"E-Ticketing System for Indian Museums and Heritage Sites"

A Project Report Submitted to

Rajiv Gandhi Proudyogiki Vishwavidyalaya

Towards Partial Fulfillment for the Award of

Bachelor of Technology in *Computer Science & Engineering*

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EXAMINER APPROVAL

The Project entitled *"E-Ticketing System for Indian Museums And Heritage sites"* submitted by **Aarohi Rathore(0827CS201004), Aayush Gupta(0827CS201006) Abhay Gour(0827CS201009), Ankur Nagar(0827CS201035)** has been examined and is hereby approved towards partial fulfillment for the award of Bachelor of Engineering degree in Computer Science & Engineering discipline, for which it has been submitted. It understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein, but approve the project only for the purpose for which it has been submitted.

(Internal Examiner)   **(External Examiner)**

Date: **Date:**

GUIDE RECOMMENDATION

This is to certify that the work embodied in this project entitled **"E-Ticketing system for Indian Museums and Heritage Sites"** submitted by **Aarohi Rathore(0827CS201004), Aayush Gupta (0827CS201006), Abhay Gour(0827CS201009), Ankur Nagar(0827CS201035)** is a satisfactory account of the bonafide work done under the supervision of **Prof. Priyanka Jangde and Prof. Narendra Pal Singh** are recommended towards partial fulfillment for the award of the Bachelor of Engineering (Computer Science & Engineering) degree by Rajiv Gandhi Proudyogiki Vishwavidhyalaya, Bhopal.

(Project Guide)   **(Project Coordinator)**

Prof. Priyanka Jangde   **Prof.Narendra Pal Singh**

STUDENTS UNDERTAKING

This is to certify that project entitled **"*E-Ticketing System for Indian Museums And Heritage Sites*"** has been developed by us under the supervision of **Prof. Priyanka Jangde and Prof. Narendra Pal Singh Rathore.** The whole responsibility of work done in this project is ours. The sole intention of this work is only for practical learning and research.

We further declare that to the best of our knowledge, this report does not contain any part of any work which has been submitted for the award of any degree either in this University or in any other University / Deemed University without proper citation and if the same work is found then we are liable for explanation to this.

Abhay Gour(0827CS201009)

Aayush Gupta(0827CS201006)

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We owe a debt of sincere gratitude, deep sense of reverence and respect to our guide and mentors **Prof. Priyanka Jangde and Prof. Narendra Pal Singh Rathore**, Associate Professor, AITR, for their motivation, sagacious guidance, constant encouragement, vigilant supervision and valuable critical appreciation throughout this project work, which helped us to successfully complete the project on time.

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Executive Summary

"E-Ticketing System for Indian Museums and Heritage Sites"

This project is submitted to Rajiv Gandhi Proudyogiki Vishwavidhyalaya, Bhopal(MP), India for partial fulfillment of Bachelor of Engineering in Computer Science & Engineering branch under the sagacious guidance and vigilant supervision of *Prof. Priyanka Jangde and Prof. Narendra Pal Singh Rathore*.

The project is based on Deep Learning, which is a sub field of machine learning, concerned with algorithms inspired by the structure and function of the brain called artificial neural networks. In the project, TensorFlow is used , which is an open-source software library created by Google for machine learning applications. It is used for detecting, identifying and tracking objects through the camera in real time. The project uses a pre-trained model on Microsoft Common Objects in Context (COCO) data set , which contains approximately all common objects. The purpose of this project is to implement 'Students and vehicles counter' in the college in real-time.

"Where the vision is one year, cultivate flowers;

Where the vision is ten years, cultivate trees;

Where the vision is eternity, cultivate people."

- Oriental Saying

List of Abbreviations

Abbr1: QR-*Quick Response*

Abbr2: SMS –*Short Message Service*

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Chapter 1. Introduction

Introduction

In a rapidly changing world thanks to digitization, technology plays an important role in our daily lives. Technology has an incentive to deliver time- and cost-effective products. Implementing the idea of digitization in the public visitor system could prove to be more profitable. The second largest Indian in the world in the use of mobile devices, websites and cloud databases helps make public visits more efficient and effective. Most mobile phone users prefer its website as an operating system, so this concept suits the needs of most users. Many sites that are published every year can store visitor information in a cloud database so that it can be easily searched and processed efficiently.

The main idea behind this approach to the web is to serve people by providing a user-friendly and hassle-free interface. This website allows you to safely and easily control museum visitors. In addition, there is no need for employees to participate in ticket verification.

1.1 Overview

The paper describes the opportunities and challenges of e-ticketing in most of the board systems like public transportation, museums, heritage sites and so on. While the concept of e-ticketing is prevalent in the museums, entrance boards, and heritage sites, it is difficult to implement in an operating environment where the entire business strategy is based on an "open access" system for flexible traveling. Here we devise a QR based ticketing system with necessary hardware for the seamless visitor experience in Museums/Heritage sites along with a best Facial recognition based ticket generation. In addition, The prediction of the expected crowd will be added as a feature.

1.2 Background and Motivation

E-ticketing in tourism as a "paperless" revolution, first hit US based airlines in the 80s. It was used primarily by domestic carriers operating point to point flights. But once it got started, the travel industry globally saw the opportunity for a dramatic transformation in ticketing systems. E-ticketing is a method for documenting sale, tracking usage and accounting for a passenger's visiting without requiring the issue of paper "value documents". Passengers are able to book, pay for and print their e-tickets online from any point in the world and explore the historical places.

E-Ticketing System becomes a necessity when there is a need for automation, where the ticket booking is done by machines and Artificial Intelligence instead of doing it manually for better performance and reliability. Normally, there are people hired specially for booking the ticket and maintaining records manually in a system. Automation by this system provides a better way to perform the same work.

1.3 Problem Statement and Objectives

Unlike in the previous stage people had to walk into monument ticket counters to buy the tickets and also to check the timings. This problem is overcome by introducing the Online Ticket Booking System.

