

DISSERTATION

“AUTOMATIC NUMBER PLATE DETECTION SYSTEM”

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
AWARD OF

THE DEGREE OF

BACHELOR OF COMPUTER APPLICATION (BCA)

AT

DEPARTMENT OF COMPUTER SCIENCE, APPLICATION & ANIMATION



ESTD : 1880

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WORK CARRIED OUT AT

ST ALOYSIUS COLLEGE(AUTONOMOUS)

DURING THE ACADEMIC YEAR 2022 – 23

UNDER THE GUIDANCE OF

INTERNAL GUIDE

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Department of Computer Science, Application & Animation



This is to certify that the following students of VI Semester BCA have satisfactorily completed the project "**AUTOMATIC NUMBER PLATE DETECTION SYSTEM**" for the **Bachelor of Computer Application (BCA)** prescribed by the College during the academic year 2022 – 23.

MR CAYSUS DILAN RODRIGUES – 204606

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1.

2.



DECLARATION BY THE STUDENT

We hereby declare that this project work titled “**AUTOMATIC NUMBER PLATE DETECTION SYSTEM**” has been prepared by us during the academic year 2022 – 23 under the guidance of **Mr ROYAL PRAVEEN D’SOUZA**, Lecturer,, Department of Computer Science, Application & Animation, St Aloysius College (Autonomous), Mangaluru submitted in partial fulfillment of the requirements for the award of the degree of **Bachelor of Computer Application (BCA)** as prescribed by the College.

We also declare that this project is the outcome of our efforts, that it has not been submitted to any other University for the award of any degree or diploma.

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1. SYNOPSIS

1.1 Title of the Project

AUTOMATIC NUMBER PLATE DETECTION SYSTEM (ANPD)

1.2 Abstract

Automatic Number-plate detection is a technology that uses optical character recognition on images to read vehicle registration plates to create vehicle location data. It can use existing closed-circuit television, road-rule enforcement cameras, or cameras specifically designed for the task. ANPD is used by police forces worldwide for law enforcement purposes, including checking if a vehicle is registered or licensed. It is also used for electronic toll collection on pay-per-use roads and to catalogue the movements of traffic, for example, by highways agencies. Automatic number-plate detection can be used to store the images captured by the cameras and the text from the license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take the picture on any day or night.

1.3 Objective of the Project

Automatic number plate detection (ANPD), also known as Automatic Vehicle Identification (AVI), can be implemented using existing multi-purpose CCTV surveillance cameras or dedicated ANPD cameras. These systems use optical character recognition (OCR) software to isolate and identify vehicle registration details. This technology is typically utilized for automatic toll collection, or to detect speeding violations, but can also be used to monitor vehicle movement and for access control. A typical ANPD system includes hardware and software components including roadside camera systems, control centre computer systems, software Applications to manage captured data, and a central database of vehicle registration details.

There are two different approaches to data processing:

1.3.1 Images are captured by camera equipment and sent directly to the control centre with time, date and location information without any pre-processing. The central computer system utilizes OCR software which uses a set of algorithms to isolate vehicle registration

details, and then compares this information with a database of known vehicle registration numbers to display driver and vehicle information.

1.3.2 Images are captured by the camera equipment and processed immediately at the camera location by an embedded OCR processing unit on the camera. The isolated registration number is then transmitted to the control centre along with time, date and location data where it is compared with a database to provide driver and vehicle information. In the source data processing method, the OCR process takes approximately a quarter of a second with modern equipment and transmission can be achieved wirelessly with different radio transmission systems depending on the type and quantity of data to be sent.

1.4 Project Category

Web Based Application with AI and Machine Learning

1.5 Languages to be used

1.5.1 FRONT END: HTML, CSS, JINJA, Python(flask)

1.5.2 BACK END: Python

1.5.3 DATABASE: Firebase, SQL

1.6 Structure of the proposed project

The designed application provides admin view. The admin view is meant to search for vehicles, to see previous data and records etc. The admin/user has a real time control of the application such as, over ride the number plate detection process.

1.7 Module Description

1.7.1 ADMIN

1.7.1.1 Registration: A personal with Admin status can initiate registration methods this is done by two procedures those are:

a)CSV file method: The CSV or Comma separated value file format updated to the application where in the application reads the file and then automatically inputs all the data by itself.

b)Single Entry System: Where in the Admin passes the details of a vehicle manually to the system through a form.

c)Admin Registration: Admin can register new admin, who can then access the system using the new credentials.

1.7.1.2 Manage the entry and exit gates: Here the Admin can access, monitor and manage the operations of all gates within the campus where the ANPD System is installed. Some operations that the admin can perform are as follows:

a)Access: The admin can access real-time data from the systems installed.

b)Monitor: The admin can monitor the gates. He can view in real time all the entries and exits.

1.7.1.3 Manage Records: The admin has full independence to alter or change or delete any record in the system should the need might arise. Though it is done by the admin the Applications logging system will log the changes done by the admin to keep record of all the actions.

1.7.1.4 Log System: The Application will have a log system where it would record all the actions of the user or the admin, it would contain date, time, user and the action performed. There are two types of log systems:

a) Application Log: Where the Users actions will be stored for future reference.

1.7.1.5 Search: The Admin can search for vehicle records when needed.

1.7.1.6 Vehicle page: This is a page which can be accessed only by admins where in they can find all the details of the vehicle in one single page.

1.7.1.7 Graphs and data: The Admin can access Graphs and data related to the Establishments total carbon footprint. The data would include the following:

a) Categorisation of Vehicles: The vehicles would be categorised into different fields such as Establishment owned vehicles, Establishment hired vehicles, Personal Vehicles of Essential Personal, Visitors etc.

b) Other graphs: No of Commuters, type of commuters, etc.

1.7.1.8 Print data System: Here the admin can print the data from the application from a time to time basis in a PDF format

1.7.2 VEHICLE

1.7.2.1 Enter: The Vehicles enter through a gate where the system is placed. This process is only allowed for establishment authorised vehicles.

1.7.2.2 Exit: The vehicles can exit the establishments.

1.8 Any other information

1.8.1 TensorFlow(to implement machine learning in the system)

1.8.2 Google cloud vision API OCR(for character recognition)

1.8.3 Google cloud AutoML(for machine learning)

1.9 Future scope of the Project

The system can be enhanced using sensors at the entrance. As any vehicle enters the gate it first capture the image of its number plate. Then the image is sent to database where it is categorized. If the number plate matches then gate would open, else it will send an alert. The Guard or any recognized or registered authority(Admin) can access the site using a mobile phone and then enter the number of people and send the data to the application. This process needs an human intervention.

2. SOFTWARE REQUIREMENTS AND SPECIFICATIONS

2.1 Introduction

The Software Requirement Specification (SRS) is a collection and organisation of all the requirements surrounding a project. As the vision document was a board statement of a user's needs goals and objectives and features of the system, the SRS begins the detailing of those needs and features of the system, the SRS begins the detailing of those needs and features and how they are going to be implemented in the solution. The SRS is not a frozen document, but rather a living art effect. It has a number uses as the developer begins the implementation efforts. It serves as a basis for communication between all parties and serves as an input to software testing and quality assurance checks.

2.1.1 Purpose

This SRS Documentation is of the project Automatic Number Plate Detection (ANPD) version 1.0, this document is a comprehensive description of the intended purpose and environment for ANPD under development. This document will fully describe as to what the ANPD system will do and how it will be expected to perform. The document aims to analyse and give in depth insight into the complete system.

2.1.2 Document Conventions

This document follows MLA Format. Bold-faced text has been used to emphasize sections and subsection headings. Diagram illustrations may be used to help illustrate complex concepts of system components.

2.1.3 Intended Audience and Reading Suggestions

While the software requirement specification (SRS) document is written for a general audience, this document is intended for individuals directly involved in the development of ANPD system such as Project managers, developers, testers, users and stakeholders. This document need not be read sequentially; users are encouraged to jump to any section they find relevant.

2.1.4 Product Scope

ANPD is used primarily for number plate detection, Our main objective is to detect vehicle number plates and to validate the number plate and either allow access or deny access. Our other objective is to collect Vehicle data from the establishment and to analyse and prepare graphs showing various different kinds of data such Emission, environmental data etc.

2.1.5 Reference

Software Engineering: A Practitioners Approach, 8th Edition

<https://www.studocu.com/in/document/jawaharlal-nehru-technological-university-hyderabad/software-engineering/srs-template-2-ieee-format-for-the-students/25871615>

<https://www.perforce.com/blog/alm/how-write-software-requirements-specification-srs-document>

2.2 Overall Description

2.2.1 Product Perspective

The world today is moving towards technologically advancements, but there are these small things that people usually miss in our case it is the guard at the gate system. We have seen for ages a guard on a gate who stands guard and checks and validates any vehicle which enters the establishment but with our project ANPD we are determined to eliminate the process of manually checking and logging all entries and exists in and out of the establishment. We are implementing machine learning models which will automate the process of validating vehicles. This is a new self contained products.

2.2.2 Production Functions

- **Registration:** The admin is allowed to register users of the system.
- **Managing gates:** The admin can access and manage gates.
- **Record managing:** we can alter or change or delete any records in the system.
- **Logs system:** It stores the activity of the users of system.
- **Search:** you can search for vehicles records.
- **Vehicle page:** Page containing vehicle details.
- **Graphs and data:** The admin can access various graphs and data from the system.
- **Printing data:** The Admin/user can print the data.

2.2.3 User Classes and Characteristics

In this product there are mainly two user classes that interact with the product. Those are as given below:

2.2.3.1 ADMIN

The admin is the super user of the system and has most functions and freedom when it comes to being a system user. The functions of administrative class are as given below.

1. Registration:
 - a)CSV file method
 - b)Single Entry System
 - c)Admin registration
2. Manage the entry and exit gates:
 - a)Access
 - b)Manage
 - c)Monitor
3. Manage Records
4. Log System:
 - a) Application Log
 - b)App Error Log

5. Search
6. Vehicle page
7. Graphs and data:
 - here various data can be accessed which will be represented in graphical format like
 - a) Categorisation of Vehicles
 - b) Other graphs
8. Print data System

2.2.3.2 VEHICLE

the vehicles have no direct use in the application though without them the system is of no use

1. Enter
2. Exit

2.2.4 Operating Environment

Front End: HTML, Java script, CSS, Jinja (Flask: Python)

Back End: Python

Other API's: TensorFlow Lite, Google cloud vision API

Application Type: Client Server Application

Database: MySQL, firebase

Operating System: Windows 7 or better, MAC, Linux

Browser: Google Chrome, Mozilla Firefox, Microsoft Edge etc

Devices: Smart Phones, Desktop

2.2.5 Design and Implementation Constraints

- i. The software is designed and is uploaded on the web. We need constant internet connection to use the software.
- ii. The software depends on cloud database for data that is pre stored. Hence it is vital that the database is online while the system is up.
- iii. The coding of the front end is done using HTML, CSS, Java script and bootstrap hence it is necessary that we implement a browser that supports these languages.
- iv. The capturing and uploading of the image is done using Raspberry PI and camera unit, hence it is essential that Hardware components such as Raspberry PI are up and running, There is also a need for providing the Raspberry PI unit with constant Electricity and Internet Connection.
- v. The AI Systems can be faulty sometimes as a Machine Learning model can never be 100% Accurate with data, Hence there must be safeguards to tackle this problem.

2.2.6 User Documentation

the Admins will be given a user manual of the system and they will be trained by developers about the features.

2.2.7 Assumptions and Dependencies

1. As the system is web-based system it can be used both on computers and mobiles.
2. The system is dependent on the Admin for certain inputs such as registrants, vehicle data etc.
3. The system where the web-application is accessed and the raspberry pi unit are connected to the internet.
4. Admin can Override any system i.e. if the system malfunctions or there is human intervention is needed.

2.3 External Interface Requirements

2.3.1 User Interfaces

It provides a GUI for the admin, here he or she can login and access the system. From here the admin can access the functions of the system. There are also mobile first GUI's designed for usage by guards and drivers of vehicles specific for their functions. The GUI is designed using HTML, CSS, Java script and is handled in the server by Python's Flask web framework. This is primarily used because the languages and framework mentioned above are supported in most of the used browsers.

2.3.2 Hardware Interfaces

The user need not have any specialised hardware installed in the system. The minimum requirements are 4 GB of RAM and 200 GB of Hard disk space. The Establishment is need not have any other infrastructure as we install Raspberry pi systems and cameras with the system. The website and database are stored and hosted through cloud.

2.3.3 Software Interfaces

Browser should support HTML/HTML 5 compatible for experience for admin and all its users. The website communicates with the database in order to get the information about the vehicles and then makes graphs and gives information based on that data.

2.4 System Features

2.4.1 Registration and Login

2.4.1.1 Description and Priority

The primary admin username and password are stored in the database by developers before hand which allows them to login at the beginning of this web app. The Admin can then register users of the application and also register vehicles such as employee vehicles, Establishment owned vehicles and other vehicles which will be then stored in the database. The admin can only initiate registration process hence its a high priority.

2.4.1.2 Stimulus/Response Sequences

Admin first clicks on New Registration then the admin selects which type of registration admin wants to initiate (example an institution of education the new Admin students vehicle registration or staff vehicle registration or college owned or hired vehicle registration). The admin can do this process one by one or he can upload a CSV file into the web app and the program will sort out the registration process for him.

Once the admin is finished with uploading the details it will then show the admin all the details it has uploaded and then the admin can either press proceed or he can press cancel which would cancel the process.

2.4.1.3 Functional Requirements

REQ-1: A button for Registrations in admin's panel

REQ-2: A detailed panel to select type of Registration

REQ-3: A table must be created based on the different types of registrations

2.4.2 Manage Entry and Exit Gates

2.4.2.1 Description and Priority

The admin can access this page as to monitor the gates, this module will give the admin access to the data that is retrieved from the gates where the system is installed. the admin can monitor any activities happening in the gate. The admin can also manage the gates in real time such as if there is a scenario where all unauthorized vehicles are banned from entering an establishment the admin can authorize such vehicles through this mode. This module is only accessed by admin hence it is a high priority.

2.4.2.2 Stimulus/Response Sequences

The primary page on the dashboard will be dedicated for Gates and its data the admin can then click on the monitor button in the specific gate section where in the admin is directed to a new page where he can check the real time data of what is happening in the gate he has many other options such as option to check data and also option to alert if a human assistance is needed in one of the gates the admin can also see visually through video as to what is happening at the gate through real time video.

