Tribhuvan University

Faculty of Humanities and Social Sciences

LICENSE TRACKER

A PROJECT REPORT

Submitted to

Department of Computer Application

Asian college of Higher Studies

In partial fulfillment of the requirements for the Bachelors in Computer Application

Submitted by

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Under the Supervision of

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Faculty of Humanities and Social Science

Asian college of Higher Studies

Supervisor's Recommendation

I hereby recommend that this project prepared under my supervision by Lakpa Dolma Sherpa and Deepa khadka entitled "**LICENSE TRACKER**" in partial fulfillment of the requirement for the degree of Bachelor Application is recommended for the final evaluation.

……

Mr. Janak k lal.

Lecturer

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Faculty of Humanities and Social Science

Asian college of Higher Studies

LETTER OF APPROVAL

This is to certify that this project submitted by LAKPA DOLMA SHERPA & DEEPA KHADKA entitled "**LICENCE TRACKER**" in partial fulfillment of the requirement for the degree of Bachelor in computer Application has been evaluated. In our opinion it is satisfactory in the scope and quality as a project for the required degree

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Acknowledgement

Presentation inspiration and motivation have always played a key role in the success of any venture.

I express my sincere thanks to Mr. Janak kumar Lal to encourage us the highest peak and to provide us the opportunity to prepare the project. I am immensely obliged to my partner for her elevating inspiration, encouraging guidance and kind supervision in the completion of our project.I feel to acknowledge my indebtedness and deep sense to our supervisor Mr. Janak K lal whose valuable guidance and kind supervision given to us throughout the course which shaped the present work as its show.

Last, but not the least, our parents are also an important inspiration for us. So we submit our earnest thanks again to all of them for their encouragement and moral support.

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ABSTARCT

Traffic congestion is a major problem in many cities along with other countries. Failure of signals, poor law enforcement and bad traffic management has led to traffic congestion. One of the major problems with cities is that the existing infrastructure cannot be expanded more, and thus the only option available is better management of the traffic. Traffic congestion has a negative impact on economy, the environment and the overall quality of life. Hence it is high time to effectively manage the traffic congestion problem. There are various methods available for traffic management. Traffic management systems are composed of a set of application and management tools to improve the overall traffic efficiency and safety of the transportation systems Kathmandu traffic police fines thousands of bikers and other vehicle's driver for violating traffic rules and paying fine and getting back our paper takes a lot of time. With this in mind, License tracker is a web-based application that will keep track of traffic violation tickets and give information about the road condition and help to avoid certain road if there is blockage. Use of this app will lead to reduced traffic congestion. This app will require less time for installation

Key words: Traffic fine, photoelectric, tkinter, xampp

LIST OF ABBREVATIONS

DFD	Data Flow Diagram
UI	User Interface
SQL	Structured Query Language
GB	Gigabytes
ER	Entity–Relationship
RFID	Radio-Frequency Identification

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Chapter 1: Introduction

1.1 Introduction

In cities, where the number of vehicles continuously increases faster than the available traffic infrastructure to support them, congestion is a difficult issue to deal with and it becomes even worse in case of car accidents. In this context [1]. Traffic management systems are composed of a set of application and management tools to improve the overall traffic efficiency and safety of the transportation systems. Kathmandu traffic police fines thousands of bikers and other vehicle's driver for violating traffic rules and paying fine and getting back our paper takes a lot of time. With this in mind, License tracker is a web-based application that will keep track of traffic violation tickets and give information about the road condition and help to avoid certain road if there is blockage**.**

1.2 Problem statement

Traffic congestion has been one of the fundamental problems faced by the modern cities since the wide usage of automobiles. Just a normal few minutes trip to the convenience store may take up to half an hour due to traffic or slowdown. According to the police, congestion are actually the causes of some issues like road rage, and major accidents

Traffic jams and traffic rule violation tickets are the most common thing in busy city like Kathmandu. While we are rushing in daily life sometimes we forget to ask where our paper i.e. license and blue book are taken and paying fines and getting back our paper takes a lot of time. This application will keep the track blue book and license that traffic took due to rule violation. this application can easily solved this problem .It Enables online payment Besides this, we all know that one of the main reasons for traffic jams is due to road blockage either by strike or road maintenance. It will notify the public about the road condition and prevent them from getting stuck in jams. This method is in fact, workable and effective.

1.3 Objectives

The main objective of this systems to provide convenience to the management team by developing the application to make processes regarding Traffic Management easier.

Here is some specific objective of the project:

- To view current status of the road.
- To keep track of blue book and license.
- Help to manage the traffic.

1.4 Scope and Limitation

The scope of the research is to analyze the existing traffic system in Nepal and to access the scope of license tracker in the context of Nepal and to further explore the technical challenges in traffic management system. The system can be used to notify the road condition. Some of the limitation are;

- When Searching if the name is same then it can cause difficulties.
- Not easy to handle details.
- Unable to analyze past data.

1.2 Report organization

Chapter two contain background study and literature review. Chapter three contain system analysis and design which explain the requirement analysis, feasibility analysis, Architectural Design, Database Schema Design, Interface Design (UI Interface / Interface Structure Diagrams), Physical DFD, ER diagram and process modeling in detail. Similar chapter four explain the implementation and testing in detail. Chapter five contains outcome, conclusion and future recommendation. The last chapter contains source code and snapshot of the system.

Chapter 2: Background study and Literature Review

1.3 Background Study

The traffic management system aims to minimize traffic congestion and its negativity effects. [2]. Tools to improve the overall traffic efficiency and safety of the transportation systems. Cities and traffic have developed hand-in hand since the earliest large human settlements. The same forces that draw inhabitants to congregate in large urban areas also lead to sometimes intolerable levels of traffic congestion on urban streets. As we know. Kathmandu traffic police fines thousands of bikers and other vehicle's driver for violating traffic rules and paying fine and getting back our paper takes a lot of time. With this in mind, License tracker is a web-based application that will keep track of traffic violation tickets and give information about the road condition and help to avoid certain road if there is blockage.. Transportation system provides the way for movements and medium reaching the destinations

1.4 Literature Review

In the recent past, researchers have tested a wide array of technologies in an attempt to find improved method of monitoring traffic conditions. Traffic system comprises one of but many of the areas of current research. Traffic congestion on road networks is nothing but slower speeds, increased trip time and increased queuing of the vehicles. When the number of vehicles exceeds the capacity of the road, traffic congestion occurs [3]

There are similar systems that help in traffic management digitally like Official Traffic Fines, Traffic Police, Nepal, and Traffic Rule Violation Detection System. In traffic police app, the users can receive information on traffic status within Kathmandu valley and remain informed about current status of traffic pressure at various intersections. Traffic App also facilitates the users to create customized routes to directly check the traffic congestion along their personalized routes, for example office, home etc. Nepal, and Traffic Rule Violation Detection System detects violations faster than humans. All these app play a constructive role in helping improve the condition of traffic as well as the driving experience on the road.

