this information for the Salary Management at the end of the month.

4.2.7. Essential Service Management

Under this function, those who are considered essential services can register into the system. The system will generate a QR code after the registration and the user will receive the fuel quota for the week. Essential services will receive an extra amount of fuel quota than normal users. They can buy fuel until the quota is over for the week. After every week fuel quota will be reset. Users can update and delete their company details in this system. If notices are available users can view them from the system also. Users have the option to search a location of a fuel station and they can generate a report about the most searched fuel stations monthly.

4.2.8. Notice Management

This function was added to our system with concerns about the inconvenience caused by false news regarding fuel distribution, fuel types, etc. Once the administrator logs in to the system and enters to the notice page there is a form provided. This page is only accessible for the administrator. The notices contain a priority level according to the importance of the notice. This priority level is also inserted via the form through a dropdown menu. The notice number and notice date are autogenerated and sent to the database. The admin is provided with a grid which contains all the notices. He/she can click on an existing notice and the form, mentioned before, is refilled and could be updated and deleted as preferred. The notices the administrator posts can be viewed through the staffs and client's notice pages respectively. The client's and staff's notice page doesn't contain the insert/update and delete privileges. Priority notices are shown in a special window for the user and the client. The admin as well as the client and the staff can view

notices through a search bar provided, using the notice title. Finally, a monthly report can be generated in which the frequently viewed notices and the number of notices posted for a month is viewed. The frequency report would contain a notice number vs notice view-count graph. The number of notices report would contain a month vs the number of notices posted graph. These reports can only be downloaded by the admin, from the reports interface.

4.2.9. Payment Management

This function allows the system to maintain the details of the payment for a particular vehicle or essential service with respective fuel types. Staff can log in to the system and calculate the payment. After that, a payment bill will be created and the details will be stored in the database. Staff and admin can retrieve the payment details from the database and if there are any mistakes, they can update those details. Also, they will be able to delete the payment bill which is unnecessary.

5. Literature Review

Sri Lanka is facing a huge economic crisis and political turmoil. It is the first-ever economic crisis that the country has witnessed after its independence. The crisis has caused a persistent lack of foreign cash and inflation has resulted in a serious scarcity of fuel. The depletion of foreign reserves has made the people spend hours and days together in long queues outside the fuel stations [1]. Considering the prevailing situation in the country our team has come up with an idea to implement a website to manage the supply of fuel. A Fuel supply management system is designed to measure the fuel in an effective way in order to reduce the queues outside the station and the black market for fuel too. The information on the fuel, vehicles, staff, and users will be stored in computerized systems, and end of each month, reports can be generated with available data.

The government of Sri Lanka has designed a website for fuel management in the last month [2]. Although they implemented a website, users cannot register for the website at the same time. If so, the register button will be disabled. So, we have planned to design a website that will be more user-friendly. And we have planned to store the staff details, manage their attendance and salary also in one system which was not an available feature on the government website. Another drawback of the government website is we can register only the vehicles to get fuel. But we have planned to register a company which comes under essential service. So that essential services also can get fuel without any issues.

6. Methodology

6.1. SE Related Methods

- Planning
 - Identifying a real-world problem and a solution.
- Requirements Gathering and Analysis
 - Gathering the requirements of the system.
- Software Design
 - Designing ER diagram
 - Designing wireframes
- Software Development
- Test and Integration
- Deployment

6.2. Tools

- GitHub
- MySQL workbench
- Trello
- Mockflow (wireframes)
- Draw.io (ER diagram)