2.4.2.3 Functional Requirements

REQ-1: A button for monitor in admin's dashboard

REQ-2: A button to access daily records

2.4.3 Manage records

2.4.3.1 Description and Priority

The admin can access all the records of all the vehicles from this option he can then delete or add or change records. The admin can choose the timeline from

which he wants access the records. This process can only be accessed by the admin, this is of high priority.

2.4.3.2 Stimulus/Response Sequences

The Admin can click on records button and then he can browse through data to find specific data. In every data there will be a section to add or delete a specific row. There will also be an option to change timeline.

2.4.3.3 Functional Requirements

REQ-1: A button for Records in admin's dashboard.

REQ-2: A table must be created in the database for the records page to access the data from.

2.4.4 Search

2.4.4.1 Description and Priority

The admin or the guard can access the vehicle details just by entering the numberplates in the search bar and the system will provide the details.

2.4.4.2 Stimulus/Response Sequences

The admin can click on the search option in the dashboard and then the Admin will directed to a site where he can enter the number plate details and then the system will search for particular vehicle and will return with details.

2.4.4.3 Functional Requirements

REQ-1: A button for Search in admin's dashboard.

2.4.5 Graphs and data

2.4.5.1 Description and Priority

This is one of the main features of the system as this feature gives out the data in form of Graphical charts and various other methods. Here the system will collect all the data necessary for the creation of graphs and then it will show it the user in a visually appealing manner. This is a very high priority module.

2.4.5.2 Stimulus/Response Sequences

The admin can click on the graphs and data option then the user is directed to a page where the user can access specific data that he needs or the data he can just access the general data which is available in the graphs and data page. The data will be real time and hence the page will refresh every 30 seconds so that the user has the most recent data at the tip of finger. He can then click print data option to print specific data that the admin needs.

2.4.5.3 Functional Requirements

REQ-1: A button for Graphs and Data in admin's dashboard.

REQ-2: A option for printing the data.

REQ-3: The website should have access to all the necessary database tables.

2.5 Other Non-Functional Requirements

2.5.1 Performance Requirements

Quickest possible algorithms are required to implement in the system for recognition process and validation process as time is of the essence. Traffic is heavy at morning, afternoon and evening hours the process should be completed within minutes. The server and databases should be working 24 hours a day 7 days a week and the same goes for the raspberry pi installed in the gates.

2.5.2 Safety Requirements

The application is password protected and access limited based on the level of authorisation. The admin has access to all the processes the guard and drivers have access to their particular features. Data can be managed only by the admin.

2.5.3 Security Requirements

The data in the system is secured and is only accessible to the developers and admin, the application is password protected. The database is coded in a way to stop any SQL injection attacks. The application uses sessions and cookies as a measure of stopping DDOS attacks. The website also has verifies who the user is every time a page is accessed using cookies and sessions.

2.5.4 Software Requirements

The necessary qualities of software products are

2.5.4.1 Security

The application is password protected and various measures will be taken to stop normal attacks from hostile sources.

2.5.4.2 Maintainability

The application is developed using python in the back end, since it is a fairly easy and quite popular language the maintaining of the system should be fairly simple to any developer. In case of the absence of the developer the code will have comments in them to make the new developer understand what is happening in a block of code.

2.5.4.3 Reliability

The application is hosted on a server hence there will be concern for the number of requests, but the server can handle with ease at least 100 requests at a time without any loss in speed. The raspberry pi can handle 2 cars at a time, this is its optimal performance and the output will be given within 2 millionths of a second.

2.5.4.4 Portability

The application is easily portable to any Windows or Linux system.

2.5.4.5 Correctness

The ANPD application uses Machine Learning Model, Machine learning models usually tend to have accuracy which is less than 100% but we will try to build a model which has an accuracy rate of above 90%.

2.5.4.6 Flexibility

The system will be built in a way that it is flexible to any future changes that we might across.

2.5.5 Business Rules

- i. The Admin can only access the records, alter the records, update the records.
- ii. The Admin can only access the Real Time Footage and monitor gates
- iii. The Admin can only register new guards, drivers, vehicles.
- iv. The Admin can only override the system.

2.6. Other Requirements

2.6.1 APPENDIX A: Glossary

Acronyms:

1. **ANPD:** *Automatic Number Plate Detection*
2. **SQL:** *Structured Query Language*
3. **SRS:** *Software Requirement Specification*
4. **CSS:** *Cascading Style Sheet*
5. **HTML:** *Hyper Text Markup Language*
6. **MAC:** *Macintosh Operating System*
7. **GUI:** *Graphical User Interface*
8. **RAM:** *Random Access Memory*
9. **DOS:** *Denial of Service*
10. **DDOS:** *Distributed Denial Of Service*
11. **CSV:** *Comma Separated Value*
12. **ML:** *Machine Learning*
13. **IOT:** *Internet of Things*
14. **REQ:** *Requirements*

3. SYSTEM ANALYSIS AND DESIGN

3.1 Introduction

System Analysis is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components. It is conducted for the purpose of studying a system or its parts in order to identify its objectives. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose. Analysis specifies what the system should do. System design is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to understand the old system thoroughly and determine how computers can best be used in order to operate efficiently. System Design focuses on how to accomplish the objective of the system.

Design is a creative activity that cannot be done mechanically, it requires human insight. The design activity is a fundamental phase in a process that progressively transforms the systems requirements through a number of intermediate stages into the final product. Software design is defined as the decomposition of the system into module description of what each module is intended to do and of the relationship among the modules. This description is called as the software architecture, we can view a design as a process in which the architecture if described through steps of increasing details, each new step implements the requirements identified in the previous one, the final step being the implementations, which completes the transformations of the software architecture into programs.

The purpose of this document is to give the entire description if the software requirements using the system design document format in accordance with the IEEE standards, it can also be used as the guide to user on how to use the software efficiently.

3.2 Functional decomposition

Functional decomposition is the process of breaking down a system into smaller, more manageable parts in order to analyse and understand it. In the case of automatic number plate detection (ANPD), functional decomposition could involve breaking down the system into the following functions:

- Object detection: The system detects which type of vehicle the object is i.e. car, bus, two wheeler etc.
- Number plate detection: The system should be able to detect the region of the image that contains the license plate.
- Character recognition: The system should be able to recognize the individual characters of the license plate. This can be done using techniques such as optical character recognition (OCR) or deep learning algorithms.

3.3 Description of the programs

3.3.1 Structure Charts

Structure Chart represent hierarchical structure of modules. It breaks down the entire system into lowest functional modules, describes functions and sub-functions of each module of a system to a greater detail. Structure Chart partitions the system into black boxes (functionality of the system is known to the users but inner details are unknown). Inputs are given to the black boxes and appropriate outputs are generated.

Modules at top level are called modules at low level. Components are read from top to bottom and left to right. When a module calls another, it views the called module as black box, passing required parameters, and receiving results.

Symbols used in construction of structured chart

1. Module:

It represents the process or task of the system. It is of three types.

- Control Module

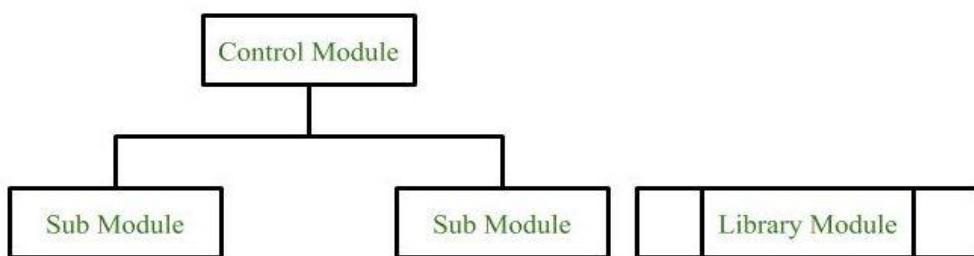
A control module branches to more than one sub module.

- Sub Module

Sub Module is a module which is the part (Child) of another module.

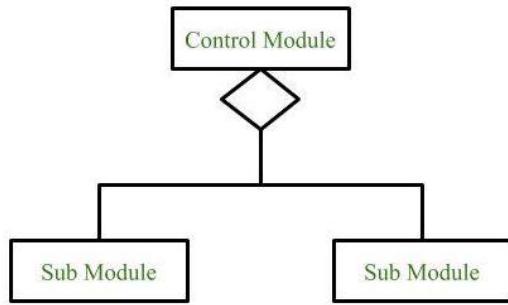
- Library Module

Library Module are reusable and invokable from any module.



2. Conditional Call

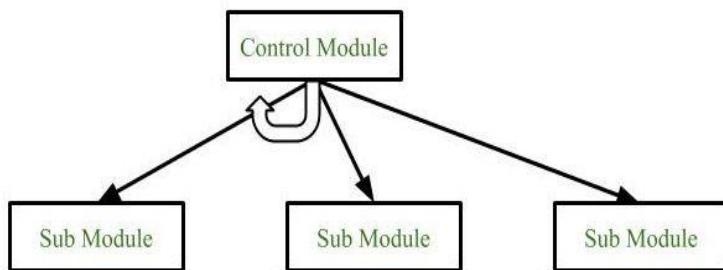
It represents that control module can select any of the sub module on the basis of some condition.



3. Loop (Repetitive call of module)

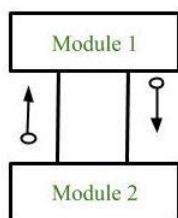
It represents the repetitive execution of module by the sub module.

A curved arrow represents loop in the module.



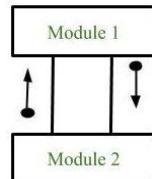
4. Data Flow

It represents the flow of data between the modules. It is represented by directed arrow with empty circle at the end.



5. Control Flow

It represents the flow of control between the modules. It is represented by directed arrow with filled circle at the end.

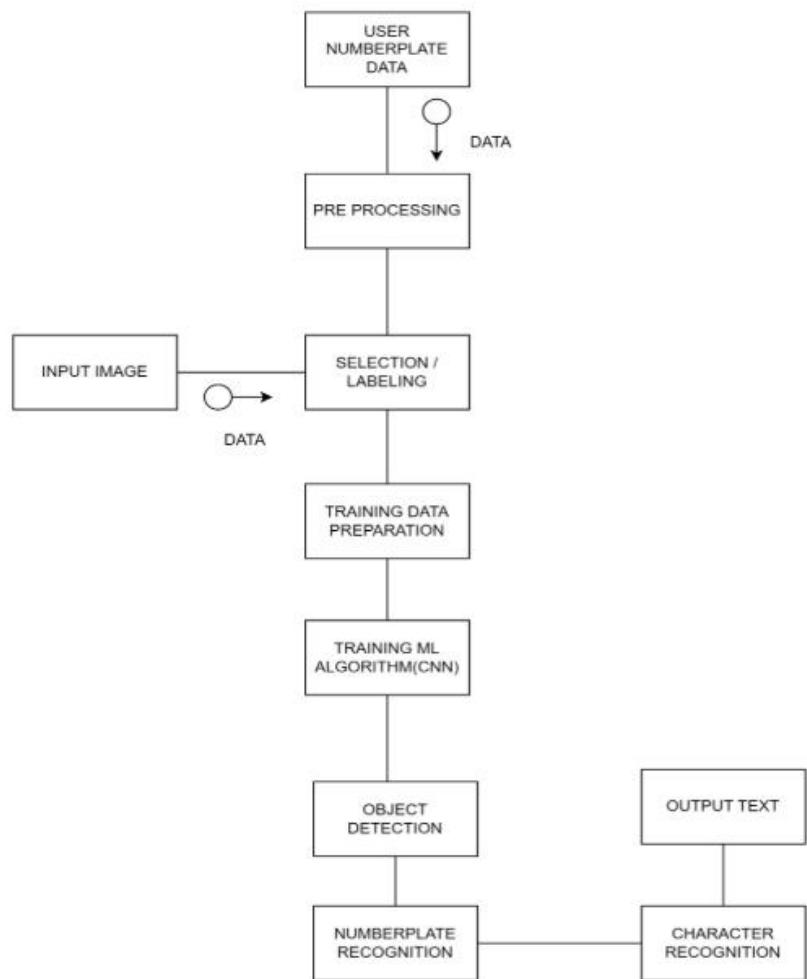


6. Physical Storage

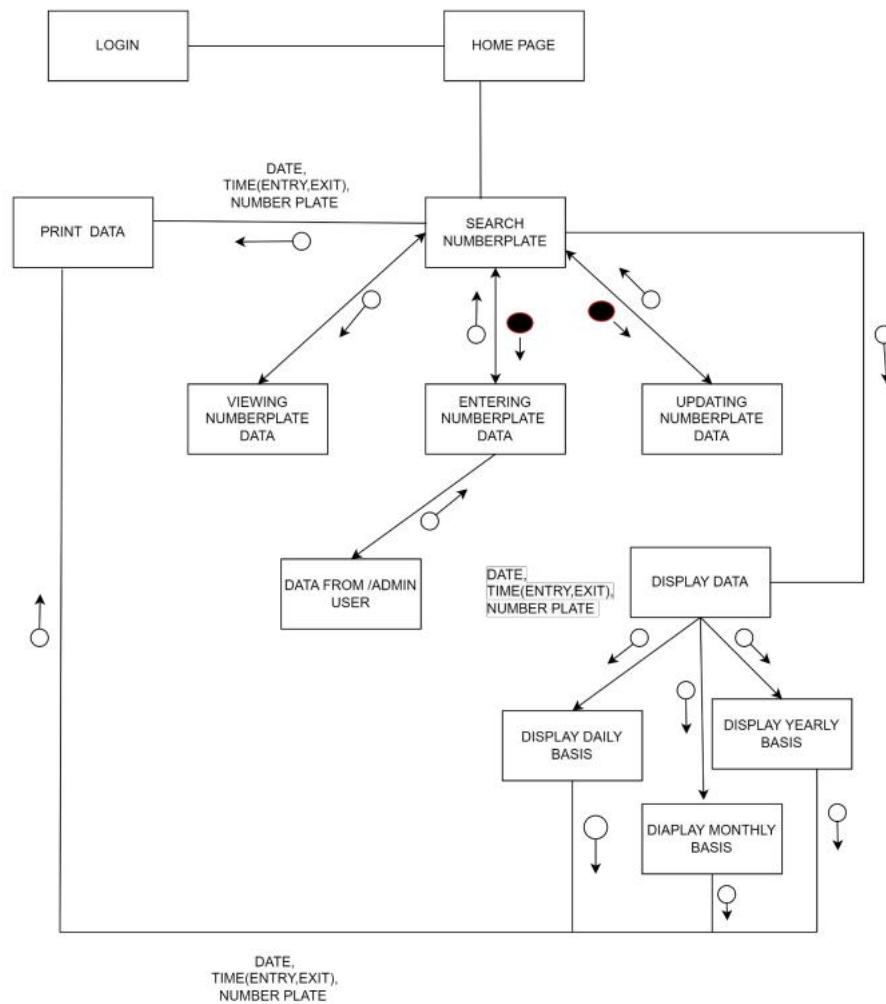
Physical Storage is that where all the information are to be stored.