The aim of this research is to provide a design of an integrated intelligent system for management and controlling traffic lights based on distributed long range Photoelectric Sensors in distances prior to and after the traffic lights. The appropriate distances for sensors

are chosen by the traffic management department so that they can monitor cars that are moving towards a specific traffic and then transfer this data to the intelligent software that are installed in the traffic control cabinet, which can control the traffic lights according to the measures that the sensors have read, and applying a proposed algorithm based on the total calculated relative weight of each road. Accordingly, the system will open the traffic that are overcrowded and give it a longer time larger than the given time for other traffics that their measures proved that their traffic density is less. [4]. Also the proposed system is designed to accept information about any emergency case through an active RFID based technology. Emergency cases such as the passing of presidents, ministries and ambulances vehicles that require immediate opening for the traffic automatically. The system has the ability to open a complete path for such emergency cases from the next traffic until reaching the target destination. (End of the path). As a result the system will guarantee the fluency of traffic for such emergency cases or for the main vital streets and paths that require the fluent traffic all the time, without affecting the fluency of traffic generally at normal streets according to the time of the day and the traffic density. Also the proposed system can be tuned to run automatically without any human intervention or can be tuned to allow human intervention at certain circumstances [5]. This provides diversity in control and shows how several control strategies can be used and switched over to provide best control. The solution is cost-effective too employing minimum number of sensors.

The license tracker is also similar to these existing system except that, this app keeps the track of the document that traffic police took due to rule violation and notify the public to avoid certain roads if there are any kind of obstacles. The above existing system work for the traffic police but this app is mainly focused for general public.

Chapter 3: System Analysis and design

1.5 System analysis

1.5.1 Requirement analysis

i. Functional requirement

A functional requirement defines a system or its component. It describes the functions a software must perform. The functional requirements of this system are sign in/sign out, search license, register document, update document, give message and view total fund raised and trend of no of traffic rule violence. Our system has two actors i.e. admin and user

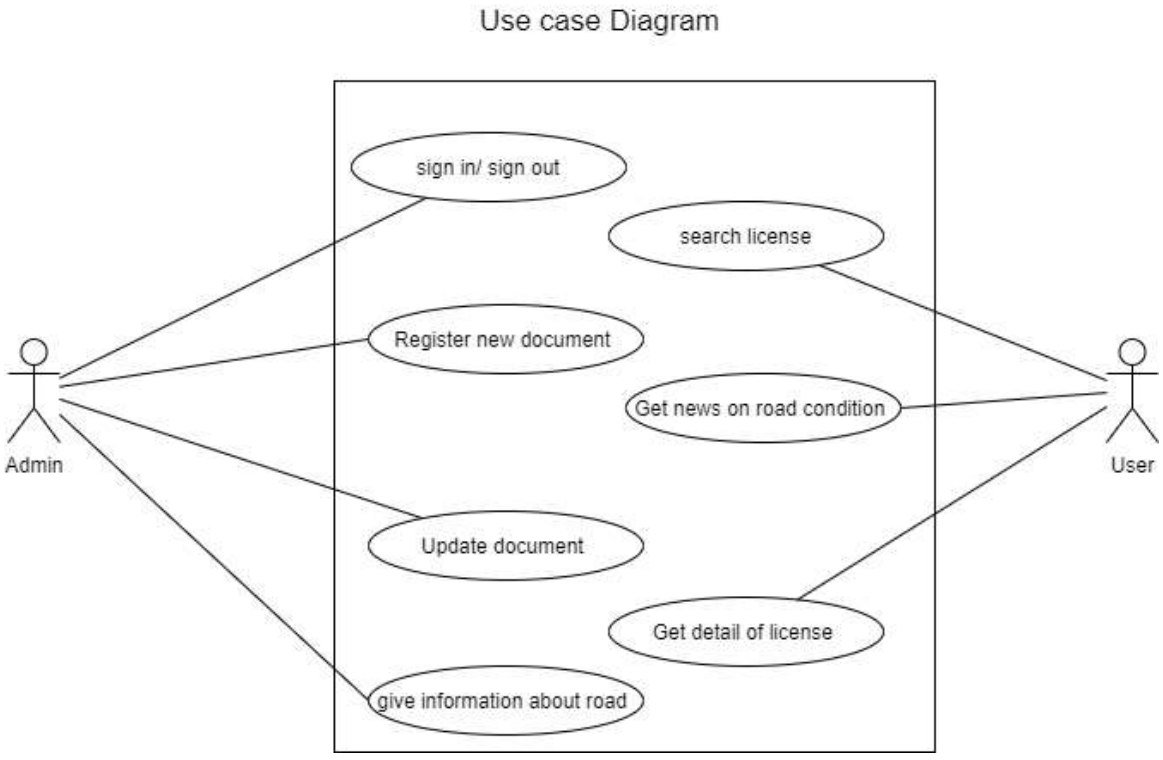


Figure 0.1: Use case diagram

- Functional requirements of system:
  a. Sign in/ sign out: admin has to sign in two get access to the admin panel and once he/she sign out it will redirect to index page.
  b. Register new document: Authorized person and add new document in the database.

c. Update document: If the same document already exit, it will update new value and increase the count by one. If it new document then it simply add new document.
d. Give information about road: once the admin has access to the admin panel they can add new message from there.
e. Search license: any user can search their document detail by using their document number.
f. Get news about road: any user can who use this application will get message that admin has added.

- Actor

  There two actor in this system i.e.

  a. Users: user are public who use the data that admin has added in the database. As shown in the use case diagram they can see their document detail and also get news about the road.
  b. Admin: admin is the traffic police whose username and password are already set. They add new data and message to the database. As shown in use case diagram admin can add new document, sign in and sign out, add new message.

ii. Non-Functional Requirement

A non-functional requirement is a specification that describes the system's operation capabilities and constraints that enhance its functionality. Non-functional requirements of this is categorized as follow:

a) Performance and scalability: As it is small desktop application it returns its result within seconds but may not work with traffic.
b) Portability and compatibility : As it is a desktop-based application, it is compatible of running in any desktop with window 7 and above, 2 GB RAM, hard disk 250 GB and i5 above processor
c) Security: In this application only admin has access to the data. Other users have access only to their data only. Though only authorized person have access to the system, the data is not encrypted so it is open to all the admin.
d) Usability: this system is highly comfortable. People who are familiar with other desktop application and can understand a general English use this application.