Thus, the system implemented has the following objectives :

1. **Objective 1:** To book tickets online for visiting museums/heritage sites.,by automation with the help of a Website,Artificial Intelligence, and thus reduce manual efforts and increase performance.

2. **Objective 2:** To keep a record of all the registered persons as log files in the database that can be retrieved whenever required for analysis ;

provides complete information regarding currently how many people are already in museums/heritage sites or how many people are waiting.

1.4 Scope of the Project

The project uses an Internet based application and provides a website for visiting museums/heritage sites where any user with the internet can access it. It can have a wide variety of applications in various areas. Some of them are given below :

- The website provides complete information regarding currently how many people are already in museums/heritage sites or how many people are waiting.
- People can book tickets online from remote locations and at any time of day or night.
- In tourist places and World Heritage Sites which are commonly crowdy, the ticketing of tourists is necessary for billing and other .
- For accounting purposes , the project can be used efficiently and easily.

1.5 Team Organization

- **Ankur Nagar :**
  - Along with doing preliminary investigation and understanding the limitations of the current system, I studied about the topic and its scope and surveyed various research papers related to object detection and the technology that is to be used.
  - Documentation is also a part of the work done by me in this project.

- **Abhay Gour :**
  - I investigated and found the right technology and studied it. For the implementation of the project , I collected the object

data and trained the model for it. Implementation logic for the project objective and coding of internal functionalities is also done by me.

- Also, worked on Back end design for storing results in the database for maintaining logs.

- **Aayush Gupta :**

  - I studied about the requirements analysis along with other operational requirements. I also helped in developing the components related to the verification and validation of tickets.

1.6 Report Structure

The project *E-ticketing System for Indian Museums and Heritage Sites* is primarily concerned with the **Image processing in real-time** and the whole project report is categorized into five chapters.

Chapter 1: Introduction- introduces the background of the problem followed by rationale for the project undertaken. The chapter describes the objectives, scope and applications of the project. Further, the chapter

gives the details of team members and their contribution in development of the project which is then subsequently ended with a report outline.

Chapter 2: Review of Literature- explores the work done in the area of Project undertaken and discusses the limitations of the existing system and highlights the issues and challenges of the project area. The chapter finally ends up with the requirement identification for present project work based on findings drawn from reviewed literature and end user interactions.

Chapter 3: Proposed System - starts with the project proposal based on requirement identified, followed by benefits of the project. The chapter

also illustrates the software engineering paradigm used along with different design representations. The chapter also includes a block diagram and details of major modules of the project. Chapter also gives insights of different types of feasibility study carried out for the project undertaken. Later it gives details of the different deployment requirements for the developed project.

Chapter 4: Implementation - includes the details of different Technology/ Techniques/ Tools/ Programming Languages used in developing the Project. The chapter also includes the different user interface designed in project along with their functionality. Further it discuss the experiment results along with testing of the project. The chapter ends with evaluation of project on different parameters like accuracy and efficiency.

Chapter 2. Review of Literature

Review of Literature

The existing E-ticketing System connect website provides an interface for booking tickets only by logging into a registered account right from the first screen. This may require a lengthy and time-consuming process for those users who simply want to know the availability of tickets. This idea overcomes a particular shortcoming as it would only require user authentication at the time of ticket booking, making the website more user-friendly for guest-guests to check ticket availability. An idea proposed in the paper "Android Application for Ticket Booking and Ticket Checking in Suburban Railways" published in the Indian Journal of Science and Technology [4] provides a view of ticket booking and ticket receipt in encrypted QR code form via SMS. However, this would not be possible because SMS does not facilitate the sending of images, rather only data in the form of texts can be sent via SMS. The proposed idea overcomes this flaw by generating a QR code on the web page screen from which a screenshot can be taken if needed. This screenshot can be used for verification later. This proposed website not only provides more flexibility to guest users to check the availability of ticket details but also allows the ticket to be transmitted in an encrypted and valid format.

2.1 Preliminary Investigation

2.1.1 Current System

- Existing system refers to the system that is being followed till now. The existing system requires more computational time, more manual calculations, and the complexity involved in Selection of features is high. The other disadvantages are lack of security of data, Deficiency

of Data accuracy, Time consuming etc. To avoid all these limitations and make the working more accurate the system needs to be computerized. Here in E-ticketing, a detailed study of existing systems is carried along with all the steps in system analysis.

2.2 Limitations of Current System

- The limitations of Current Systems are as follows :

- Lack of security of data.

- More man power.

- Time consuming.

- Consumes a large volume of spare work.

- Needs manual calculations.

- No direct role for the higher officials.

- Damage of machines due to lack of attention.

2.3 Requirement Identification and Analysis for Project

- Significant work has been done in the field of E-ticketing System for Indian Museums and Heritage Sites ; however, it is not easy to achieve desired results. The review of literature leads to draw certain major findings which are as under :

- The paper describes the opportunities and challenges of e-ticketing in most of the board systems like public transportation, museums, heritage sites and so on. While the concept of e-ticketing is prevalent in the museums, entrance boards, and heritage sites it is difficult to implement in an operating environment where the entire business strategy is based on an "open access" system for flexible traveling. Here we devise a QR based ticketing system with necessary hardware for the seamless visitor experience in Museums/Heritage sites along with a best Facial recognition based ticket generation. In addition, The prediction of the expected crowd will be added as a feature.

- The paper presents a new approach, the main idea behind this approach to the web is to serve people by providing a user-friendly and hassle-free interface. This website allows you to safely and easily control museum visitors. In addition, there is no need for employees to participate in ticket verification.[3]

- The paper focused on the problem of computational time, more manual calculations, and the complexity of existing E-ticketing Systems. Specifically, it shows that using QR Codes and Facial Recognition as features can significantly improve performance compared to the standard linear features used in existing systems. For frontal faces, local orientation histograms enable state of the art performance using only a few hundred training examples. For profile view faces, local orientation histograms enable learning a system that seems to outperform the state of the art in real-time systems even with a small number of training examples. [4]

- The work presented a real time robust facial recognition and QR Based system for face detection and ticket generation respectively, which can be used in varying environments.