3.3.1.1 STRUCTURE CHART FOR MODEL



3.3.1.2 STRUCTURE CHART FOR WEBSITE



3.4 SYSTEM MODEL

3.4.1 Block Diagram

A block diagram is a drawing illustration of a system whose major parts or components are represented by blocks. These blocks are joined by lines to display the relationship between subsequent blocks. We use block diagrams to visualize the functional view of a system. It uses blocks connected with lines to represent components of a system. With a block diagram, you can easily illustrate the essential parts of a software design or engineering system and depict the data flow in a process flow chart.

A block diagram is a diagrammatic representation of a system or process in which the various components or functions are represented by blocks interconnected by lines or arrows to show the relationship between them. In a block diagram, the blocks represent the individual components or subsystems of the system, while the lines or arrows represent the connections between them. Block diagrams are commonly used in engineering, science, and other fields to illustrate complex systems, processes, or algorithms. They can be used to show the flow of information or materials, the sequence of operations, or the functional relationships between different parts of a system. Block diagrams are often used as a high-level overview of a system or process, providing a simplified representation that can be easily understood and communicated to others.

Notations used in block diagram

1. Blocks: Blocks are used to represent components or stages of the system or process being depicted in the diagram. They can be represented as rectangles, circles, triangles, or other shapes depending on their function.



2. Arrows: Arrows are used to represent the flow of data or information between the blocks. They indicate the direction of flow and can be labeled to indicate the specific data or information being passed between the blocks.

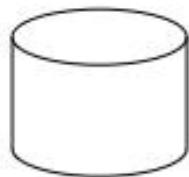


3. Lines: Lines are used to connect blocks and indicate the relationships between them. They can be used to show different types of relationships, such as inputs and outputs, cause-and-effect relationships, or feedback loops.

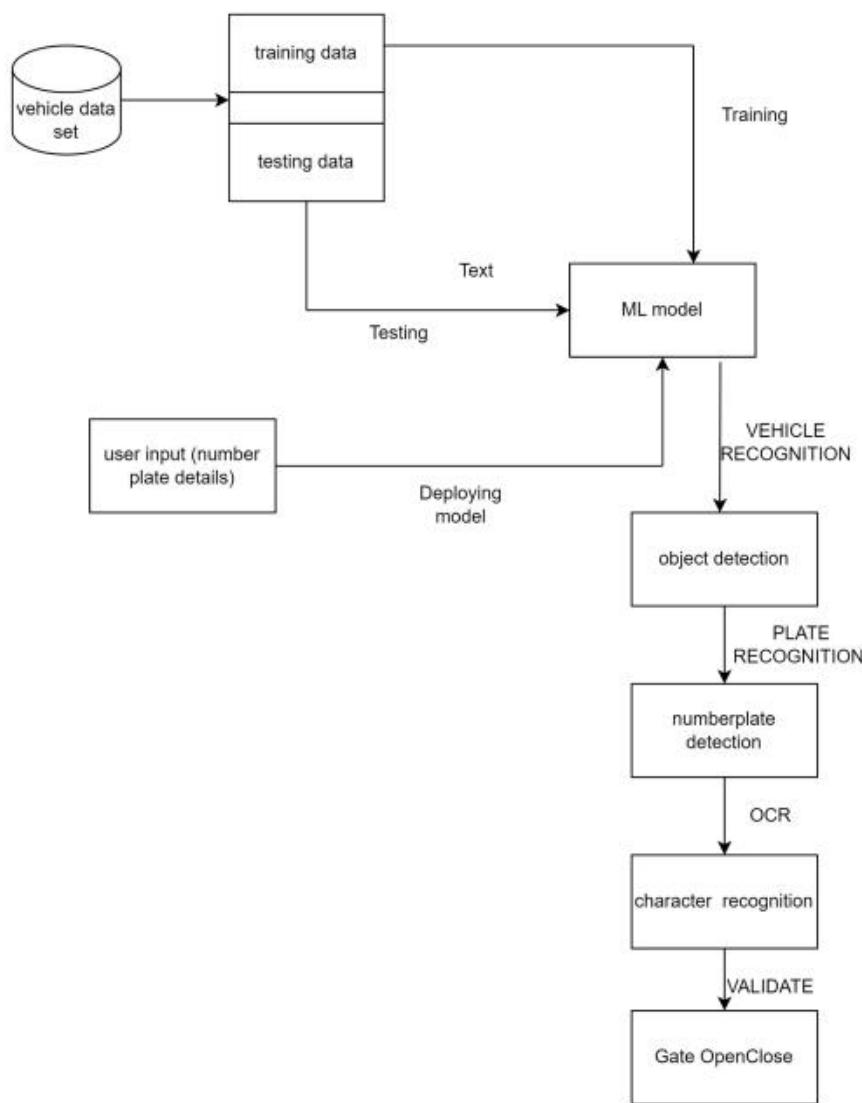
4. Inputs and outputs: These are the signals or information that enter or leave the system or process. Inputs are typically on the left side of the diagram and outputs are on the right side.



5. Data Set: The dataset block represents a collection of data that is being processed or analysed by the system, and it serves as important element in the representation of the system or process.



3.4.1.1 BLOCK DIAGRAM

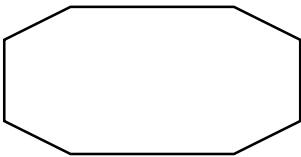
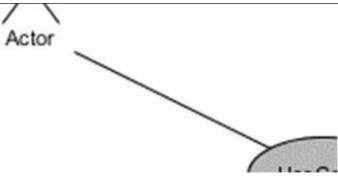


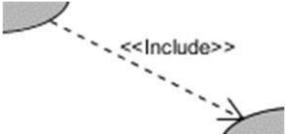
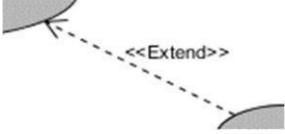
3.4.2 Use case diagram

A use case diagram is a graphic depiction of the interactions among the elements of a system. It is a methodology used in system analysis to identify, clarify and organize system requirements. A use case diagram does not show the detail of the use case, it only summarizes some of the relationships between use case and the actors. The diagram does not show the order in which steps are performed to achieve the goals of each use case. It deals only with the functional requirement of the system. The purpose of use case diagram is to capture core functionalities of a system and visualize the interactions of various things called as actors with the use case. Our proposed system will mainly have one actor, which will be an admin belonging to the concerned institution. The admin can choose to add more users, if needed. However, each new user will share similar functionalities as the main admin, with the exception of being able to create new users.

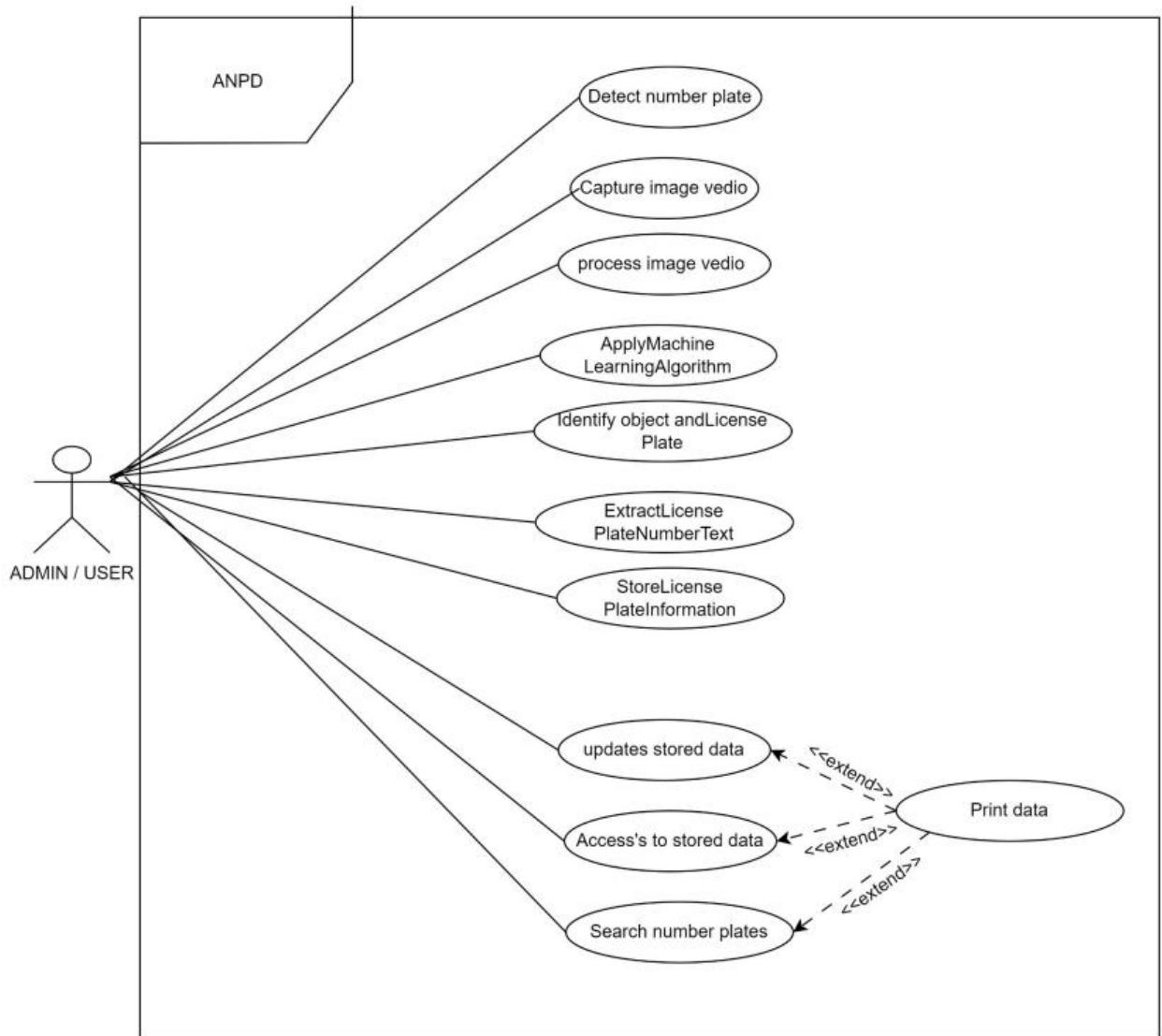
A use case consists of use cases, persons, or various things that are invoking the features called as actors and the elements that are responsible for implementing the use cases. Use case diagrams capture the dynamic behaviour of live system. Use case diagrams are responsible for visualizing the external things that interact with part of the system. A use case diagram should be simple as possible. A use case diagram should be complete. A use case diagram should represent all interactions with use case. If there are too many use cases or actors, only the essential use cases should be represented.

A use case diagram should describe at least a single module of a system. If the use case diagram is large then it should be generalized. The name of the actor and use case should be meaningful and relevant to the system. Interaction of an actor with the use case must be defined clearly and in an understandable way. Annotation must be used where ever they are required. If a use case or an actor has multiple relationship, then only significant interactions must be displayed.

Diagrams	Description
 Use case	A use case represents a user goal that can be achieved by accessing the system or software application. In Visual Paradigm, you can make use of the sub-diagram feature to describe the interaction between user and system within a use case by creating a sub-sequence diagram under a use case. You can also describe the use case scenario using the Flow of Events editor.
 Association	Actor and use case can be associated to indicate that the actor participates in that use case. Therefore, an association correspond to a sequence of actions between the actor and use case in achieving the use case.

 Actor	<p>Actors are the entities that interact with a system. Although in most cases, actors are used to represent the users of system, actors can actually be anything that needs to exchange information with the system. So, an actor may be people, computer hardware, other systems, etc.</p>
 Include	<p>An include relationship specifies how the behaviour for the inclusion use case is inserted into the behaviour defined for the base use case.</p>
 Extend	<p>An extend relationship specifies how the behaviour of the extension use case can be inserted into the behaviour defined for the base use case.</p>

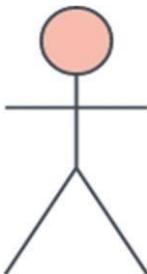
3.4.2.1 USE CASE DIAGRAM



3.4.3 Sequence diagram

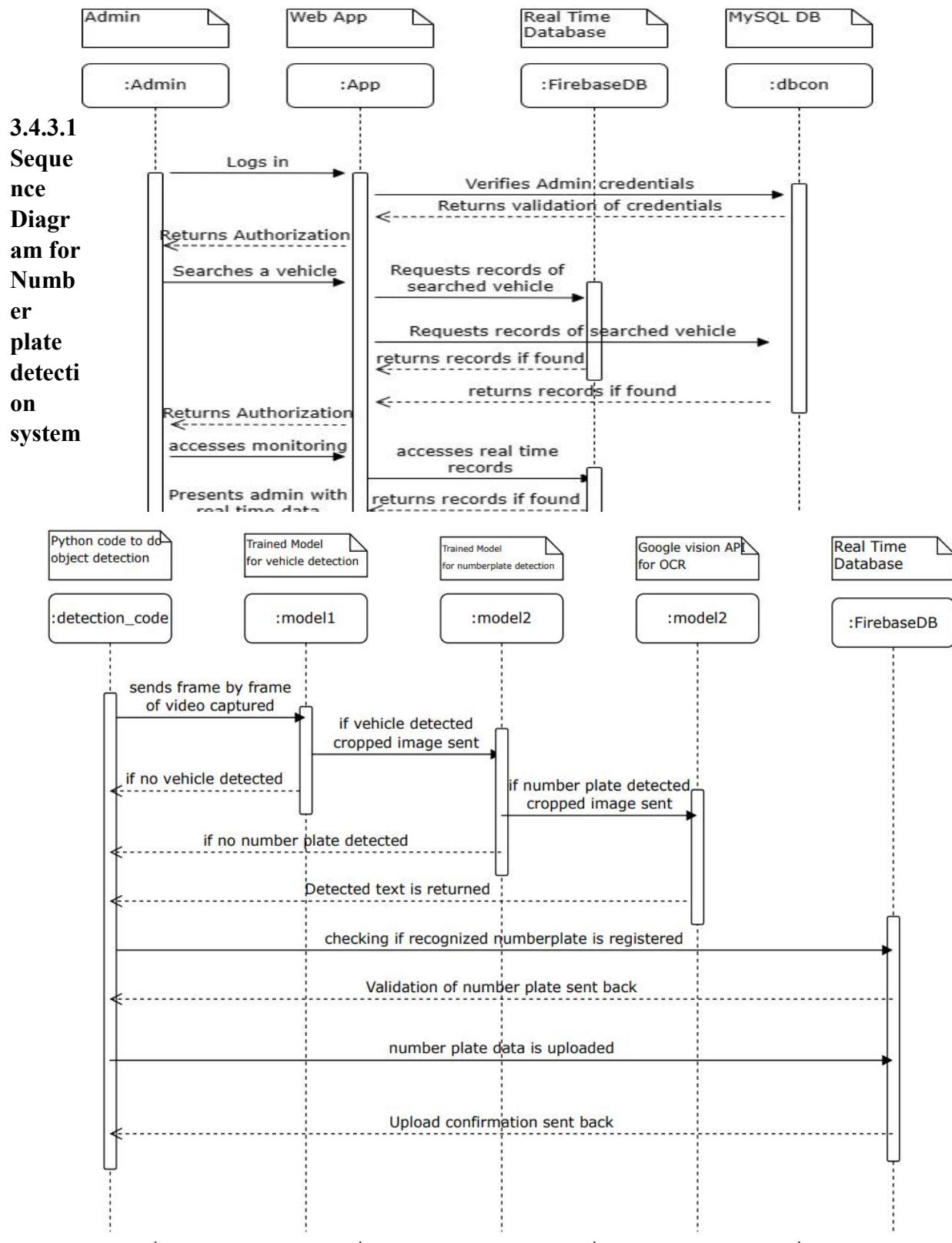
UML sequence diagram model is the flow of logic within the system in a visual manner, enabling both to document and validate the logic and are commonly used for both analysis and design purposes. It is the most popular UML artifact for dynamic modelling which focus on identifying the behaviour within the system. Sequence diagram are typically associated with use case realizations in the logical view of the system under development. Sequence diagrams are sometime called as event diagrams and event scenarios.