1.5.2 Feasibility Analysis

A System request must pass several tests called feasibility study. Feasibility study is the process of identifying if problem can be solved or not solved, determining objective, and assessing the range of cost and benefits associated with several alternatives for solving a problem. We can say also feasibility study is to detailed investigation and analysis of a proposed development whether it is visible technically and economically.

The purpose of a feasibility study is to determine whether or not the purpose of a new system can be justified. The analysis has to answer one fundamental question: (can the required functions be carried out by systems more efficiently than the current?)

I. Technical feasibility

Technical feasibility refers to the technical resources needed to develop, purchase install, or operate the system. In terms of technical feasibility the system requires a fundamental change of the hardware and software that the center owns. Existing system either must be changed or upgraded and new system should be acquired.

System Hardware Requirement: with window 7 and above, 2 GB RAM, hard disk 250 GB and i5 above processor.

System Software Requirement: Microsoft SQL server and Python interface tkinter.

II. Operational Feasibility

This app will integrate the digital payment and help in faster and easier fine payment. Admin i.e. traffic police store the driver detail on database and these data will be used for further processing. Individual with general knowledge of traffic rules, digital payment and familiar with this kind of web-based application can use this application. The program will be GUI based so it will be simple to use and easy to understand.

III. Economic feasibility

Economic any python developer can develop this system with in about three months. A server is needed to be setup along with a few personals so the fees of

the server and salary of the personals will be needed to be paid monthly. The project is made with open source application so only the development team will be required to be paid. So, the project is economically feasible.

1.5.3 Data modeling (E-R Diagram)

E-R is a detailed, logical representation of the entities, association and data element for an organization or business. This application has three table i.e. document_detail, message and login. This tables relation and attribute as shown in the following ER diagram.

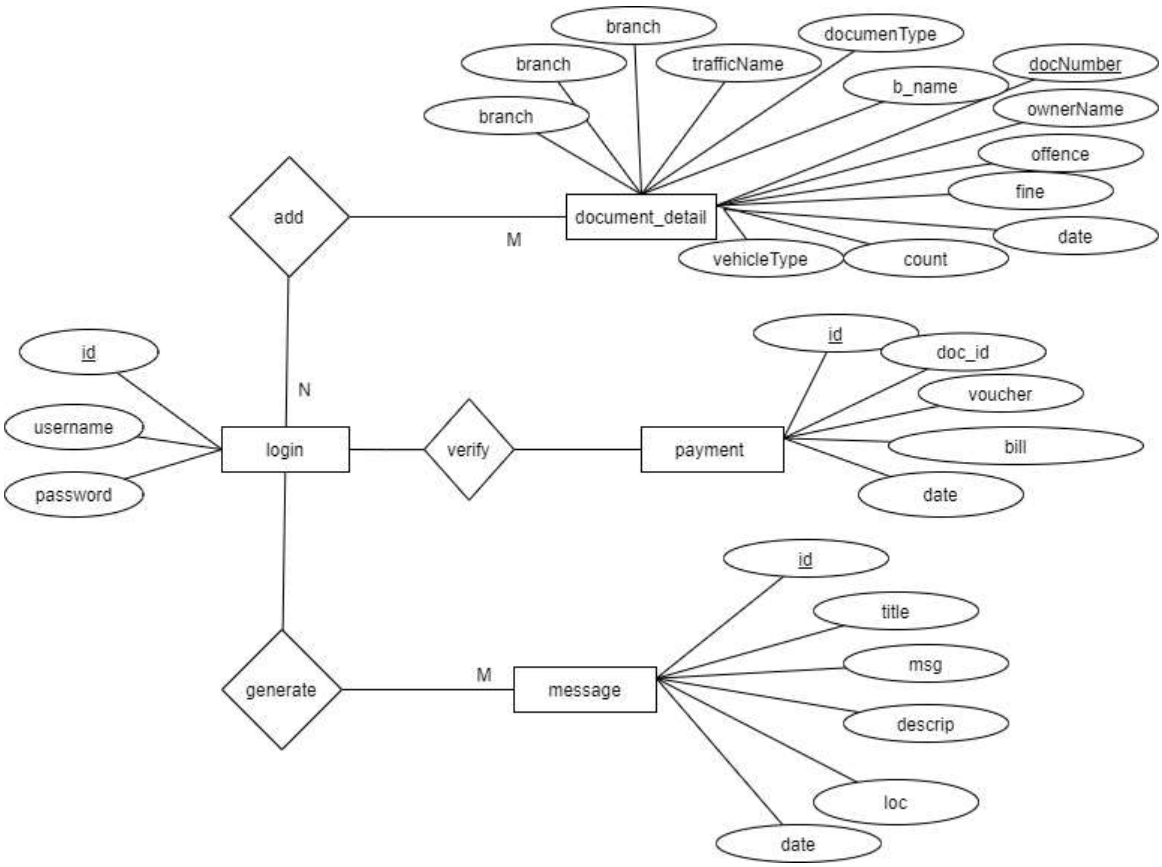


Figure 0.2: ER diagram

Once the admin is authenticated they can add new message and document. One admin can add more than two message and document that is why they have n: m relation.

1.5.4 Process modeling (DFD)

Process modeling is a technique designed to understand and describe the process. It connects and improves the communication between the current and the future state of

a process. A Data flow diagram (DFD) is used to describe the process model of our system. Our system dfd is extended up to second level.

a. Zero level data flow diagram

This is the zero level DFD of license tracker, it also called context level diagram. It's a basic overview of the whole license tracker system or process being analyzed or modeled. it is designed to be an at glance view of user and admin showing the system as a single high level process, with its relationship to external entities of generate message and view message. It should be understood by a wide audience. Including traffic in zero level DFD of license tracker.