- The paper introduced a new facial recognition system for user verification.. The approach is mainly based on the paper "Android application for ticket booking and ticket checking in suburban railways" published in the Indian journal of science and Technology[4] gives an insight of booking tickets and receiving the ticket in an encrypted form of QR code through an SMS.

- The paper introduces an approach to use a web application through which passengers can access various ticketing options in a user-friendly and efficient manner. The implementation of a quick response (QR) code and a biometric scanner provides a system for ticket validation and passenger identity verification. This project brings the implementation process of ticket booking and efficient passenger identity verification using biometric data. The implementation of this proposal would be a great impetus to the digitization and preservation of paper.

- The paper describes the working and implementation of QR Code based on

"The International Journal of Emerging Research in Management & Technology".[3]

2.3.1 Conclusion

This chapter reviews the literature surveys that have been done during the research work. The related work that has been proposed by many researchers has been discussed. The research papers related to E-Ticketing ,QR generation and facial recognition from 2013 to 2015 have been shown which describes the opportunities and challenges of e-ticketing in most of the board systems like museums, heritage sites and so on.

Chapter 3. Proposed System

Proposed System

3.1 The Proposal

The main goal of this idea is to create a website through which we completely digitize ticketing operations, providing a user friendly and stable interface for the needs of museum visitors.

This website provides options for:

1) ticket booking

2) ticket status viewing

3) ticket cancellation

In order to view the ticket status or cancel it, we need to log in to the registered account with which the ticket was booked with the necessary credentials. Once logged in, the user can proceed with the requested cancellation operation or view the ticket status. To check the availability of the ticket, the user must enter the relevant information about the museum. After finding out the availability of the ticket, they can proceed to book the ticket by logging into the registered account. The ticket booking process has been linked with details that make the booking process extremely quick and easy. The ticket is then generated in an encrypted Quick Response (QR) code format that is sent to the screen of the website from which a screenshot can be taken. This quick response (QR) code can later be used to validate the ticket. We can use biometrics technology to verify visitors, which can also be linked to a database of details. Since ticket validation and visitor identity verification is done digitally quickly, we can incorporate a fully digital museum ticket reservation system and use effective authentication techniques by linking to a database of details.

3.2 Benefits of the Proposed System

The current system had a lot of challenges that are overcome by this system:

- **Man Power :** It does not require any person or their efforts to stand and count the number of people.
- **24 x 7 Availability :** The main advantage of e-ticketing is that you can book, purchase and print out the electronic ticket any time 24 hours a day.
- **User-friendly:** E-tickets give freedom to plan trips yourself and design the route according to your preferences, selecting the most convenient time of departures and arrivals, and planning to visit various places.
- **Time Management:** E-tickets give freedom to plan trips yourself and design the route according to your preferences, selecting the most convenient time of departures and arrivals, planning to visit various places.

3.3 Features of the Website:

3.3.1 Security :

The system is designed to prevent unauthorized people from trespassing the premises. Using an e-ticketing system project presents reports about the customer's activity.

The system tracks the number of visitors entry and exit from the premises throughout the day. At the end of the business day, you can retrieve the data and maintain records about the people who have visited the premises.

3.3.2 Simplified Accounting :

With the collection and distribution of tickets being automated, you relieve the working staff from the burden of reporting sales to the accountant at the end of the business day.

The accountant does not have to count money and document it manually. Instead, the system does the instant collection and accounting on your behalf.

3.3.3 Ticket automation –

You can't go far without robust automation capabilities in today's world, regardless of any field. Automation can perform many tasks, streamline your support operations, and significantly boost the effectiveness of your customer support team. Basic automated operations vary from reminders to routing tickets to specific agents.

3.3.4 Easy Ticket Buying Interface

If a customer decides on to book a ticket they will be able to:
- Get all the information on our Website.
- Easily navigate through the booking interface and select their seats.
- Pay online through their choice of online payment gateway.
- Get a ticket confirmation within seconds.

3.3.5 Customer Experience

- The ticket buyers would have a pleasant customer experience if they consider booking tickets from our platform. They will find the experience they have when interacting on your website and on your online ticketing system quite impressive.
- It keeps you organized.
- A lack of organization can lead to less productivity and longer ticket times. An online ticketing system keeps an organized list of tasks created by priority standing that will

keep help desk support agents and the customers happy (and productive).

3.3.6 Efficiency:

Ticketing software is a way to take a multitude of different problems and be able to take care of them all in the same organized fashion. Because of the level of organization it brings, requests won't require as much effort to answer as other systems. It'll also mean fewer hours needed to solve any problems. The efficiency will also mean less room for human error, or in other words, fewer mistakes.
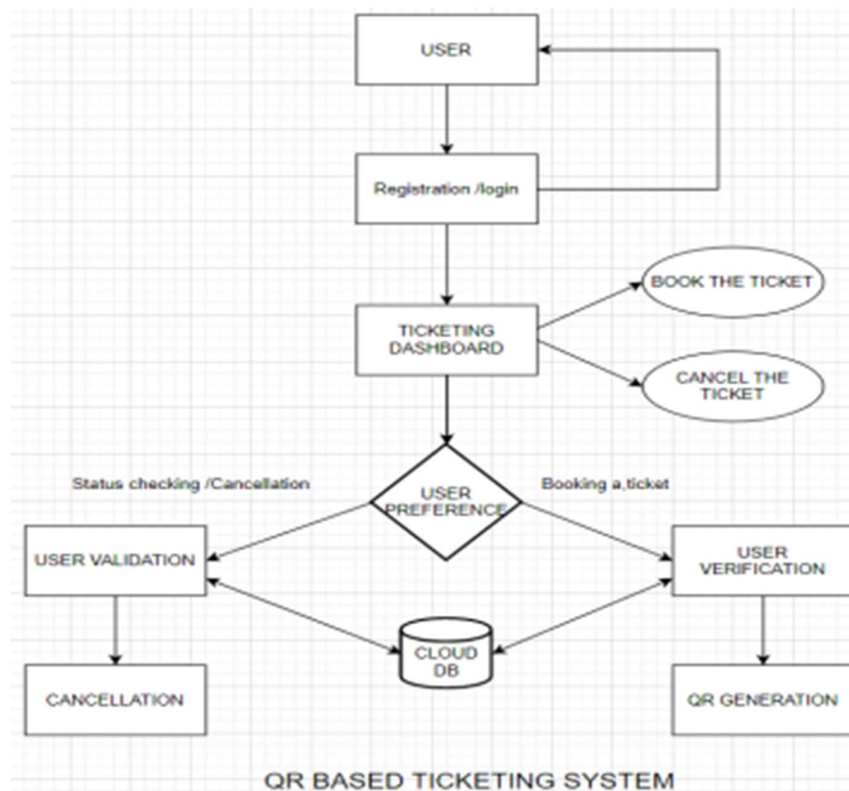
3.3 Block Diagram