A sequence diagram shows, as parallel vertical lines different processes or the objects that live simultaneously and as horizontal arrows, the messages exchanged between them, in the order in which they occur. This allows the specification of simple runtime scenarios in a graphical manner. A sequence diagram shows object interactions arranged in time sequence, it depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

Diagrams	Description
 Object symbol	Represents a class or object in UML. The object symbol demonstrates how an object will behave in the context of the system. Class attributes should not be listed in this shape.
 Activation box	Represents the time needed for an object to complete a task. The longer the task will take, the longer the activation box becomes.
 Actor Symbol	Shows entities that interact with or are external to the system.

 <p>Lifeline symbol</p>	<p>Represents the passage of time as it extends downward. This dashed vertical line shows the sequential events that occur to an object during the charted process. Lifelines may begin with a labelled rectangle shape or an actor symbol.</p>
 <p>Synchronous message symbol</p>	<p>Represented by a solid line with a solid arrowhead. This symbol is used when a sender must wait for a response to a message before it continues. The diagram should show both the call and the reply.</p>
 <p>Asynchronous message symbol</p>	<p>Represented by a solid line with a lined arrowhead. Asynchronous messages don't require a response before the sender continues. Only the call should be included in the diagram.</p>
 <p>Reply message symbol</p>	<p>Represented by a dashed line with a lined arrowhead, these messages are replies to calls.</p>
 <p>Delete message Symbol</p>	<p>Represented by a solid line with a solid arrowhead, followed by an X. This message destroys an object.</p>

3.4.3.1 Sequence Diagram for Web App



4. DATABASE MODELING

4.1 Prototype Model

The prototype model gives a brief depiction into the working of a system. In other words, it provides a glimpse into the working of the website. It depicts the various actors using a system, the device on which the system is implemented (i.e., a depiction of the system), the inputs and outputs flowing throughout the system, and the processes utilized in the system in order to provide its intended functionalities.



1. The vehicle enters the gate.
2. The camera installed on the gate captures the photo
3. The entry or the exit time is recorded.
4. The photo is sent to the Machine learning model.
5. The vehicle is detected from the image and then the vehicle type is determined i.e. car, bike etc.
- 6.. Number plate image is extracted.
- 7.. The text is extracted from the number plate image.
8. the data collected is sent to the database.
9. here the data is used to generate new updated reports.
10. The database is updated with new reports constantly.
11. the control goes back to the gate, with validation data of it is an entry procedure where as in exit no validation is required.

4.2 Table Description

Table description refers to the process of providing information about the structure, content, and characteristics of a table. This information is often used to help users understand the purpose and meaning of a table, as well as to aid in data analysis and interpretation. Table descriptions can be included as part of a larger data documentation effort, or provided separately as a reference for users. They can be especially useful for researchers, analysts, and other data users who need to understand the structure and content of a table in order to use it effectively.

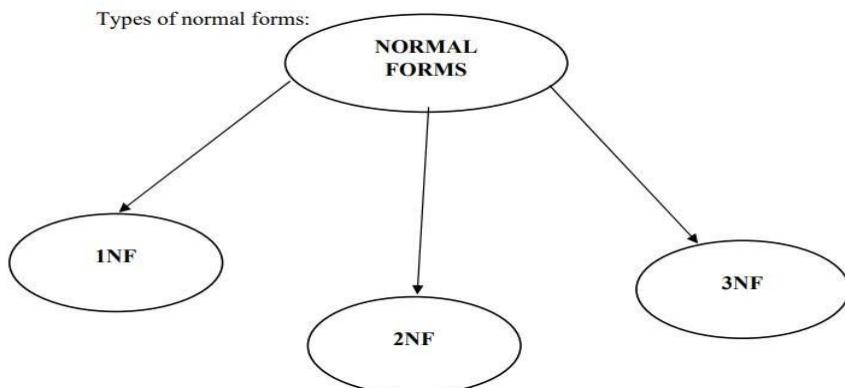
A table is an arrangement of data in rows and columns, or possibly in a more complex structure. A table is a collection of related data held in a table format within a database. The database management system (DBMS) is the software that interacts with end users, applications, and the database itself to capture and analyse the data.

A database consists of one or more tables. Each table is made up of rows and columns. Each row in a relational table is uniquely identified by a primary key. This can be by one or more sets of column values. In most scenarios it is a single column, such as user ID. Every relational table has one primary key. Its purpose is to uniquely identify each row in the database. No two rows can have the same primary key value. The practical result of this is that you can select every single row by just knowing its primary key.

4.3 Normalization

Normalization is the process of minimizing redundancy from a relation or set of relations. Redundancy in relation may cause insertion, deletion and updating anomalies. So, it helps to minimize the redundancy in relations. Normal forms are used to eliminate or reduce redundancy in database tables.

- Normalization is the process of organizing the data in the database.
- Normalization is used to minimize the redundancy from a relation or set of relations. It is also used to eliminate the undesirable characteristics like Insertion, Update and Deletion Anomalies.
- Normalization divides the larger table into the smaller table and links them using relationship.
- The normal form is used to reduce redundancy from the database table.



Normal Form	Description
1NF	A relation is in 1NF if it contains an atomic value.
2NF	A relation will be in 2NF if it is in 1NF and all non-key attributes are fully functional dependent on the primary key.
3NF	A relation will be in 3NF if it is in 2NF and no transitive dependency exists.

First Normal Form(1NF)

- A relation will be 1NF if it contains an atomic value.
- It states that an attribute of a table cannot hold multiple values. It must hold only single-valued attribute.
- First normal form disallows the multi-valued attribute, composite attribute, and their combinations.

Second Normal Form(2NF)

- In the 2NF, relational must be in 1NF.
- In the second normal form, all non-key attributes are fully functional dependent on the primary key.

Third Normal Form(3NF)

- A relation will be in 3NF if it is in 2NF and not contain any transitive partial dependency.

- 3NF is used to reduce the data duplication. It is also used to achieve the data integrity.
- If there is no transitive dependency for non-prime attributes, then the relation must be in third normal form.

A relation is in third normal form if it holds at least one of the following conditions for every non-trivial function dependency $X \rightarrow Y$.

1. X is a super key.
2. Y is a prime attribute, i.e., each element of Y is part of some candidate key.

TABLE NAME: admins

Name	Type	Constraints	Description
FirstName	char(15)	Not null	First name of the Admin
MiddleName	char(15)	Not null	Middle name of the Admin
LastName	char(15)	Not null	Last name of the Admin
Email	varchar(25)	Not null	Admin's email Id
Gender	char(10)	Not null	Admin's gender
Username	varchar(15)	Not null	Unique user id given per user to login
Password	varchar(20)	Not null	Unique Encryption key for the user to log into the system

TABLE NAME: vehicleowners

Name	Type	Constraints	Description
FirstName	char(15)	Not null	First name of the Vehicle owner
MiddleName	char(15)	Not null	Middle name of the Vehicle owner
LastName	char(15)	Not null	Last name of the Vehicle owner
Email	varchar(25)	Not null	Vehicle owner's email Id
Gender	char(10)	Not null	Vehicle owner's gender
Position	varchar(25)	Not null	Vehicle owner's

			designation
Contact	int(12)	Not null	Phone number of the vehicle owner
NumberPlate	varchar(15)	Not null	Number plate of the vehicle registered
Id	varchar(15)	Not null	Unique Id of vehicle owner

TABLE NAME: entryexits

Name	Type	Constraints	Description
NumberPlate	varchar(15)	Not null	Number plate of the vehicle registered
FirstName	char(15)	Not null	First name of the Vehicle owner
MiddleName	char(15)	Not null	Middle name of the Vehicle owner
LastName	char(15)	Not null	Last name of the Vehicle owner
Email	varchar(25)	Not null	Vehicle owner's email Id
Gender	char(10)	Not null	Vehicle owner's gender
Position	varchar(25)	Not null	Vehicle owner's designation
Contact	int(12)	Not null	Phone number of the vehicle owner
Id	varchar(15)	Not null	Unique Id of vehicle owner
NumberPlate Type	char(20)	Not null	Number plate type of the vehicle registered
EntryTime	datetime	Not null	Entry time to facility
ExitTime	datetime	Not null	Exit time to facility
VehicleType	char(20)	Not null	Vehicle type i.e Car, bike

5. TESTING AND VALIDATION

5.1 Introduction

Testing is the major quality control method used during software development. It is the basic function to detect errors. During the requirement analysis and design the output of the document that is usually textual and non-executable after the coding phase the computer programs are available that can be executed for testing purpose. The goal of testing is to uncover requirement, design and coding errors in the program. Testing determines whether the system appears to be working according to the specifications. It is the phase where we try to break the system and we test the system with real scenarios at a point. The implementation is the final and important phase. It involves user-training system testing. In order to ensure successful running of the proposed system, the user tests the system and changes are made according to their needs. The testing involves the testing of the developed system using various kinds of data, while testing errors are noted and correctness is made.

5.2 Testing Objectives

- Testing is the process of executing a program with the intent of finding errors.
- A successful test case is one that uncovers un-yet-discovered errors.

System testing is a stage of implementation, which is aimed at ensuring that the system works accurately and efficiently as per the user need, before the live operation commences. As stated before testing is vital to the success of a system. System testing makes a logical assumption that if all the parts of the system are correct, the goal will be successfully achieved. A series of test are performed before the system is ready for user acceptance test.

5.3 Testing Methods

System testing is the stage of implementation. This is to check whether the system works accurately and efficiently before live operation commences. Testing is vital to the success of the system. A series of test are performed for the proposed system is ready for the user acceptance testing.

5.4 Testing Steps

5.4.1 Unit testing

Unit testing is a level of software testing where individual units/components of software are tested. The purpose is to validate that each unit of the software performs as designed. A unit is the smallest testable parts of any software. It usually has one or few inputs and usually a single output.

5.4.2 Integration testing

Integration testing is a level of software testing where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in integration testing. It is performed to expose defects in the interfaces and in the interactions between integrated components or systems.

5.4.3 Validation

Validation testing can be defined in many ways, but a simple definition is that the validation succeeds when the software functions in the manner that is expected by the client. After validation test has been conducted, one of the three possible conditions exists. The function or performance characteristics confirm to specifications and are accepted. The deviation from specification is uncovered and a deficiency lists is created. Proposed system under consideration has been tested by using validation test and found to be working satisfactory.

5.4.4 Output Testing

After performing the validation the next step is output testing of the proposed system, since no system could be useful if it does not produce the required output in a specific format. The output format on the screen is found to be correct. The format was designed in the system design time according to the user needs. For the hard copy also the output comes as per the specified requirements by the user. Hence output testing did not result in any correction for the system.

5.4.5 User Acceptance Testing

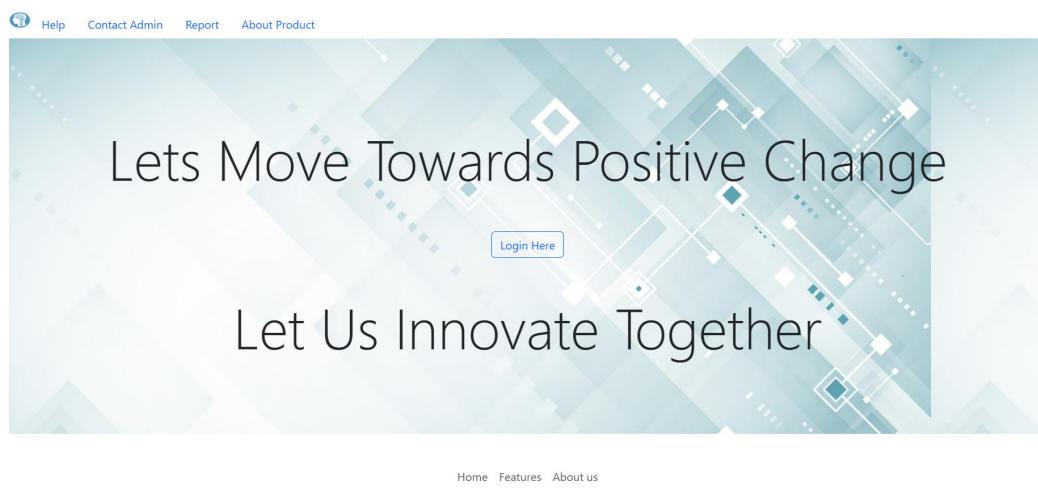
Acceptance testing is the level of software testing where a system is tested for an acceptability. It is a formal testing with respect to other needs, requirements conducted to determine whether or not a system satisfies an acceptance criteria and to enable the users or other unauthorized to determine whether or not to accept a system.