Process flow of license tracker system:

- managing all the license detail
- managing all the generate message
- managing all the view message
- managing all the new license

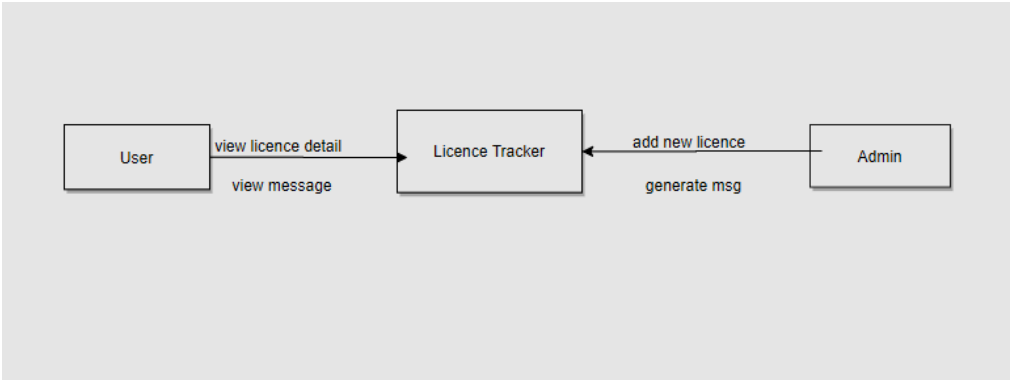


Figure 0.3: Level 0 DFD

b. First level data flow diagram

First level DFD of license tracker system shows how the system is divided into sub-system processes, each of which deals with one or more data flows to or from an

external agent. And which together provide all of the functionality of the license tracker system as a whole. It also identifies data stores add/update, detail, and view message of the system. DFD level1 provide a more detailed breakout of pieces of the 1ST level DFD.

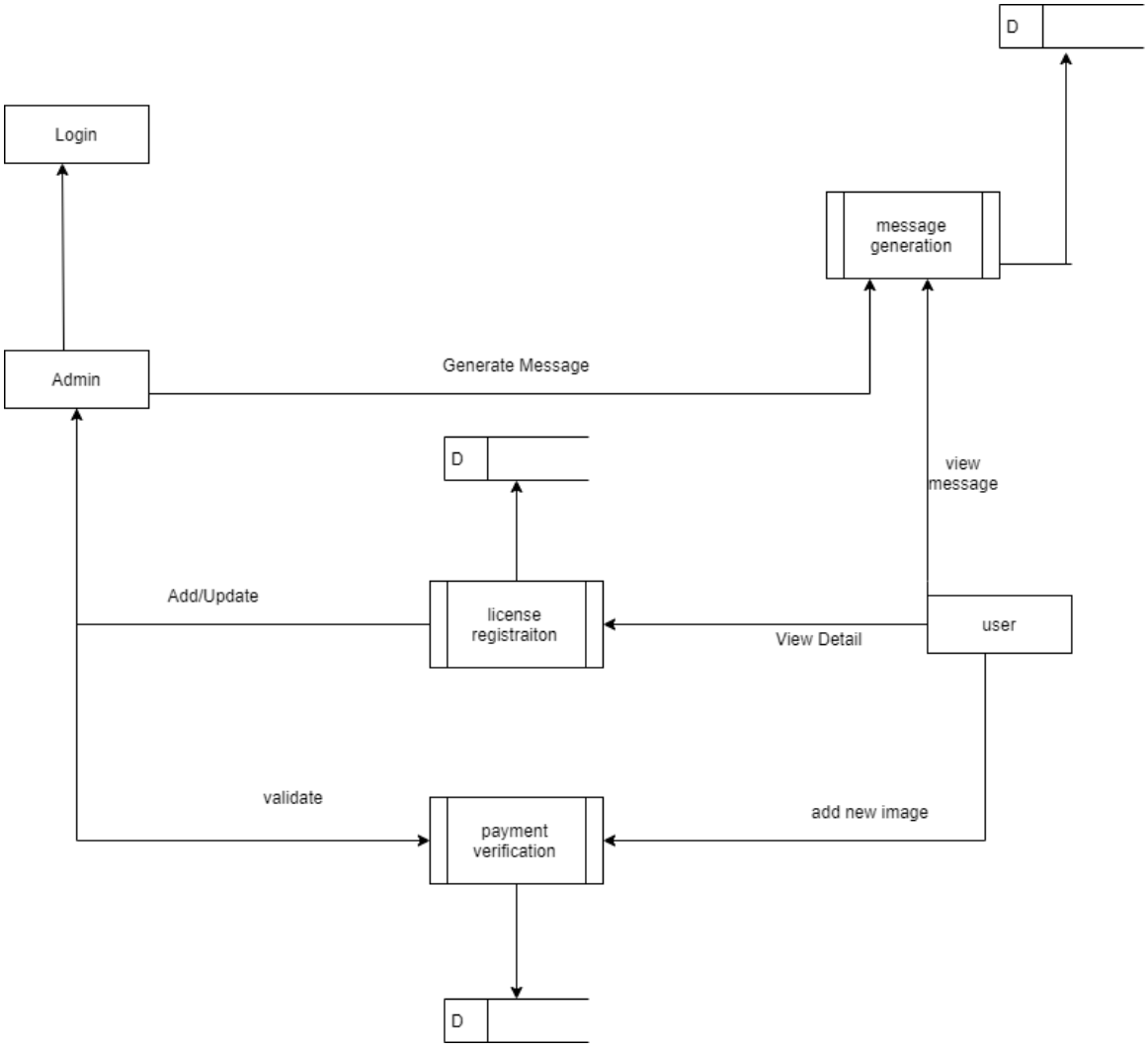


Figure 0.4: Level 1 DFD

c. Second level data flow diagram

DFD level 2 then goes one step deeper into parts of level 1 of traffic. It may require more functionalities to reach the necessary level of detail about the license tracker functioning. First level DFD (1st level) of license tracker system shows how the

system s divided into sub-system (processes). The 2nd level DFD contain more detail of user registration, detail message, add/update.

Low level functionalities of license tracker system:

- Admin logins the system and manage all the functionalities of license tracker system.
- Admin can add, update. generate message
- Admin can manage all the details.
- Admin can search the details of the document.