Figure 3-1 : Block Diagram

3.4 Feasibility Study

A feasibility study is an analysis of how successfully a system can be implemented, accounting for factors that affect it such as economic, technical and operational factors to determine its potential positive and negative outcomes before investing a considerable amount of time and money into it.

3.4.1 Technical

For any real-time detection system, there is a need to process images from the video. For this, the kind of framework used must be the one that is capable of extracting those objects from the images easily and accurately in real-time. The framework used in this is Tensorflow, which is a framework designed by Google for efficiently dealing with deep learning and concepts like neural networks , making the system technically feasible.

The system, once set up completely, works automatically without needing any person to operate it. The result (count and other information),
gets automatically saved in the database, without requiring any manual effort for saving it.

For making the system technically feasible, there is a requirement of a GPU built system with a high processor for better performance.

3.4.2 Economical

For any real-time object detection system, there is a need for a High definition Camera for better and accurate results.

Since the system is completely automated, there is a need for continuous electricity supply for it to operate 24X7.

The Tensorflow framework used in the system works great with GPU built systems, which are a little on the expensive side.

Since the system uses high performance processors continuously, to save any disaster from occurring due to very high temperatures, there is a requirement of a cooling system in the environment where it is implemented.

3.4.3 Operational

The main motto of our system is to reduce the manual efforts of counting the students and vehicles by automating it.

The system is able to do that accurately and efficiently making the system operationally feasible.

3.5 Design Representation
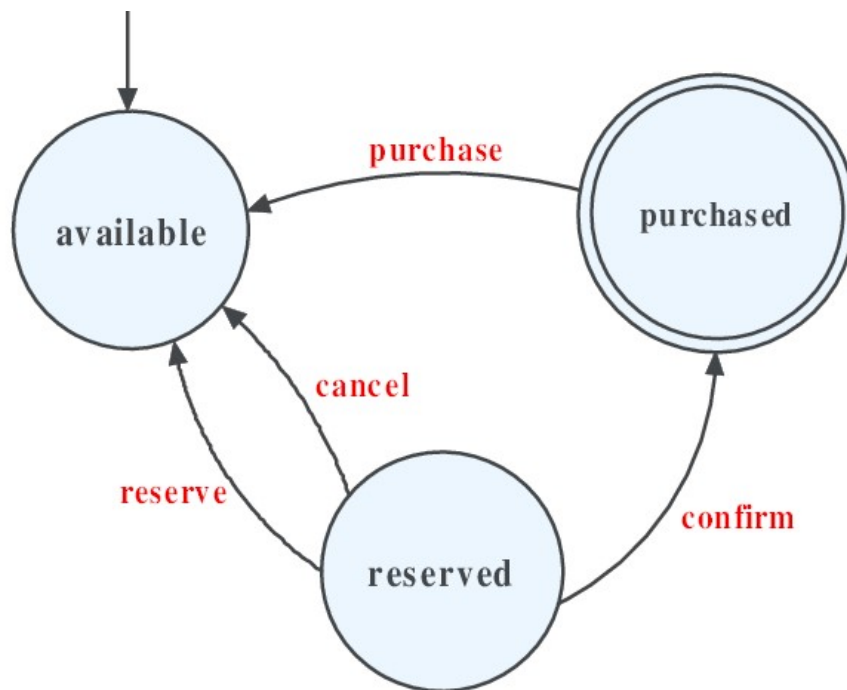
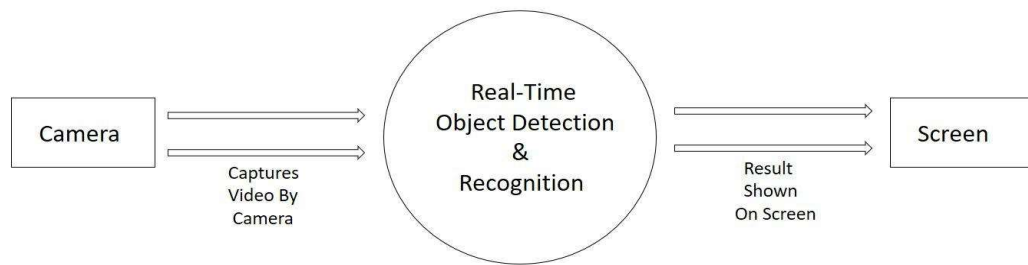**Design Representation of E-Ticketing System**