5.5 Test cases

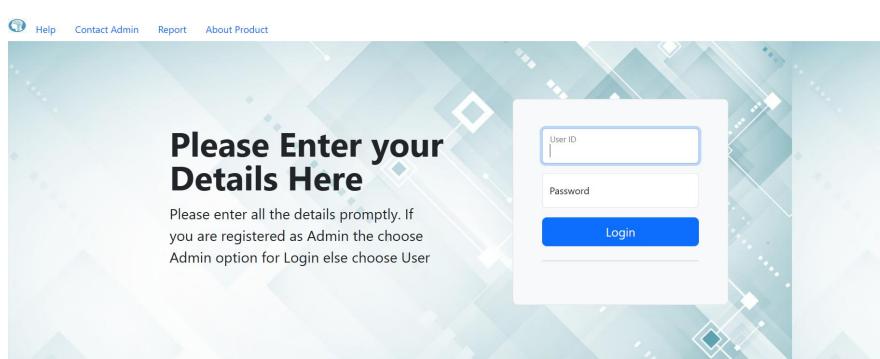
5.5.1 Home page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A home page appears with login button	Success
	Username (onKeyPress())			
2	Login (onClick())	Admin clicks the login button	Must go to a login page	Success

5.5.1.1 Home page



5.5.1.2 Loaded Login page



5.5.2 Login Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Login page appears with input boxes and login button	Success
2	Username (onKeyPress())	Admin enters the Username	Values are accepted	Success
3	Password (onKeyPress())	Admin enters the password	Values are accepted	Success
4	Login (onClick())	Admin clicks the login button with valid Credentials	Must move to a Dashboard page	Success
5	Login (onClick())	Admin clicks login button with invalid credentials	Error shows in login page	Sucess

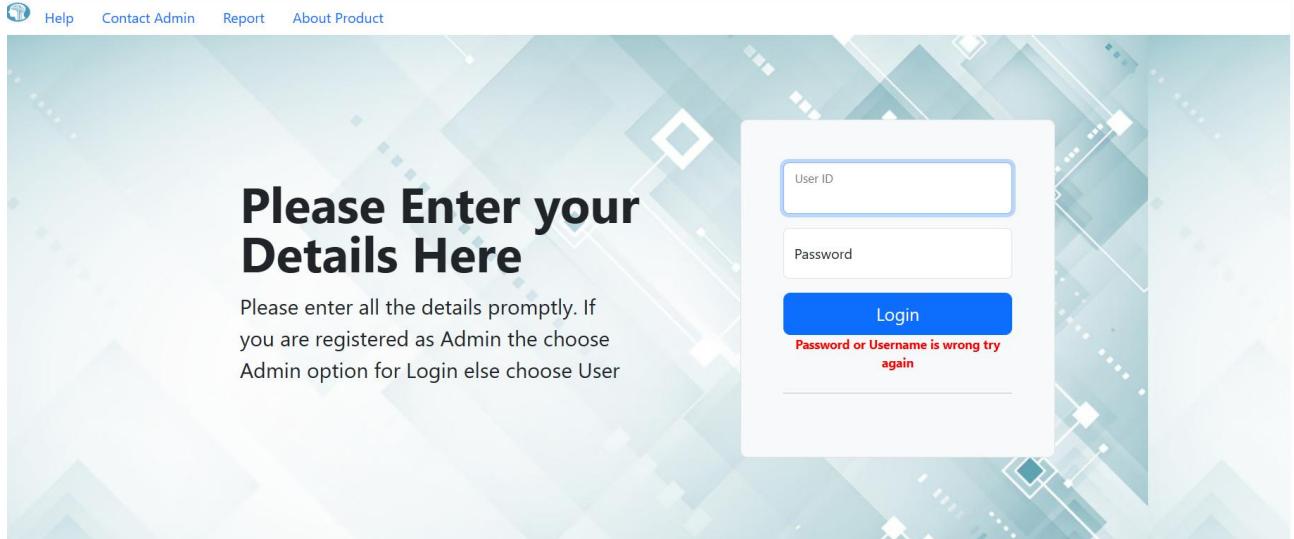
5.5.2.1 Login Page

The screenshot shows a login interface. At the top, there is a navigation bar with icons for Help, Contact Admin, Report, and About Product. The main content area has a light blue background with a subtle geometric pattern. In the center, there is a white rectangular form. It contains two input fields: one for 'User ID' and one for 'Password', both with placeholder text. Below these fields is a large blue button labeled 'Login'. Above the form, there is a heading 'Please Enter your Details Here' and a descriptive paragraph: 'Please enter all the details promptly. If you are registered as Admin the choose Admin option for Login else choose User'.

Home Features About us

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5.5.2.2 Invalid Login Error



Home Features About us

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5.5.2.3 Dashboard page on login Acceptance

The dashboard has a search bar at the top labeled 'Search For Vehicles Here' with a placeholder 'Type number plate to search...' and a 'Search' button. Below the search bar, the word 'Dashboard' is displayed in large letters. A subtext says: 'One Place to monitor all. Please remember all activities are logged here and a weekly report is created.' A bold notice at the bottom of this section reads: 'NOTICE::PLEASE DO NOT TAMPER WITH THE DATA!!'.

The dashboard features three main sections representing different gates:

- GATE 01:** Shows a score of 24/100. Below it, the status is listed as 'CARS: 21', 'BIKES: 3', 'GATE STATUS: ACTIVE', and 'TEACHERS: 21'.
- GATE 02:** Shows a score of 24/100. Below it, the status is listed as 'CARS: 21', 'BIKES: 3', 'GATE STATUS: ACTIVE', and 'TEACHERS: 21'.
- GATE 03:** Shows a score of 0/100. Below it, the status is listed as 'CARS: 0', 'BIKES: 0', 'GATE STATUS: DISABLED', and 'TEACHERS: 0'.

5.5.3 Dashboard Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Dashboard page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	SearchBar (onKeyPress())	Admin enters the numberplate	Values are accepted	Success
4	Search(onClick())	Admin searches a numberplate with valid details	A vehicle page is loaded	Success
5	Search(onClick())	Admin searches a numberplate with invalid details	An error page is shown saying no results	Success
6	Monitor (onClick())	Admin clicks on Monitor page	A monitor page for a gate is loaded	Success
7	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
8	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.3.1 Dashboard page

The screenshot shows the Reck-iT ANPD dashboard. At the top left is the logo "Reck-iT ANPD". On the right is a menu icon. Below the header is a search bar with the placeholder "Search For Vehicles Here" and a button labeled "Search". The main area is titled "Dashboard" with a sub-instruction: "One Place to monitor all. Please remember all activities are logged here and a weekly report is created." A bold notice at the bottom reads "NOTICE::PLEASE DO NOT TAMPER WITH THE DATA!!". Below this are three cards for "GATE 01", "GATE 02", and "GATE 03". Each card displays a count (24/100), vehicle counts (Cars: 21, Bikes: 3), and teacher counts (Teachers: 21 for Gate 01, ACTIVE for others). Gate 03 is marked as "DISABLED".

GATE	CARS	BIKES	TEACHERS	STATUS
GATE 01	21	3	21	ACTIVE
GATE 02	21	3	21	ACTIVE
GATE 03	0	0	0	DISABLED

5.5.3.2 Session Error page

The screenshot shows the session error page. At the top left is the Reck-iT ANPD logo. The main message is "OOPS!! Something went wrong". Below it, a sub-message says "Session ended or you have been logged out please login again". A blue link "Click Here" is provided for re-login. At the bottom are navigation links: "Home", "Features", and "About us". A copyright notice at the very bottom reads "© 2023 Reckit Start up Initiative".

5.5.3.3 Search page success

Reck-iT ANPD

KA19EQ9080

Below Are the details of the vehicle you want you can also print the page using the button at the end of the page

Basic Information

Numberplate: KA19EQ9080
ID : 204639

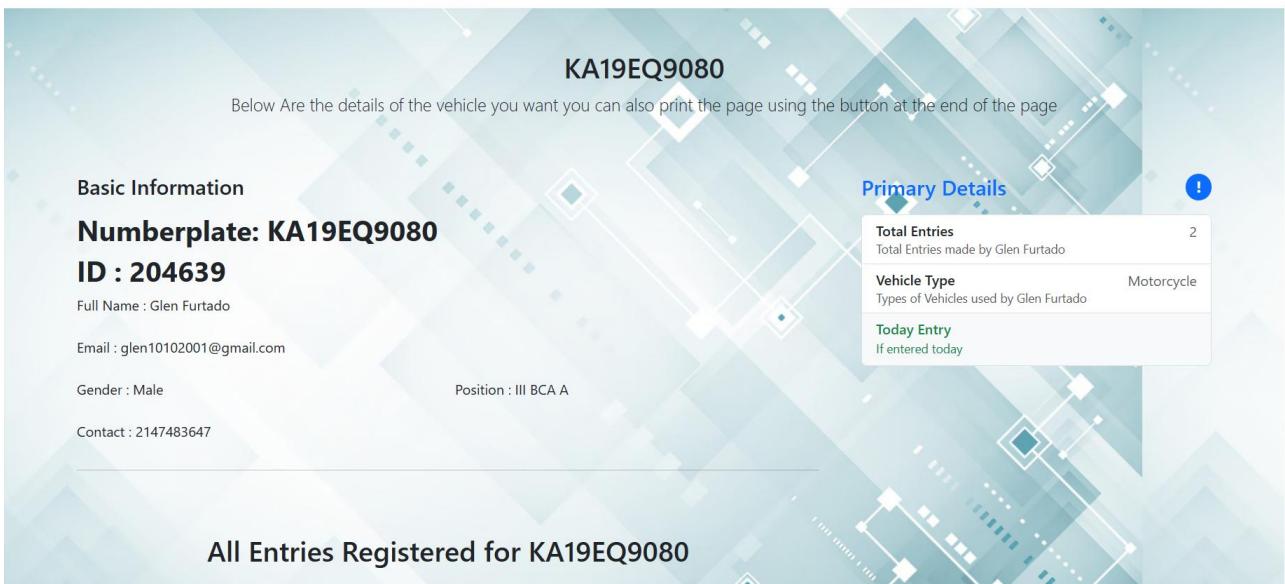
Full Name : Glen Furtado
Email : glen10102001@gmail.com
Gender : Male
Contact : 2147483647

Position : III BCA A

Primary Details

Total Entries	2
Total Entries made by Glen Furtado	
Vehicle Type	Motorcycle
Types of Vehicles used by Glen Furtado	
Today Entry	If entered today

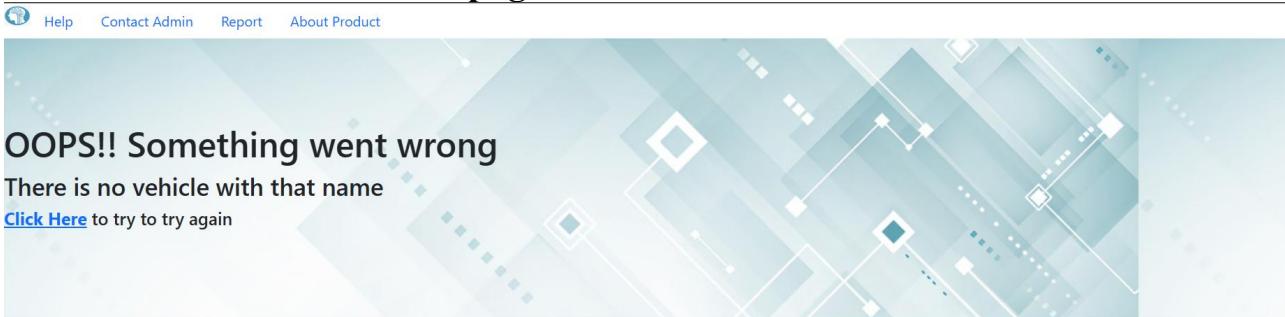
All Entries Registered for KA19EQ9080



5.5.3.4 Search page Unsuccessful

Help Contact Admin Report About Product

OOPS!! Something went wrong
There is no vehicle with that name
[Click Here](#) to try to try again



Home Features About us

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5.5.3.5 Monitor Page

GATE 01

Below Are the details of Gate 01

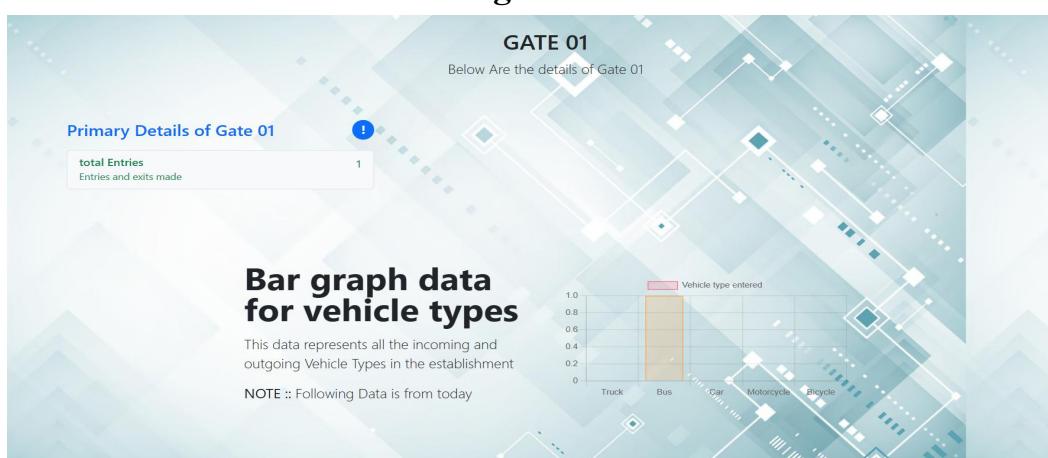
Primary Details of Gate 01

total Entries	1
Entries and exits made	

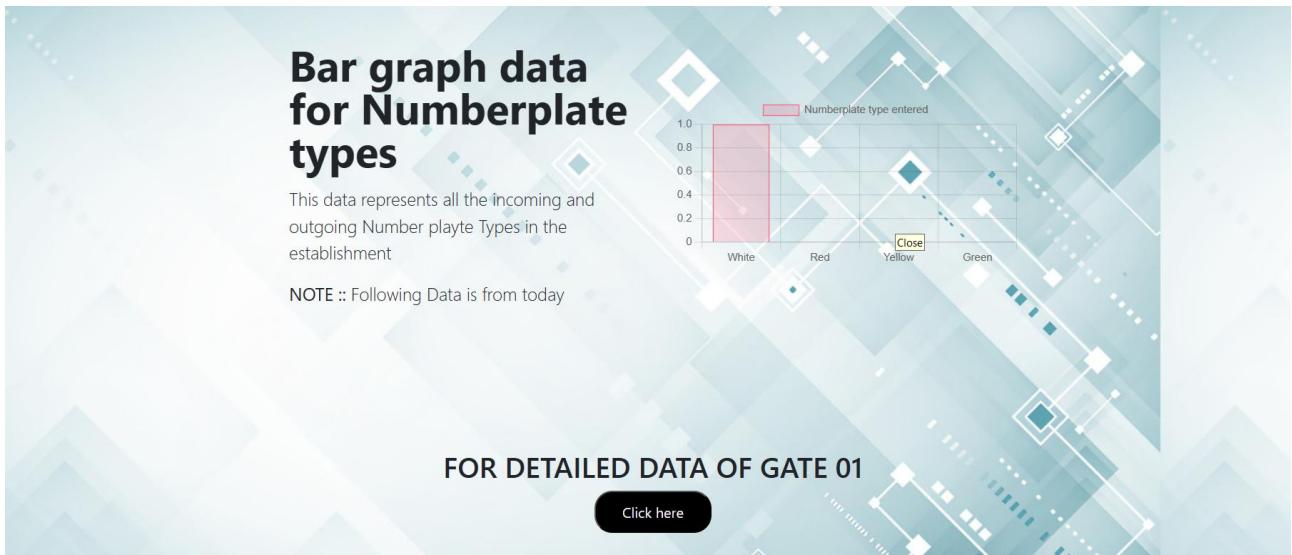
Bar graph data for vehicle types

This data represents all the incoming and outgoing Vehicle Types in the establishment

NOTE :: Following Data is from today



Vehicle Type	Count
Bus	1.0
Car	0.2
Motorcycle	0.1
Bicycle	0.1
Truck	0.0



5.5.3.6 Navigation Bar

Reck-iT ANPD

Welcome

- Home
- Infographics
- Registrations
- Records
- Files ▾
- Account

Dashboard

One Place to monitor all. Please remember all activities are logged here and a weekly report is created.