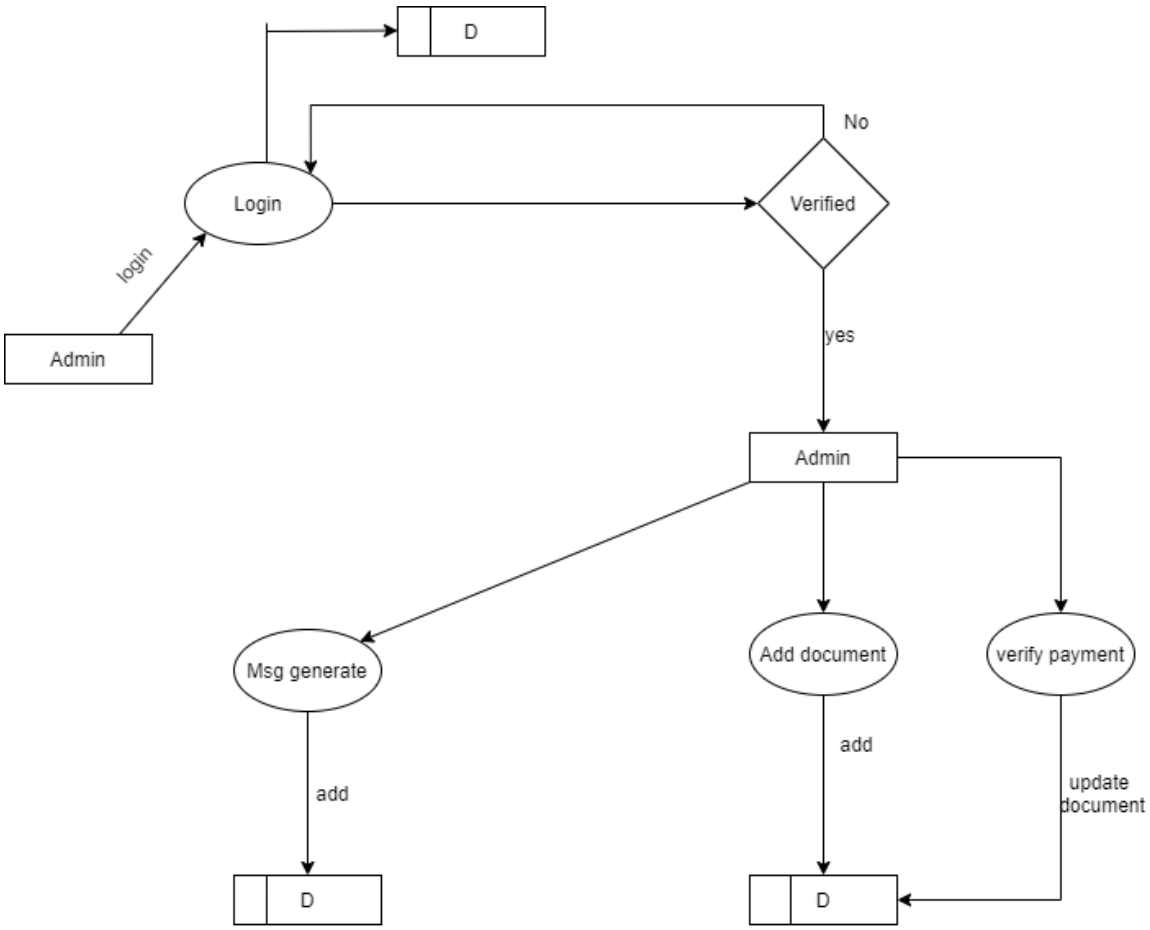


Figure 0.5: Level 2 DFD

1.6 System Design:

Systems design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on the specified requirements. Our system is design on the basis of architectural design, database schema design, interface design and physical dfd.

1.6.1 Architectural Design:

The process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer system. It describe a system category that consists of database, business logic, and its components. A number of different layers are defined with each layer performing a well-defined set of operations. Each layer will do some operations that becomes closer to machine instruction set progressively.

a. The presentation layer: components will receive the user interface operations .It contains all categories related to the presentation layer. In our system this layer consist of admin panel and index window.
b. The business layer: It contains business logic to utility services and application software functions.

c. The database layer: This is where all the data is stored. This system use MySQL for storing data and connect with system with MySQL connector module of python.

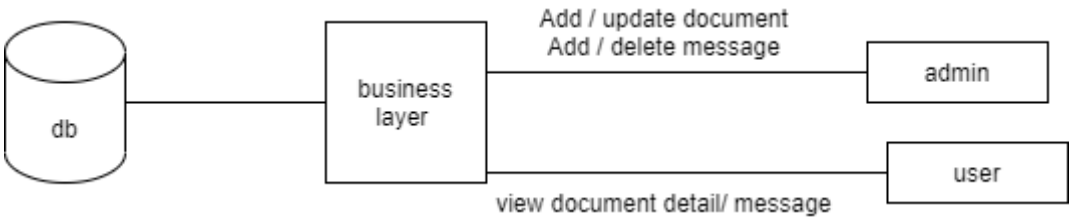


Figure 0.6 : Architecture design

1.6.2 Database schema design

A database schema is the skeleton structure that represents the logical view of the entire database. It defines how the data is organized and how the relations among them are associated. It formulates all the constraints that are to be applied on the data. Fig 3.2.2 is the database schema of our system.