3.5.1 Data Flow Diagrams

Figure 3-7 Data Flow Diagram Level 0
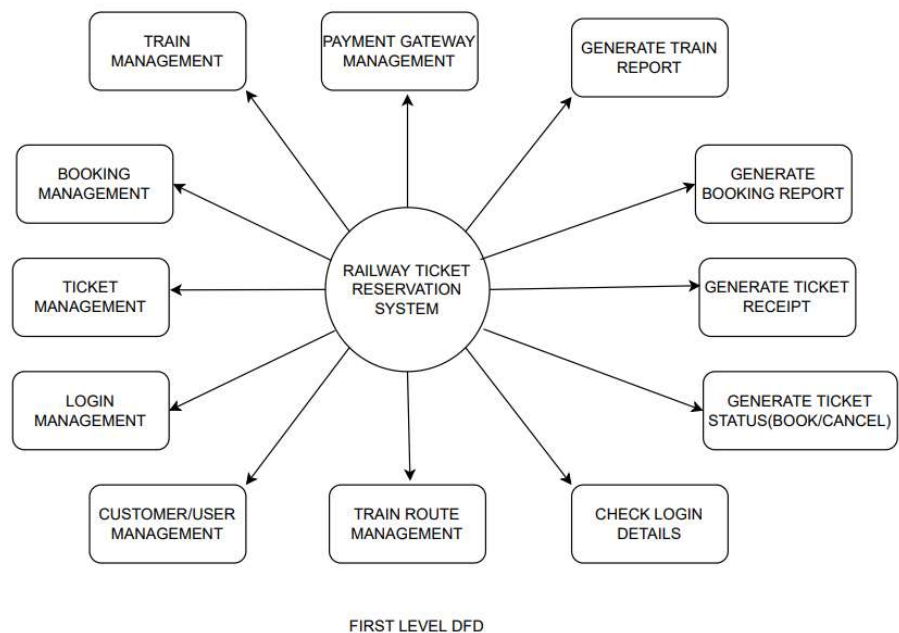

FIRST LEVEL DFD

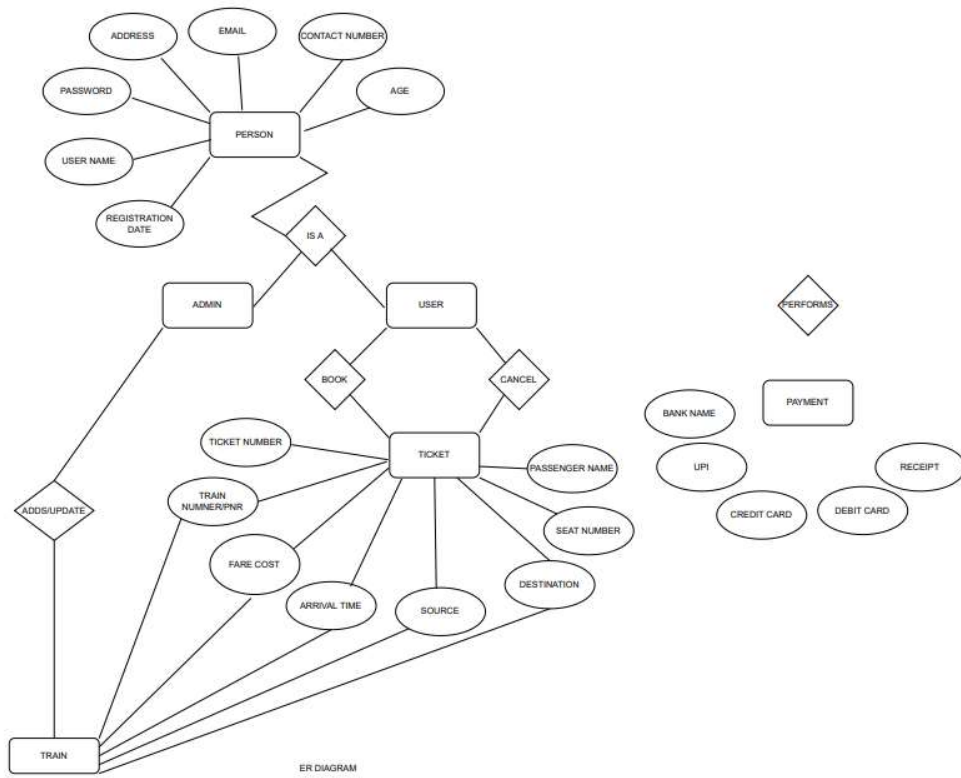**Figure 3-8 Data Flow Diagram Level 1**

Figure 3-9 ER Diagram

3.5.2 Database Structure

The name of the database created is "db_detect" and there is one table in the database named "logs" for storing the records.

The "Logs" table has the following structure :

Name	Data Type	Description
Datetime	Timestamp	Shows the complete date and time when the person/vehicle enters and is identified
Type	Varchar2	Displays the type of object for example Person, Car, Dog.
CIF	Number	Count per frame.It tells the number of objects in frame.

Table 2 : Database Structure

3.6 Deployment Requirements

There are various requirements (hardware, software and services) to successfully deploy the system. These are mentioned below :

3.6.1 Hardware

- 32-bit, x86 Processing system

- Windows 7 or later operating system

- High processing computer system without GPU or with GPU(high performance)

3.6.2 Software

- OpenCV

- Python and its supported libraries

- Tensor Flow

- If Installing Tensorflow in GPU systems :

  1. CUDA® Toolkit 9.0.

  2. The NVIDIA drivers associated with CUDA Toolkit 9.0. cuDNN v7.0.

  3. GPU card with CUDA Compute Capability 3.0 or higher

Chapter 4 . Implementation
Implementation

For the problem of counting the number of students and vehicles entering the college campus manually, the system is designed in such a way so as to automate the process by placing a camera at the entrance gate so that students, bikes and cars getting inside the college campus can be identified and counted.

4.1 Technique Used

4.1.1 Deep- Learning

Deep Learning is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks. Deep learning (also known as deep structured learning or hierarchical learning) is part of a broader family of machine learning methods based on learning data representations, as opposed to

task-specific algorithms. Learning can be supervised, semi-supervised or unsupervised.

Deep learning models are loosely related to information processing and communication patterns in a biological nervous system, such as neural coding that attempts to define a relationship between various stimuli and associated neuronal responses in the brain.

Deep learning architectures such as deep neural networks, deep belief networks and recurrent neural networks have been applied to fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics and drug design, where they have produced results comparable to and in some cases superior to human experts.

4.1.2 Neural Networks :

In machine learning, a convolutional neural network (CNN, or ConvNet) is

a class of deep, feed-forward artificial neural networks that has successfully been applied to analyzing visual imagery.