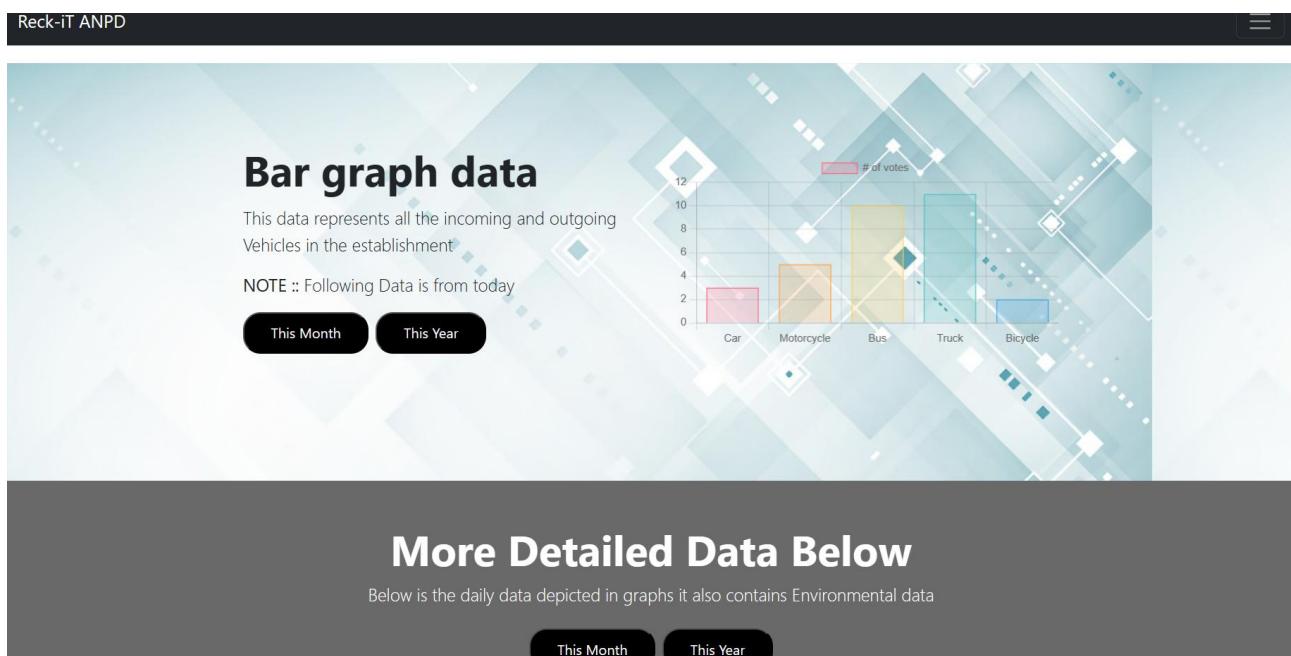
NOTICE::PLEASE DO NOT TAMPER WITH THE DATA!!

GATE 01	GATE 02	GATE 03
24/100	24/100	0/10
CARS: 21 BIKES: 3 GATE STATUS: ACTIVE TEACHERS: 21	CARS: 21 BIKES: 3 GATE STATUS: ACTIVE TEACHERS: 21	CARS: 0 BIKES: 0 GATE STATUS: D TEACHERS:

5.5.4 Infographics Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	An Infographics page is generated with graphs	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.4.1 Infographics Page



5.5.5 Registrations Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Registration Menu page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Register an admin (onClick())	Admin clicks on the register an admin button	An Admin registration page is generated	Success
5	Register an User (onClick())	Admin clicks on the register an User button	An User registration page appears	Success
6	Register using CSV (onClick())	Admin clicks on the CSV registration page	An CSV Registration Page appears with option to upload CSV file	Success
7	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.5.1 Registration Menu



5.5.5.2 Register an Admin

Reck-iT ANPD



Register Admin

First Name

Middle Name

Last Name

Email address

Select Gender
 Male
 Female
 Other

Email address

Select Gender
 Male
 Female
 Other

User ID

Password

Confirm Password

Submit Registration

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5.5.5.3 Register an User

The screenshot shows a registration form titled "Register". The form fields include:

- First Name: A text input field containing "First Name".
- Middle Name: A text input field containing "Middle Name".
- Last Name: A text input field containing "Last Name".
- Email address: A text input field containing "name@example.com".
- Registration Type: A dropdown menu showing "Choose Below".
- Personalle ID: A text input field.

5.5.5.4 Register using a CSV file

The screenshot shows a page titled "Register users using CSV". It features a file upload interface with two buttons: "Upload a CSV File" and "Choose File", both showing "No file chosen". Below the buttons is a large blue "Submit Registrations" button.

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5.5.6 User Registrations

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A User Registration page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	First name (onKeyPress())	Admin enters the First name	Values are accepted	Success
5	Middle name (onKeyPress())	Admin enters the Middle name	Values are accepted	Success
6	Last name (onKeyPress())	Admin enters the last name	Values are accepted	Success
7	Email (onKeyPress())	Admin enters the email	Values are accepted	Success
8	Registration Type (onKeyPress())	Admin selects registration type	Values are accepted	Success
9	Gender (onKeyPress())	Admin selects gender	Values are accepted	Success
10	Id (onKeyPress())	Admin enters the ID	Values are accepted	Success
11	Contact No (onKeyPress())	Admin enters the contact no	Values are accepted	Success
12	Numberplate (onKeyPress())	Admin enters the numberplate	Values are accepted	Success
13	Submit Registration	Admin clicks on the register an admin button	The page asks the admin to fill the required field	Success

	(onClick())	without filling all required details		
14	Submit Registration (onClick())	Admin clicks on the register button with all details filled	The page uploads data and send confirmation	Success
15	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.6.1 User registration page

The screenshot shows a registration form titled "Register". The fields include:

- First Name
- Middle Name
- Last Name
- Email address: name@example.com
- Registration Type: Choose Below
- Personalle ID

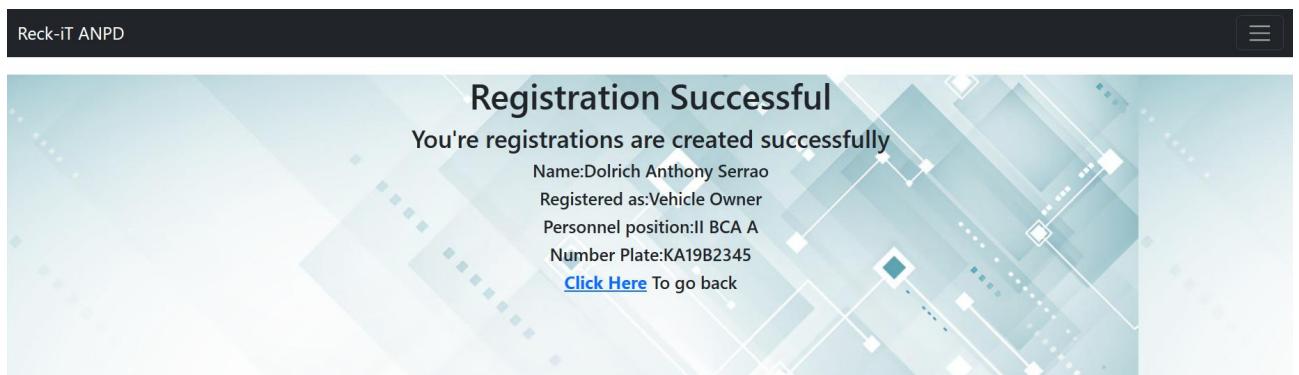
The screenshot shows a registration form titled "Register" with the following fields:

- Email address: name@example.com
- Registration Type: Choose Below
- Personalle ID: ID
- Select Gender:
 - Male
 - Female
 - Other
- Contact Number: 1234567890
- Vehicle Number Plate: Number Plate
- Submit Registration (large blue button)

5.5.6.2 Fill all Fields Error

5.5.6.3 Successful registration

The screenshot shows a registration form titled "Register". It has three input fields: "First Name", "Middle Name", and "Last Name". The "First Name" field is empty. The "Middle Name" field is also empty and has a red validation error message: "Please fill out this field." The "Last Name" field is empty.



5.5.7 Admin Registrations

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Admin Registration page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	First name (onKeyPress())	Admin enters the First name	Values are accepted	Success
5	Middle name (onKeyPress())	Admin enters the Middle name	Values are accepted	Success
6	Last name (onKeyPress())	Admin enters the last name	Values are accepted	Success
7	Email (onKeyPress())	Admin enters the email	Values are accepted	Success
8	Gender (onKeyPress())	Admin selects gender	Values are accepted	Success
9	User ID (onKeyPress())	Admin enters the Username	Values are accepted	Success
10	Password (onKeyPress())	Admin enters the Password	Values are accepted	Success
11	Confirm Password (onKeyPress())	Admin enters the Confirm password	Values are accepted	Success
12	Submit Registration (onClick())	Admin clicks on the register an admin button without filling all required details	The page asks the admin to fill the required feild	Success

13	Submit Registration (onClick())	Admin clicks on the register an admin button without giving the same passwords in confirm password and password	The page asks the admin to have same passwords	Success
14	Submit Registration (onClick())	Admin clicks on the register button with all details filled	The page uploads data and send confirmation	Success
15	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.7.1 Admin registration form

Reck-iT ANPD

Register Admin

First Name

Middle Name

Last Name

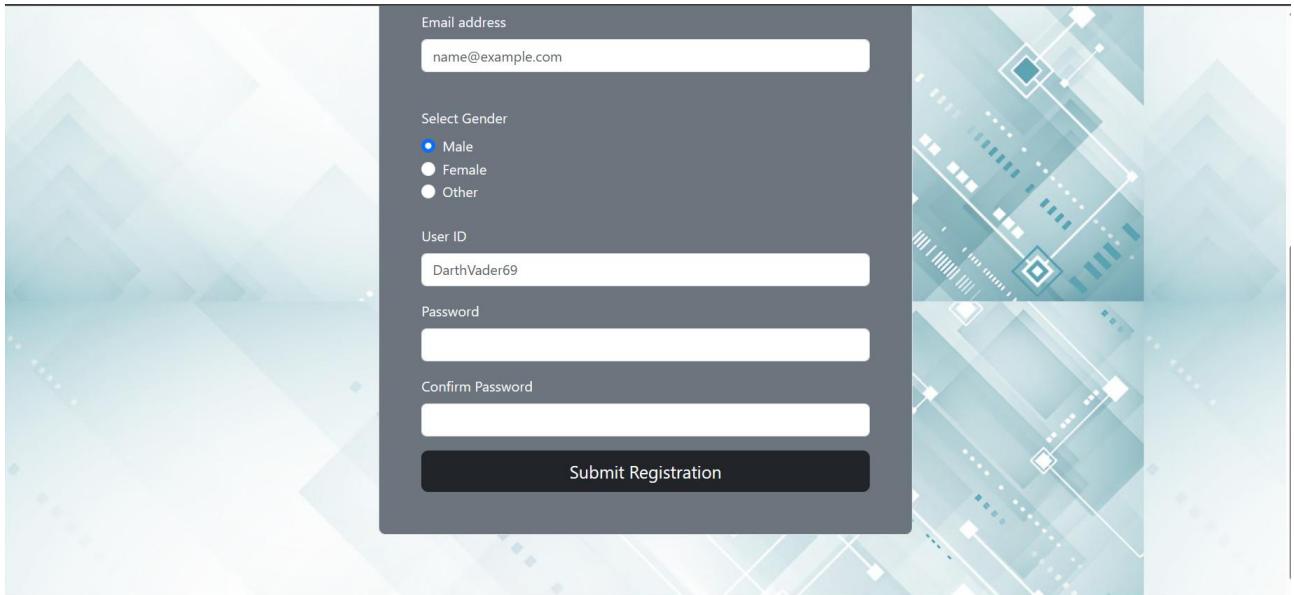
Email address

Select Gender

Male

Female

Other



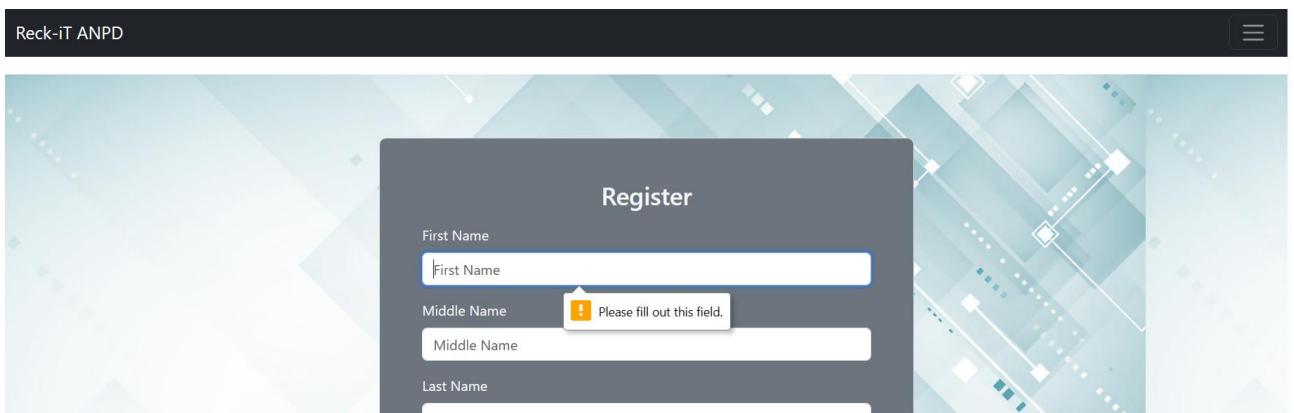
A registration form is displayed on a web page. The form fields include:

- Email address: name@example.com
- Select Gender:
 - Male
 - Female
 - Other
- User ID: DarthVader69
- Password: (empty field)
- Confirm Password: (empty field)

The "Submit Registration" button is located at the bottom of the form.