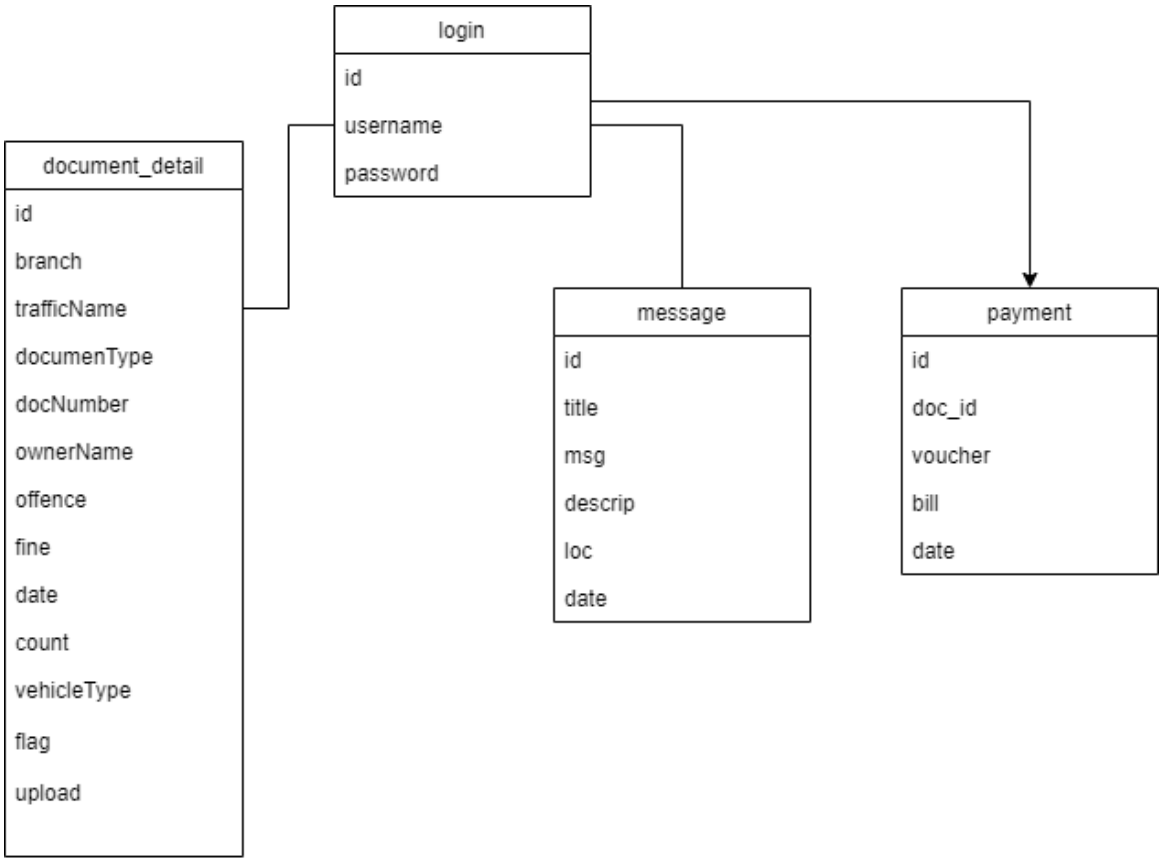


Figure 0.7 : Database Schema

1.6.3 Interface Design (UI Interface / Interface Structure Diagrams)

User interface design or user interface engineering is the design of user interfaces for machines and software. Here is some of screen shots of our user system interface.

a. Index window

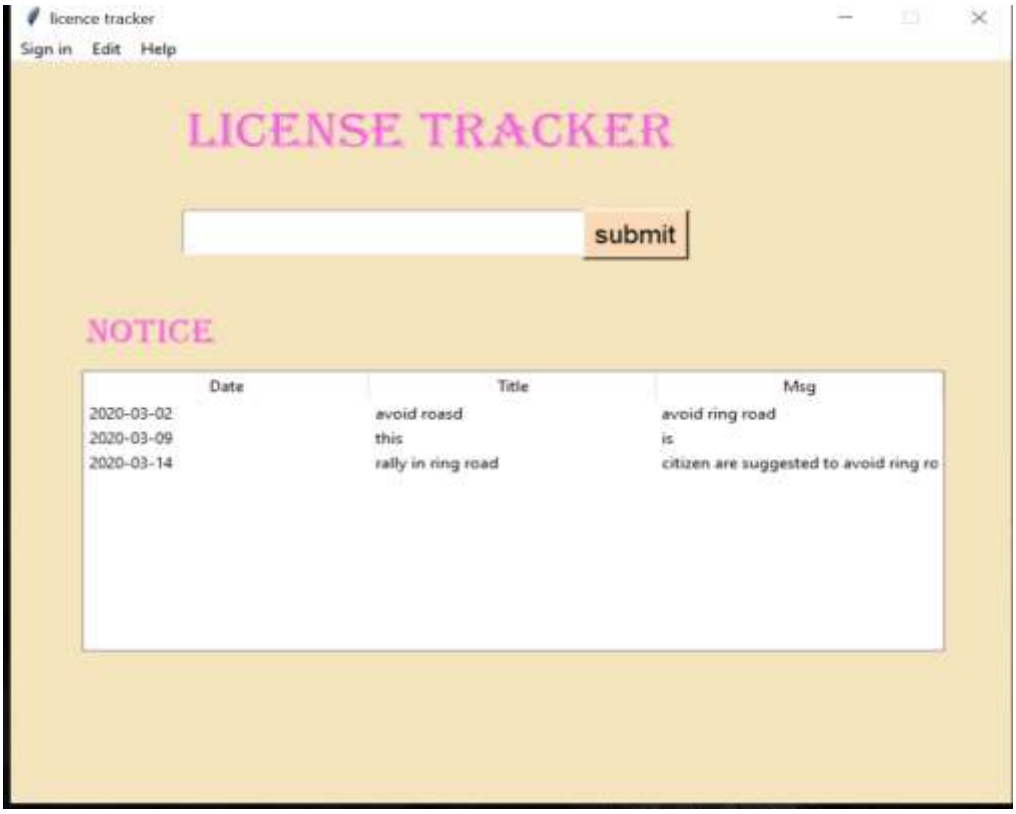


Figure 0.8: Index panel

Figure 3.8 is the index panel of our system. All the user have access to this page. It consists a search function from where user can search their document and list of messages. It also navbar which have sign in and help menu. For now only sign in button is working which is the gateway to the admin panel.