CNNs use a variation of multilayer perceptrons designed to require minimal preprocessing. They are also known as shift invariant or space invariant artificial neural networks (SIANN), based on their shared-weights architecture and translation invariance characteristics.

Convolutional networks were inspired by biological processes in that the connectivity pattern between neurons resembles the organization of the animal visual cortex. Individual cortical neurons respond to stimuli only in a restricted region of the visual field known as the receptive field. The receptive fields of different neurons partially overlap such that they cover the entire visual field. CNNs use relatively little pre-processing compared to other image classification algorithms. This means that the network learns the filters that in traditional algorithms were hand-engineered. This independence from prior knowledge and human effort in feature design is a major advantage. They have applications in image and video recognition, recommender systems and natural language processing.

4.2 Tools Used

4.2.1 OpenCV

OpenCV (Open Source Computer Vision Library) is released under a BSD license and hence it's free for both academic and commercial use. It has C++, Python and Java interfaces and supports Windows, Linux, Mac OS, iOS and Android. OpenCV was designed for computational efficiency and

with a strong focus on real-time applications. Written in optimized C/C++, the library can take advantage of multi-core processing. Enabled with OpenCL, it can take advantage of the hardware acceleration of the underlying heterogeneous compute platform.

Adopted all around the world, OpenCV has more than 47 thousand people of user community and estimated number of downloads exceeding 14 million. Usage ranges from interactive art, to mines inspection, stitching maps on the web or through advanced robotics.

4.2.2 Tensor Flow

TensorFlow is an open source software library for high performance numerical computation. Its flexible architecture allows easy deployment of computation across a variety of platforms (CPUs, GPUs, TPUs), and from desktops to clusters of servers to mobile and edge devices. Originally developed by researchers and engineers from the Google Brain team within Google's AI organization, it comes with strong support for machine learning and deep learning and the flexible numerical computation core is used across many other scientific domains.
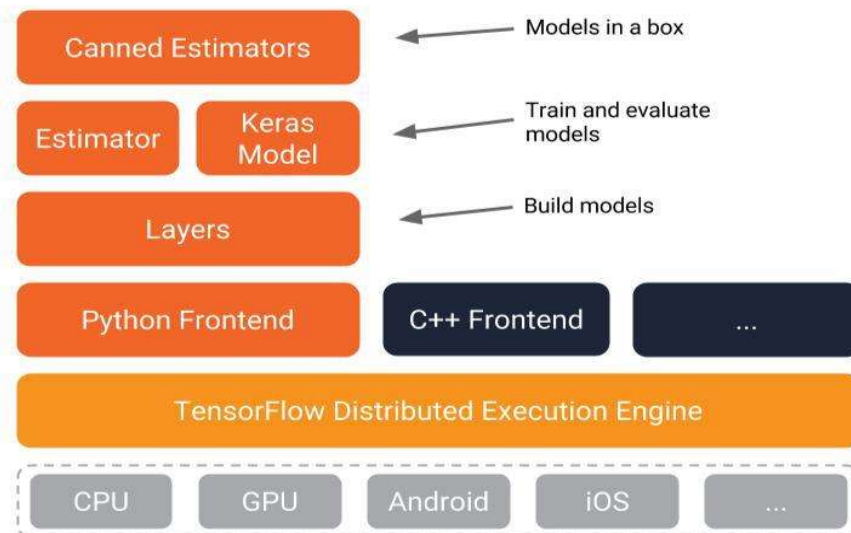
4.2.3 Models

The TensorFlow official models are a collection of example models that use TensorFlow's high-level APIs. They are intended to be well-maintained, tested, and kept up to date with the latest TensorFlow API. They should also be reasonably optimized for fast performance while still being easy to read.

Model name	Speed (ms)	COCO mAP[^1]	Outputs
ssd_mobilenet_v1_coco	30	21	Boxes
ssd_inception_v2_coco	42	24	Boxes
faster_rcnn_inception_v2_coco	58	28	Boxes
faster_rcnn_resnet50_coco	89	30	Boxes
faster_rcnn_resnet50_lowproposals_coco	64		Boxes
rfcn_resnet101_coco	92	30	Boxes
faster_rcnn_resnet101_coco	106	32	Boxes
faster_rcnn_resnet101_lowproposals_coco	82		Boxes
faster_rcnn_inception_resnet_v2_atrous_coco	620	37	Boxes
faster_rcnn_inception_resnet_v2_atrous_lowproposals_coco	241		Boxes
faster_rcnn_nas	1833	43	Boxes
faster_rcnn_nas_lowproposals_coco	540		Boxes

Table 3 : Types of Models

Below is a list of the models available.

- **COCO:** COCO is a large-scale object detection, segmentation, and captioning dataset.

- **Mnist**: **A** basic model to classify digits from the MNIST dataset.

- **Resnet**: A deep residual network that can be used to classify both CIFAR-10 and ImageNet's dataset of 1000 classes.

- **Wide_deep**: **A** model that combines a wide model and deep network to classify census income data.

The system uses COCO data set Model which is Common Object in Context designed by Mirosoft.

COCO Model :

This database has several features:

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- Object Detection

- Recognition in context

- Superpixel stuff segmentation

- 330K images (>200K labeled)

- 1.5 million object instances

- 80 object categories

- 91 stuff categories

- 5 captions per image

- 250,000 people with keypoints

COCO currently has three annotation types: object instances, object keypoints, and image captions. The annotations are stored using the JSON file format. All annotations share the basic data structure below:

The distribution of the objects in this database can be obtained from their website. In section Explore, it is possible to choose and combine each of the objects and observe how many images these objects appear. The distribution for each of the objects in training/validation set is shown in the following image:

	images		images		images		images
person	66808	cat	4298	wine glass	2643	dinning table	12338
backpack	5756	dog	4562	cup	9579	toilet	3502
umbrella	4142	horse	3069	fork	3710	tv	4768
handbag	7133	sheep	1594	knife	4507	laptop	3707
tie	3955	cow	2055	spoon	3682	mouse	1964
suitcase	2507	elephant	2232	bowl	7425	remote	3221
bicycle	3401	bear	1009	banana	2346	keyboard	2221
car	12786	zebra	2001	apple	1662	cell phone	5017
motorcycle	3661	giraffe	2647	sandwich	2463	microwave	1601
airplane	3083	frisbee	2268	orange	1784	oven	2992
bus	4141	skis	3202	broccoli	2010	toaster	225
train	3745	snowboard	1703	carrot	1764	sink	4865
truck	6377	sports ball	4431	hot dog	1273	refrigerator	2461
boat	3146	kite	2352	pizza	3319	book	5562
traffic light	4330	baseball bat	2603	donut	1585	clock	4863
fire hydrant	1797	baseball glove	2729	cake	3049	vase	3730
stop sign	1803	skateboard	3603	chair	13354	scissors	975
parking meter	742	surfboard	3635	couch	4618	teddy bear	2234
bench	5805	tennis racket	3561	potted plant	4624	hair drier	198
bird	3362	bottle	8880	bed	3831	toothbrush	1041

Finally, in order to understand better both databases, the following image shows some characteristics of them, comparing them with other important databases.
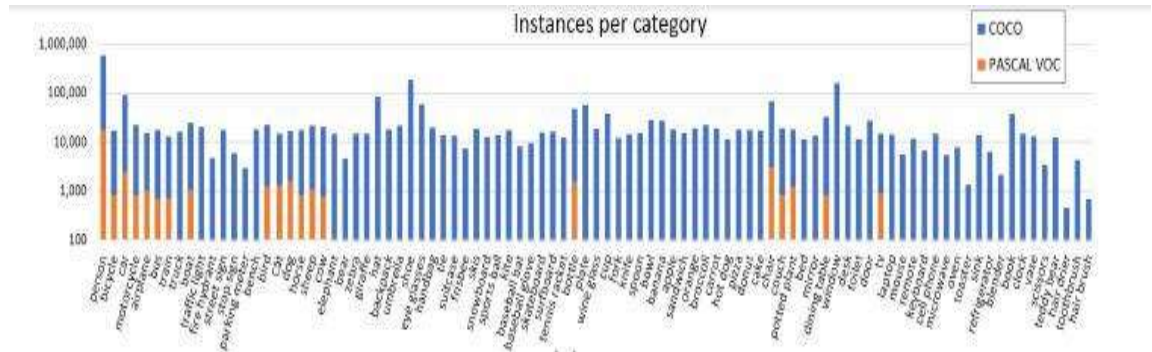
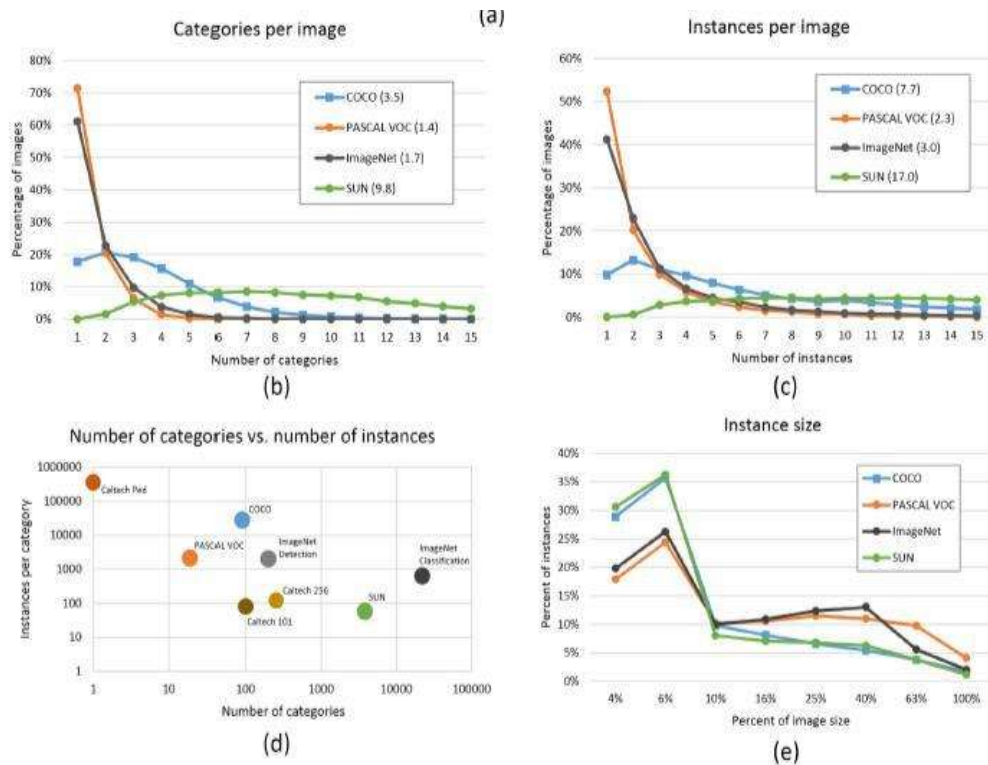

Figure 4-7 : Instances per Category

Figure 4-8 : Comparison Graphs

4.3 Language Used

Javascript language is used in the system due to the following characterstics :

Light Weight Scripting Language:

JavaScript is a lightweight scripting language because it is made for data handling at the browser only. Since it is not a general-purpose language so it has a limited set of libraries. Also as it is only meant for client-side execution and that too for web applications, hence the lightweight nature of JavaScript is a great feature.

Dynamic Typing:

JavaScript supports dynamic typing which means types of the variable are defined based on the stored value. For example, if you declare a variable x then you can store either a string or a Number type value or an array or an object. This is known as dynamic typing.

Platform Independent:

This implies that JavaScript is platform-independent or we can say it is portable; which simply means that you can simply write the script once and run it anywhere and anytime. In general, you can write your JavaScript applications and run them on any platform or any browser without affecting the output of the Script.