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5.5.7.2 Fill out all fields error

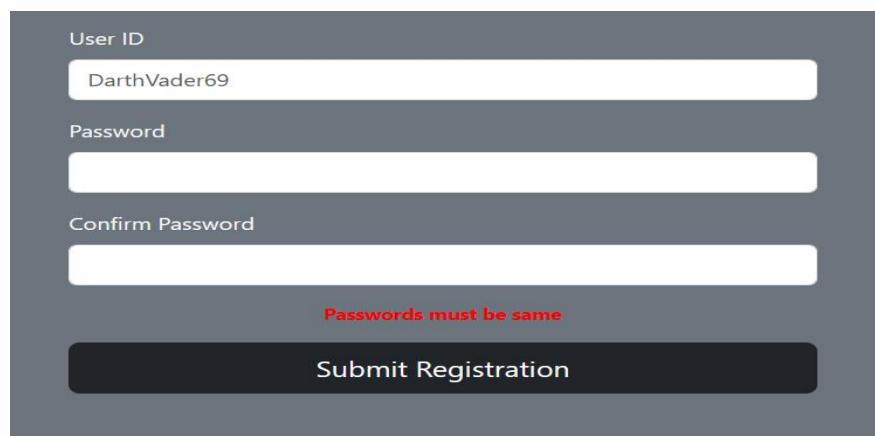


The registration form shows validation errors:

- First Name: The input field is empty, and a yellow validation message box indicates: "Please fill out this field."
- Middle Name: The input field is empty.
- Last Name: The input field is empty.

The "Register" button is at the top of the form.

5.5.7.3 Password and Confirm passwords must be same

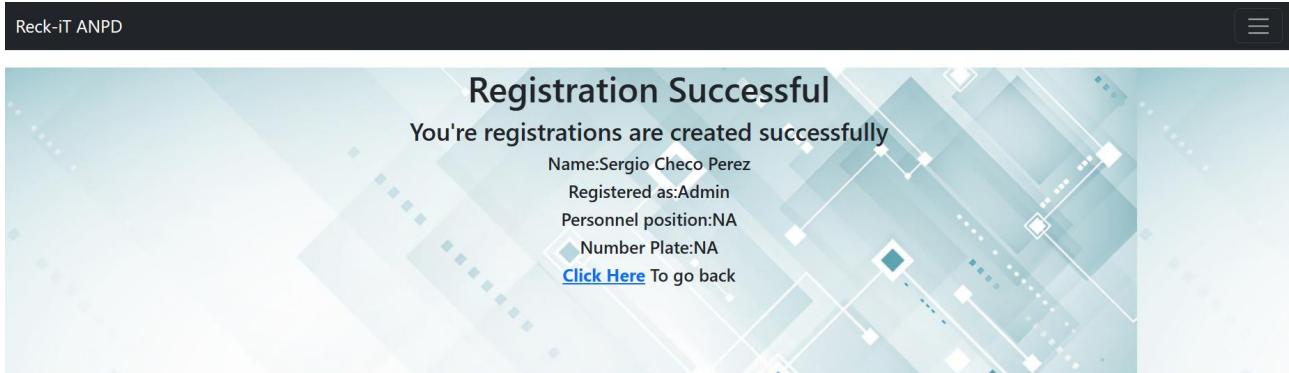


The registration form shows a validation error message:

Passwords must be same

The "Submit Registration" button is at the bottom of the form.

5.5.7.4 Successful registration



5.5.8 CSV Registrations

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A CSV Registration page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Choose file (onClick())	A pop up menu appears for Admin to select file to upload	Values are accepted	Success
5	Submit Registration (onClick())	Admin clicks on the register an admin button without giving the appropriate file format or empty file	An error page is loaded	Success

6	Submit Registration (onClick())	Admin clicks on the register button with all details filled	The page uploads data and send confirmation	Success
7	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.8.1 CSV registrations Page

Reck-iT ANPD

Register users using CSV

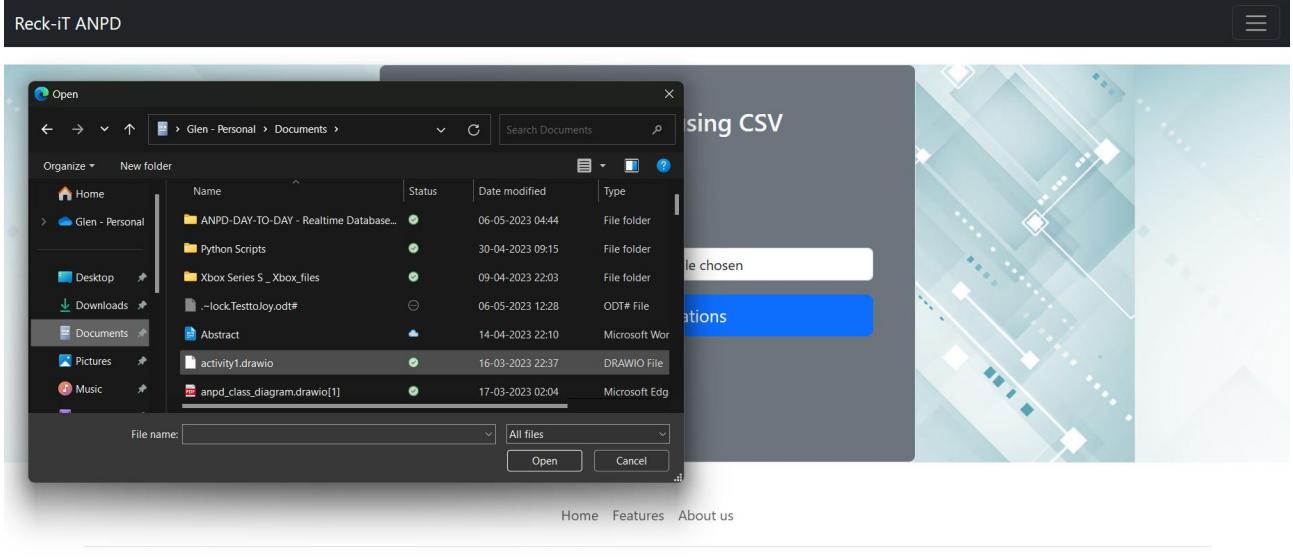
Upload a CSV File Choose File No file chosen

Submit Registrations

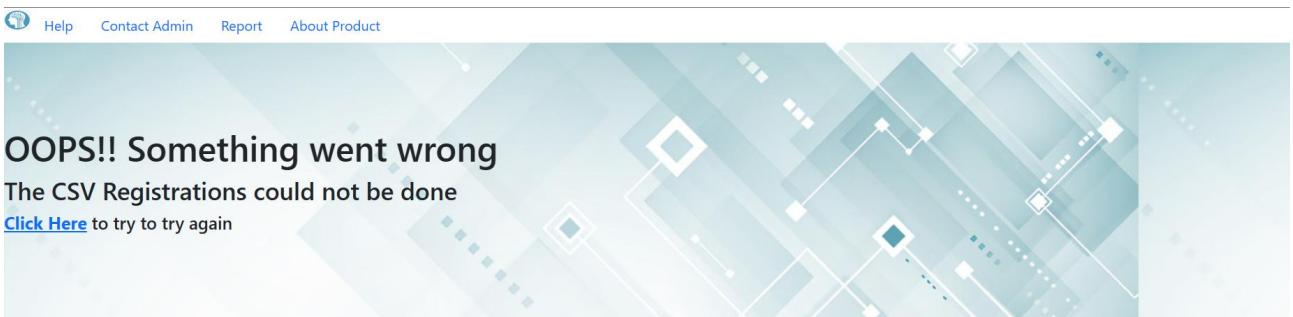
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5.5.8.2 Pop window for selecting file on clicking choose file



5.5.8.3 Error Page if file is corrupt or not of .csv format



5.5.9 Records Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A records page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Date (onClick())	Admin can choose date	Values are accepted	Success
5	Month (onClick())	Admin can choose month	Values are accepted	Success
6	Year (onClick())	Admin can choose year	Values are accepted	Success
7	Daily Data (onClick())	Admin clicks on the Daily data button	A Daily data page is loaded	Success
8	Monthly Data (onClick())	Admin clicks on the Monthly data button	A Monthly data page is loaded	Success
9	Yearly data (onClick())	Admin clicks on the Yearly data button	A Daily Yearly page is loaded	Success
10	Transfer Data (onClick())	Admin clicks on the Daily data button	Data is transferred from real time database and confirmation is sent	Success
11	Transfer Data (onClick())	Admin clicks on the Daily data button but real time database is empty	An error page is generated saying no data to be transferred	Success
12	View data (onClick())	Admin clicks on view data and passes with valid date as input	A page is loaded with data from that date	Success

13	View data (onClick())	Admin clicks on view data and passes with invalid date as input	An error page is loaded saying no data found	Success
14	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.9.1 Records Page

The screenshot shows a mobile application interface for 'Reck-iT ANPD'. At the top, there is a header bar with the app's name and a three-line menu icon. Below the header, there is a search bar labeled 'Search by Date' with a placeholder 'dd-mm-yyyy' and a calendar icon. A 'View Data' button is located below the search bar. The main content area is divided into two sections:

- Daily Data:** This section contains a heading 'Daily Data' and a sub-section with the text 'Here you can find real time data right from the gate, The data is updated automatically every 30 sec'. It also features a 'View Data' button.
- Transfer Data:** This section contains a heading 'Transfer Data' and a sub-section with the text 'Here you can transfer all data from Realtime Database to My SQL' and 'Note::Please perform this action at the end of the day'. It features a 'Transfer Data' button.

Month by Month data

We also collect Month by month by month data of the gates. Click below to access Monthly Data from this or any past year

▼

[View Data](#)

Yearly Data

We also have yearly data of your establishments Vehicle Entry and exits Please click the below button to access it

▼

[View Data](#)

5.5.9.2 Date Valid

Reck-iT ANPD
≡

Data of 2023-05-06

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45

[Print the data](#)

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5.5.9.3 Date invalid

Help [Contact Admin](#) [Report](#) [About Product](#)

OOPS!! Something went wrong

Couldn't find any records or error occurred try again please

[Click Here](#) to try to try again

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5.5.9.4 Daily Data page

Reck-iT ANPD

Daily Data of 2023-05-06

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA12B7890	Bus	204637	Gavin Dsouza	II BCA A	2147483647	dsouza@gmail.com	Male	2023-05-06 01:47:54.596476	2023-05-06 01:47:54.596476

[Print the data](#)

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5.5.9.5 No Daily Data Found

Reck-iT ANPD

Daily Data of 2023-05-06

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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5.5.9.5 Monthly Data

Reck-iT ANPD

Monthly Data of May 2023

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:15:30
3	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:15:55	06 May 2023 01:15:55
4	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:17:00	06 May 2023 01:17:00
5	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:16:52
6	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:17:09	06 May 2023 01:17:09

[Print the data](#)

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5.5.9.5 Yearly Data

Reck-IT ANPD

☰

Yearly Data of 2023

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:15:30
3	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:15:55	06 May 2023 01:15:55
4	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:17:00	06 May 2023 01:17:00
5	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:16:52
6	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:17:09	06 May 2023 01:17:09

[Print the data](#)

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5.5.9.5 Successful Data Transfer

Help Contact Admin Report About Product

Transfer sucessful

Transferred data from realtime to SQL DB

[Click Here](#)to back

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5.5.9.5 Data Transfer (No records found)

Help Contact Admin Report About Product

OOPS!! Something went wrong

No records found

[Click Here](#) to try again

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5.5.10 Vehicle Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Vehicle page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Print Page (onClick())	Admin clicks on the Print Page to print the data	An PDF file is generated for the user to download	Success
5	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.10.1 Vehicle page

KA19EQ9080

Below Are the details of the vehicle you want you can also print the page using the button at the end of the page

Basic Information

Numberplate: KA19EQ9080
ID : 204639

Full Name : Glen Furtado
Email : glen10102001@gmail.com
Gender : Male
Contact : 2147483647

Position : III BCA A

Primary Details

- Total Entries: 2
- Vehicle Type: Motorcycle
- Today Entry: If entered today

All Entries Registered for KA19EQ9080

SI	Vehicle no	Vehicle Number	Type	Owner ID	Owner Name	Owner Status	Owner Contact	Email	Gender	Entry Time	Exit Time
1	KA19EQ9080	Motorcycle	204639	Glen Furtado	A	III BCA	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:16:52
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	A	III BCA	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:17:00

Print the data

5.5.10.2 PDF vehicle page

Number: KA19EQ9080

Basic Details

Owner Name : 204639

Owner ID : Glen Furtado

Owner Position : glen10102001@gmail.com

Owner Gender : Male

Owner Contact : III BCA A

Owner Email : 2147483647

Entry exit Records for KA19EQ9080 Below

General statistics:

Total Entries : 2

Vehicle Type : 1

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:15:30
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:16:52

5.5.11 Monthly Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Monthly page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Print Page (onClick())	Admin clicks on the Print Page to print the data	An PDF file is generated for the user to download	Success
5	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.11.1 Monthly data page

Reck-iT ANPD

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Monthly Data of May 2023

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:15:30
3	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:15:55	06 May 2023 01:15:55
4	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:17:00	06 May 2023 01:17:00
5	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:16:52
6	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:17:09	06 May 2023 01:17:09