b. Admin window

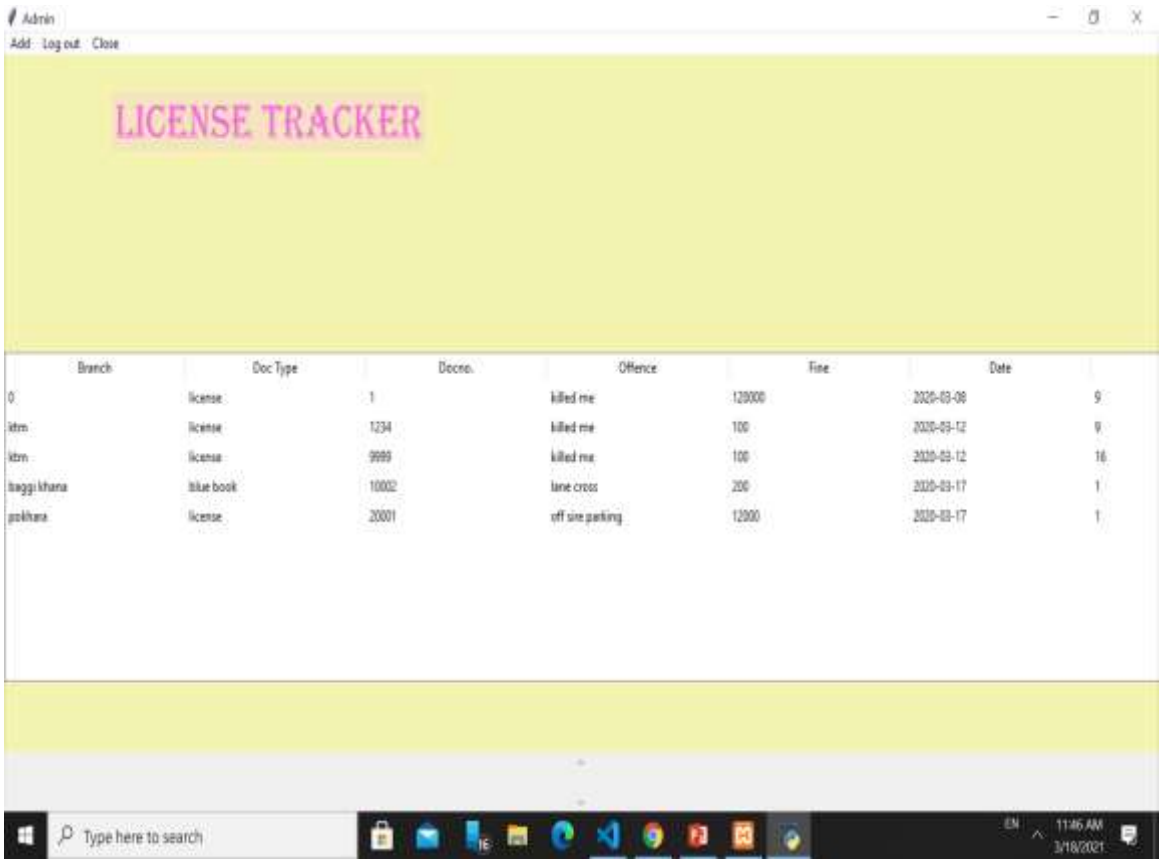


Figure 0.9: Admin panel

This is the admin panel, it consist of all the detail of the navbar with menu add and sign out and document detail and graph that describe trends of traffic rule violation over the year. The add button in menu has two sub menu for adding new message and document.

c. Registration panel

Figure 0.10: Registration Panel

The registration panel is to add new documents detail. It contain branch name, traffic name, vehicle owner name, document type, license number, offence, fine, date and vehicle type. Once this form is submitted it validated the input and it is validated it will store the data in the database.

Chapter 4: Implementation and Testing

4.1 Implementation

Implementation is where to implement how the system works as the sequential flow of forms. As we mentioned above this application has different privileges, so if you login the administrator you see the privileges and do everything in this system.

1.6.4 Tools Used

i. CASE tools:

- Draw.io : to all the diagrams of system
- Framer : to design the UI
- Vs code : to edit the code
- Microsoft word : for documentation

i. Programming language

This application is developed in tkinter package of python. The tkinter package ("Tk interface") is most commonly used GUI programming tool kit, a standard Python interface to the Tk GUI toolkit.

Sql(Structured Query Language) is used for managing data held in a relational database management system. MySQL Connector/Python, a self-contained Python driver is used for communicating with MySQL servers, and to use it to develop database applications MySQL.

ii. Database platform

Relational database, MySQL is used for storing, retrieving user's data. MySQL is a database system that runs on a server, ideal for both small and large applications and is very fast, reliable, and easy to use. It can be compiles on a number of platforms

1.6.5 Implementation Details of Modules

There are five modules in our system. They are as follow:

i. Admin : it has all the code for admin panel

ii. Backend: this module connect the MySQL and the application. It contains function for adding, retrieving data from the server.

iii. Index : this module contains all the code for index page

iv. Message: this module is for adding new message.

v. Registration: this module is to add or update new document detail.

1.7 Testing

1.7.1 Test case for unit testing

Once coding phase is completed, the next phase is testing and debugging. We have conducted three unit testing for login, registration and adding message which are shown in the following table.

Table 4.1: Test Case Result of login

Test No.	Test Type	Test Data	Reason	Expected outcome	Actual Outcome	Pass/Fail
1	Valid	username =admin and password = admin	Enter valid username and password to check if it give access to admin panel	welcome	Welcome	pass
2	Invalid	username =admin and password = 123	Enter valid username and invalid password to check if it give access to admin panel	Password and email doesn't match	Password and email doesn't match	pass
3	Null value	username = and password =	Enter valid username and invalid password to check if it give access to admin panel	please complete the required filed	please complete the required filed	pass

Table 4.2: Test Case Result of Registration

Test No.	Test Type	Test Data	Reason	Expected outcome	Actual Outcome	Pass/Fail
1	Valid	Fill the input form	All the fields are completed so registration is successful	Registration is successful	Registration is successful	pass
2	Invalid	Submit empty form	Don't accept empty form	Pop up : cant submit empty form	Pop up : cant submit empty form	pass
3	Invalid	Submit form with empty name	All the field must be filed	Name must be entered	Name must be entered	pass

Table 4.3: Test Case Result of message

Test No.	Test Type	Test Data	Reason	Expected outcome	Actual Outcome	Pass/Fail
1	Valid	Fill the input form	All the fields are completed so registration is successful	New message added successfully	New message added successfully	pass
2	Invalid	Submit empty form	Don't accept empty form	Pop up : cant submit empty form	Pop up : cant submit empty form	pass
3	Invalid	Submit form with empty title	All the field must be filed	Title must be entered	title must be entered	pass

1.7.2 Test case for system testing

Pre-condition

- Xampp server should be started
- All the unit should be integrated as one single system

Table 4.3: Test Case of system testing

Test No.	Test case	Test Data	Expected outcome	Actual Outcome	Pass/Fail
1	Open index panel Search document from search bar	1234	Display all the detail related to that document id	Display all the detail related to that document id	pass
2	Search with data that is not store in database	11111	Pop up : data not found	Pop up : data not found	pass
3	Once the document detail is open click pay button and upload image	Submit any two image	Image store in database	Image store in database	pass
4	Sign up for admin panel	Username = admin Password = admin	Open admin panel	Open admin panel	pass
5	Add new document, enter all the input field	Complete all the filed	Registration is successful	Registration is successful	pass
6	Verify the document	If data exit in database verify	Payment is verified and update the flag of document detail table	Payment is verified and update the flag of document detail table	pass
7	Logout	Click logout button	Pop up : confirmation box, if clicked yes redirect to index panel	Pop up : confirmation box, if clicked yes redirect to index panel	pass

Chapter 5: Conclusion and future recommendations

1.8 Lesson learn/outcome

With this project we successfully implemented the CRUD (Create, Read, Update, and Delete) operations in MySQL and learn to develop a desktop application with python. While developing this project we also learn about matplotlib to implement graph which is very important python data visualization library. Besides these technical knowledge we also learn project team working and work divide.