6.3 Technologies

- Java servlet API
- Java JSP
- JDBC

6.4. Project Plan

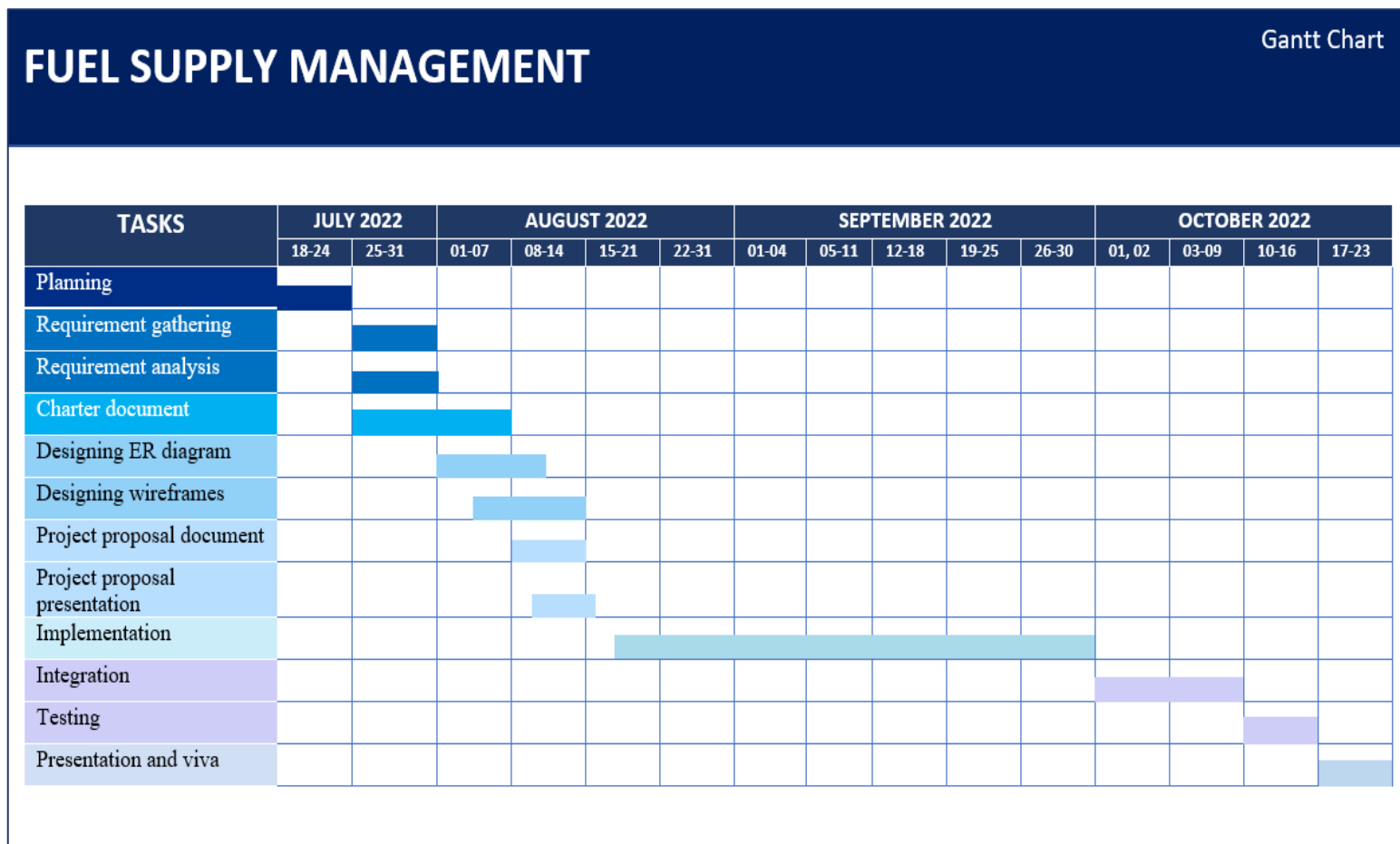


Figure 2: Gantt Chart

6.5. Work Breakdown Structure

Table 1: Tasks

	Name with Initials	Brief Description of the Function
1.	Yusri M.A.M	User management <ul style="list-style-type: none"> User registration. Send OTP. Login. Search fuel distributing places and time. View time and dates. Update profile details. Delete user profile. Report – Monthly report (frequently searched locations)

2.	Sameer M.M	<u>Salary Management</u> <ul style="list-style-type: none"> • Select a staff's data • Add date, deduction and the reason for deduction • Calculate final salary • Display final salary Slip • Edit/Update, Delete salary slips • Report – Monthly report (Maximum salary, Minimum salary, Average salary)
3.	Aadhil M.M	<u>Fuel Management</u> <ul style="list-style-type: none"> • Create fuel type record. • Search fuel type. • View fuel stock. • Record fuel refill date. • Stock management (update/delete). • Report – Monthly report (Fuel distributed amount).
4.	Sangkavi S.V.	<u>Staff Management</u> <ul style="list-style-type: none"> • Staff registration. • Send email (username, password) • Login. • Update/delete staff details. • Search staff details. • Report – Monthly report (number of permanent staffs, contract basis staffs).
5.	Rahul.J	<u>Attendance management</u> <ul style="list-style-type: none"> • Create Attendance slip. • search staff details. • retrieving working hours/OT. • Record in time, out time. • update/delete Attendance slip. • Report – Monthly report (Total OT, Total Days Worked, Total leave taken).
6.	Zamly M.Z.M	<u>Payment Management</u> <ul style="list-style-type: none"> • Create payment receipt. • Search pid • Edit / delete payment details. • Report – Monthly report (Monthly revenue)

7.	Fahmi M.F.A.	<u>Vehicle management</u> <ul style="list-style-type: none"> • Vehicle registration. • View vehicle details. • Delete/Update vehicle details. • Search vehicles. • Generate QR code. • Make renew request. • Report – Monthly report (Average fuel consumption of each user).
8.	Wijesundara W.M.R.L	<u>Essential service Management</u> <ul style="list-style-type: none"> • Company Register • Login • Retrieve details • Edit/delete details • Search fuel distributing places and time • Report – Monthly purchased report (frequently searched locations)
9.	Navaratne U.D.K	<u>Notice Management</u> <ul style="list-style-type: none"> • Create notices. • Search notices. • Retrieve staff/user notices. • Edit/delete notices. • Report – Monthly report (frequently viewed notices).

7. References

- [1] A. Studies and A. Studies, “Raagini Sharma RIEAS 3,” no. May, pp. 1–14, 2022.
- [2] <https://fuelpass.gov.lk/>