Print the data

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5.5.11.2 Monthly data page print

This is the data of May 2023

Total Entries: 7

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:15:30
3	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:15:55	06 May 2023 01:15:55
4	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:17:00	06 May 2023 01:17:00
5	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:16:52
6	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:17:09	06 May 2023 01:17:09
7	KA12B7890	Bus	204637	Gavin Dsouza	II BCA A	2147483647	dsouza@gmail.com	Male	06 May 2023 01:47:54	06 May 2023 01:47:54

5.5.12 Date Data Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Date Data page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Print Page (onClick())	Admin clicks on the Print Page to print the data	An PDF file is generated for the user to download	Success
5	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.12.1 date data page

Reck-iT ANPD

Data of 2023-05-06

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45

Print the data

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5.5.12.2 date data page print

This is the data of 2023-05-06

Total Entries: 1

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA12B7890	Bus	204637	Gavin Dsouza	II BCA A	2147483647	dsouza@gmail.com	Male	2023-05-06 03:34:45.823234	2023-05-06 03:34:45.823234

5.5.13 Yearly Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Yearly page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Print Page (onClick())	Admin clicks on the Print Page to print the data	An PDF file is generated for the user to download	Success
5	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.13.1 Yearly data page

Reck-iT ANPD

Yearly Data of 2023

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:15:30
3	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:15:55	06 May 2023 01:15:55
4	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:17:00	06 May 2023 01:17:00
5	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:16:52
6	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:17:09	06 May 2023 01:17:09

Print the data

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5.5.13.2 Yearly data page

This is the data of 2023

Total Entries: 7

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:15:45	06 May 2023 01:15:45
2	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:15:30	06 May 2023 01:15:30
3	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:15:55	06 May 2023 01:15:55
4	KA20BB8971	Car	204606	Caysus Dilan Rodrigues	III BCA A	2147483647	somethin@gmail.com	Male	06 May 2023 01:17:00	06 May 2023 01:17:00
5	KA19EQ9080	Motorcycle	204639	Glen Furtado	III BCA A	2147483647	glen10102001@gmail.com	Male	06 May 2023 01:16:52	06 May 2023 01:16:52
6	KA19BA1290	Truck	204645	Joylyn Princita Fernandes	III BCA A	2147483647	somethingtest@gmail.com	Female	06 May 2023 01:17:09	06 May 2023 01:17:09
7	KA12B7890	Bus	204637	Gavin Dsouza	II BCA A	2147483647	dsouza@gmail.com	Male	06 May 2023 01:47:54	06 May 2023 01:47:54

5.5.14 Daily Data Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Daily Data page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Page (onLoad())	Re loads the page automatically after 15 sec	A Daily data page is generated	Success
4	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
5	Print Page (onClick())	Admin clicks on the Print Page to print the data	An PDF file is generated for the user to download	Success
6	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.14.1 Daily data

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA12B7890	Bus	204637	Gavin Dsouza	II BCA A	2147483647	dsouza@gmail.com	Male	2023-05-06 01:47:54.596476	2023-05-06 01:47:54.596476

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5.5.14.2 Daily data print

This is the data of 2023-05-06

Total Entries: 1

Sl no	Vehicle Number	Vehicle Type	Owner ID	Owner Name	Owner Status	Contact	Email	Gender	Entry Time	Exit Time
1	KA12B7890	Bus	204637	Gavin Dsouza	II BCA A	2147483647	dsouza@gmail.com	Male	2023-05-06 03:34:45.823234	2023-05-06 03:34:45.823234

5.5.15 Registrants Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A Registrants page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
4	Print (onClick())	Admin clicks on print button	A PDF file is generated of all registered users	Success
5	Delete registrants (onClick())	Admin clicks on delete registrants button	A pop up will ask the admin are you sure	Success
6	Delete registrants (onClick())	Admin clicks on delete registrants button	Will delete entire registrants list from particular positions	Success
7	Access registrants (onClick())	Admin clicks on the Access to access list of registrants from particular position	A list of all the users is generated	Success
8	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.15.1 Registrants Page

The screenshot shows a dashboard titled "Dashboard" with the sub-instruction "All registered users are listed below. Click appropriate positions". Below this, there are five entries, each with a "Delete registrants" and "Access registrants" button:

- I BAA
- I BCA A
- II BA A
- II BCA A
- III BA A

5.5.15.2 Delete registrants pop up

The screenshot shows the same dashboard as above, but with a modal dialog box overlaid. The dialog box contains the text "127.0.0.1:5000 says" and "Are you sure you want to delete III BCA A registrations?". It has "OK" and "Cancel" buttons.

5.5.15.3 Accessed registrants

The screenshot shows a web application interface titled "Reck-iT ANPD". At the top, there is a navigation bar with the title and a three-line menu icon. Below the header, the page title is "Registrants from III BCA A". A table displays the following data:

ID	First Name	Second Name	Last Name	Email	Gender	Position	Contact	Numberplate
204639	Glen		Furtado	glen10102001@gmail.com	Male	III BCA A	2147483647	KA19EQ9080
204645	Joylyn	Princita	Fernandes	somethingtest@gmail.com	Female	III BCA A	2147483647	KA19BA1290
204606	Caysus	Dilan	Rodrigues	somethin@gmail.com	Male	III BCA A	2147483647	KA20BB8971

A "Print the data" button is located at the bottom left of the table area. Below the table, there is a footer with links to "Home", "Features", and "About us", followed by a copyright notice: "©2023 Rec-It A startup initiative".

5.5.15.4 Accessed registrants print

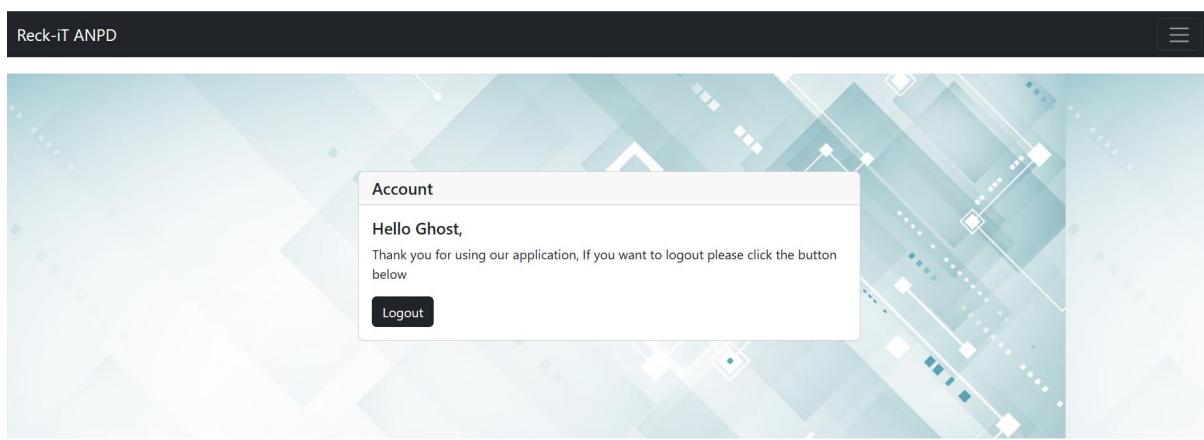
The printed version of the registrant data is titled "III BCA A Registrants". It contains the same table as the screenshot, listing the following information for three registrants:

ID	First Name	Second Name	Last Name	Email	Gender	Position	Contact	Numberplate
204639	Glen		Furtado	glen10102001@gmail.com	Male	III BCA A	2147483647	KA19EQ9080
204645	Joylyn	Princita	Fernandes	somethingtest@gmail.com	Female	III BCA A	2147483647	KA19BA1290
204606	Caysus	Dilan	Rodrigues	somethin@gmail.com	Male	III BCA A	2147483647	KA20BB8971

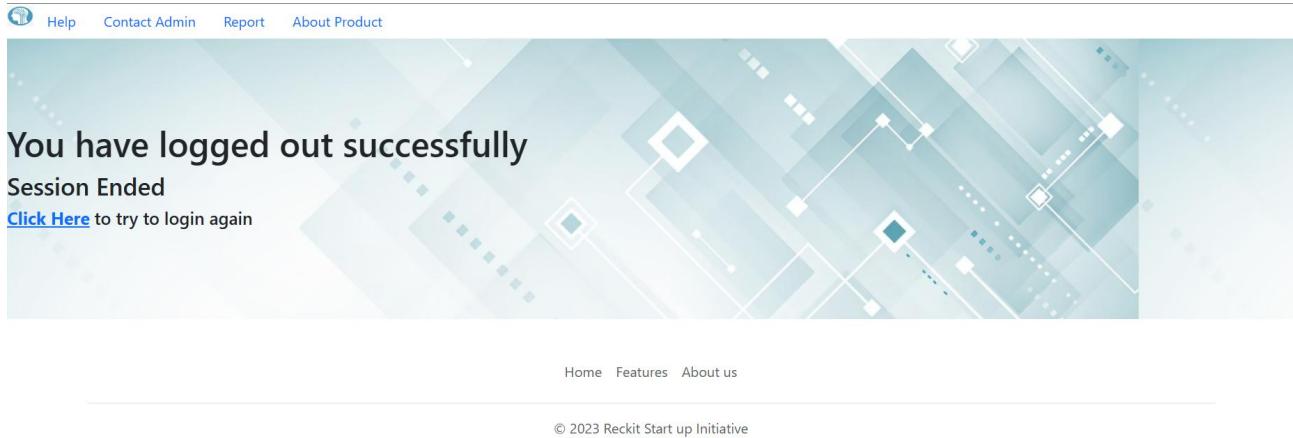
5.5.16 Account Page

Test Case ID	User event	User Input	Expected Output	Result
1	Page (onLoad())	Loads the page	A account page is generated	Success
2	Page (onLoad())	Loading the page without setting session or authorised login	An error page is loaded displaying error message	Success
3	Navbutton (onClick())	Admin clicks on the navigation menu button	A navbar is displayed	Success
7	Logout (onClick())	Admin clicks on the logout button	The user is logged out and notified using a message and session is cleared	Success
8	Page (onLoad())	Admin access the page	A function is triggered to record action	Success

5.5.16.1 Accounts Page



5.5.16.2 Logged out page



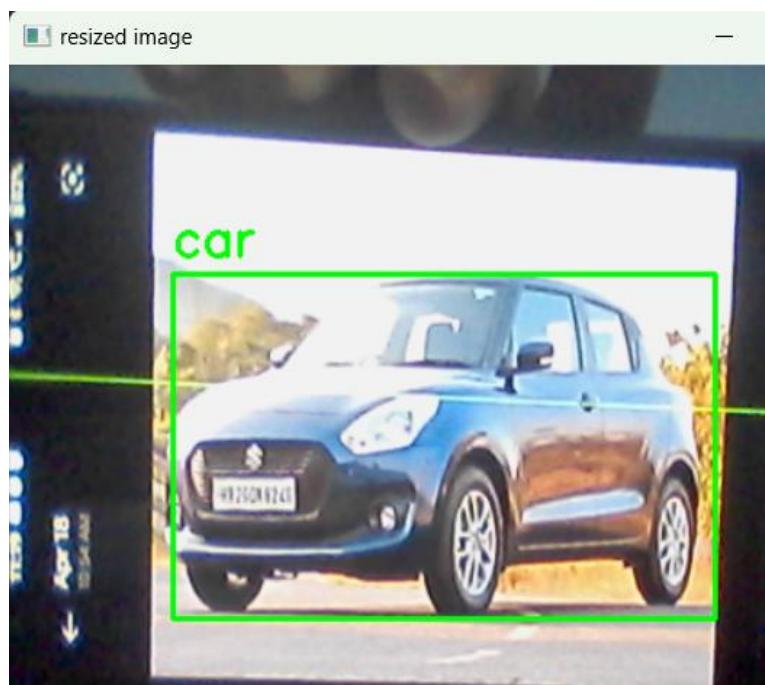
5.5.17 Application log file

```
--ACTION STARTED--  
2023-05-06 04:36:38.618564 >>USER ID : Ghost>>ACTION : Logged in to application  
-----ACTION ENDED-----  
  
-----ACTION STARTED-----  
2023-05-06 04:37:55.507362 >>USER ID : Ghost>>ACTION : Logged in to application  
-----ACTION ENDED-----  
  
-----ACTION STARTED-----  
2023-05-06 04:46:22.042093 >>USER ID : Ghost>>ACTION : Logged in to application  
-----ACTION ENDED-----  
  
-----ACTION STARTED-----  
2023-05-06 04:48:22.664402 >>USER ID : Ghost>>ACTION : Logged in to application  
-----ACTION ENDED-----  
  
-----ACTION STARTED-----  
2023-05-06 05:01:24.528335 >>USER ID : Ghost>>ACTION : Logged in to application  
-----ACTION ENDED-----  
  
-----ACTION STARTED-----  
2023-05-06 05:03:52.075347 >>USER ID : Ghost>>ACTION : Checked vehicle page of KA12B7890
```

5.5.18 Model test case

Test Case ID	User event	User Input	Expected Output	Result
1	run(model())	Runs the model program	Program runs and starts detection on each frame of the real time video	Success
2	Vehicle detect	Vehicle is detected on the video frame	The vehicle image is cropped and passed to detect numberplate	Success
3	Numberplate detect	Number plate is detected in frame	The cropped numberplate is sent for text recognition	Success
4	Text Recognition	The text is recognized on cropped image	The extracted text is sent for processing	Success
5	Upload data (firebaseupload())	The data is sent to firebase upload function	The data is uploaded to firebase real time database	Success

5.5.18.1 Detecting vehicle



5.5.18.2 Number plate is detected and cropped



5.5.18.3 Text is detected and data is processed

```
Got a detection
DETECTED PLATE: HR260K6246
Printing nplate list  ['HR260K6246']
Returning from check function HR260K6246
returning from detect text function : HR260K6246
Value from val function : True
Vehicle Type : car  Numberplate Type : White Numberplate  Numberplate Text : HR260K6246
```

6. CONCLUSION

The project ANPD system has been very successful in its primary stages, the results have been very promising. The web application created to manage this system has been working exceptionally and has been rigorously tested and has passed in all of its tests, it is also designed for an easier user experience such that the user needs no prior knowledge of programming or technical aspects of the system. This application was built for any institution of any form or size, and the system can be implemented by anyone who wishes to take advantage of modern machine learning algorithms. There are some things we can still implement which can further improve the functionality of the system. This system is a useful tool when it comes to solving problems in authorization and traffic management.

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