1.9 Conclusion

In conclusion we successfully, developed a desktop application with tkinter of python and MySQL. From this project we implemented the theoretical knowledge of database management system (DBMS), software engineering, and system analysis and design. Hence, we conclude that this project enhance our practical knowledge and team work.

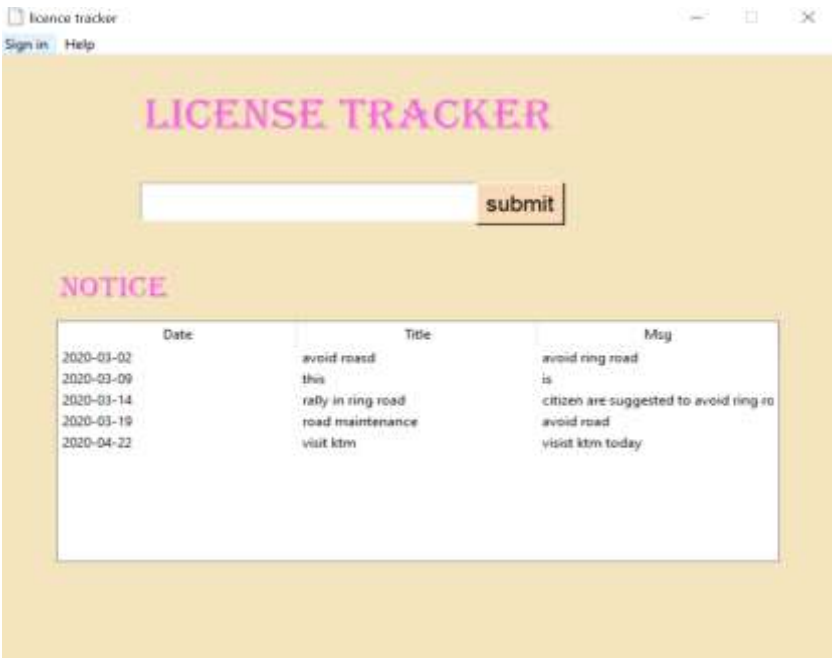
1.10 Future recommendation

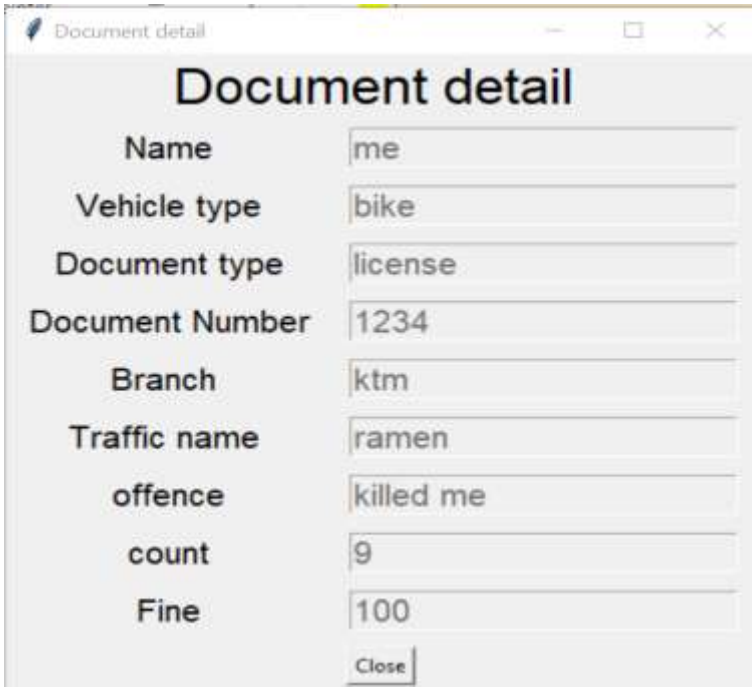
In future we can implement following features:

- New features can be added to track the long distance bus.
- UI can be improved
- Can integrate with other online payment to easily pay the fine
- Add user guidance

Appendices

Snap shots

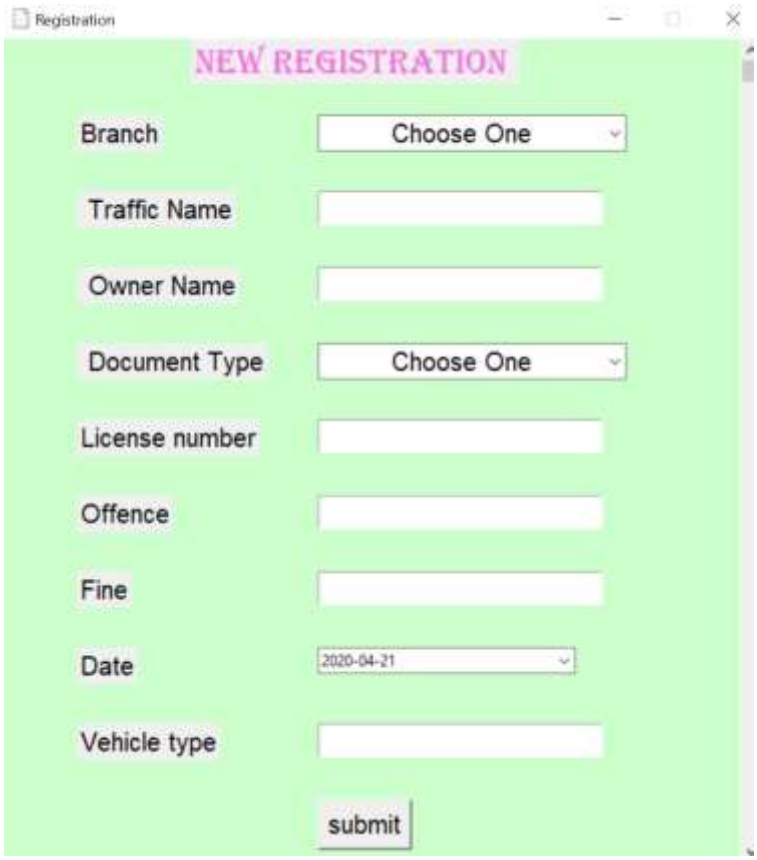




Registration

Login

Admin panel



Registration

Message

Source code

https://github.com/cat-women/licence_tracker

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