Prototype :

The Python Standard Library is huge indeed. It can help you do various things involving regular expressions, documentation generation, unit testing, threading, databases, web browsers, CGI, ftp, email, XML,

3
1

XML-RPC, HTML, WAV files, cryptography, GUI(graphical user interfaces) using Tk, and also other system-dependent stuff. Remember, all this is always available wherever Python is installed. This is called the "batteries included" philosophy of Python.

4.4 Screenshots

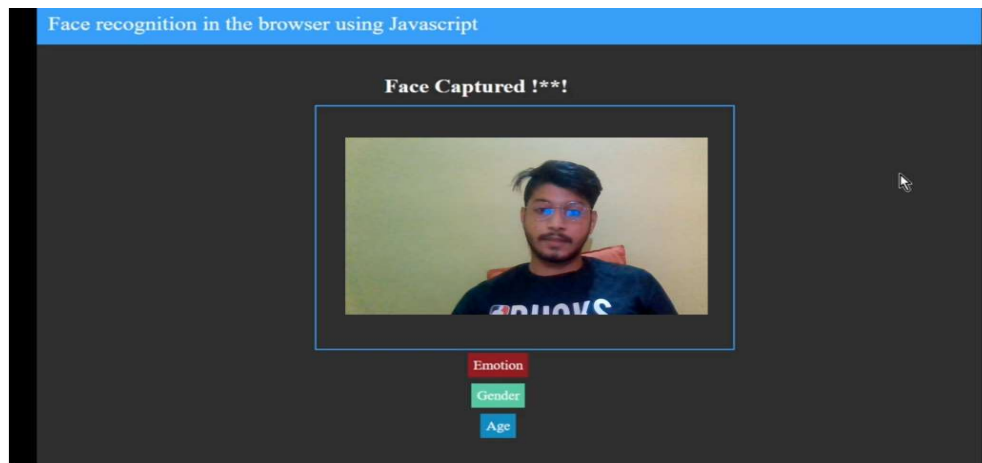The Following are the screenshots of the result of the project :
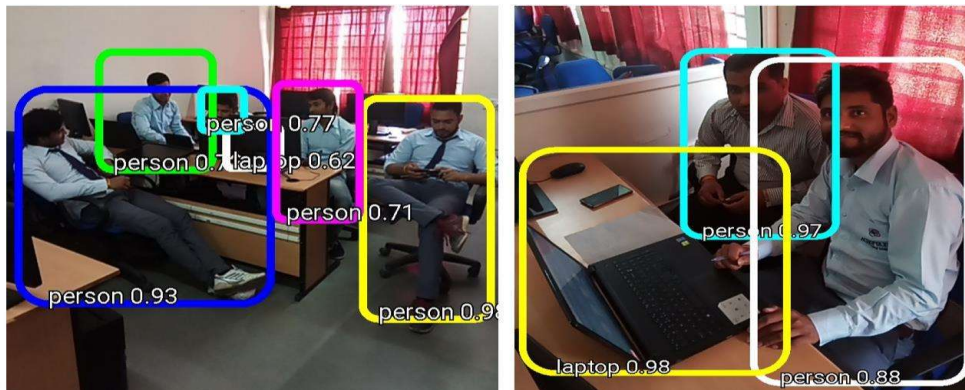

Figure 4-9 : Screenshot 1

Figure 4-10 : Screenshot 2

Figure 4-10 : Screenshot 3

Figure 4-10 : Screenshot 4

4.5 Testing

Testing is the process of evaluation of a system to detect differences between given input and expected output and also to assess the features of the system. Testing assesses the quality of the product. It is a process that is done during the development process.

4.5.1 Strategy Used

Tests can be conducted based on two approaches –

- Functionality testing

- Implementation testing

The texting method used here is Black Box Testing. It is carried out to test functionality of the program. It is also called 'Behavioral' testing. The tester in this case, has a set of input values and respective desired results. On providing input, if the output matches with the desired results, the program is tested 'ok', and problematic otherwise.

4.5.2 Test Case and Analysis

TEST CASE: 1

Test Case ID	TC001
Test Case Summary	It will check whether the system detects the students entering in the college with accuracy >=50% or not.
Test Procedure	Place and start the camera at the college entrance.
Expected Result	The students must be detected with accuracy greater than 50%.
Actual Result	The Students with accuracy greater than 50% are detected.
Status	Pass

Table 4 : Test Case 1

TEST CASE 2 OUTPUT

Figure 4-13 : Test Case 2 Output 1

Chapter 5.Conclusion

Conclusion

5.1 Conclusion-

The main objective of this post is to use a web application through which passengers can access various ticketing options in a user-friendly and efficient manner. The implementation of a quick response (QR) code and a biometric scanner provides a system for ticket validation and passenger identity verification. This post brings the implementation process of ticket booking and efficient passenger identity verification using biometric data. The implementation of this proposal would be a great impetus to the digitization and preservation of paper.

The work done manually can now be completely replaced by this automated system and it can reduce all the extra efforts of maintaining the records.

5.2 Limitations of the Work

Limited features

One of the advantages a paid tool has over a free online ticket system is a broader range of features. A free tool might only be available for the IOS but not for the phone and other endpoint monitors.

You need internet access

Whether you are using a free online ticketing system or a paid one, you cannot access it without an internet connection. Some people would prefer to have offline solutions to accessing their tickets.

Influx of customers

Attracting a large number of customers is suitable for any business. However, if you are running a small business, installing a free online.

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Guide Interaction Sheet

S No	Meeting Date	Summary of Work & Discussion	Member Present	Team Lead Remarks	Remarks/Guide Sign
1	13-Aug-2022	Project title selection	Abhay, Aarohi, Aayush, Ankur	All Have contributed in discussion panel & selected a good topic	
2	03-Sep-2022	Synopsis Building and Requirement analysis	Abhay, Aarohi, Aayush	Abhay - Docx Indentation, Formatting & Synopsis preparation	
3	05-Sep-2022	Work distribution + Discussion on ER, State Chart Diagram, DFD diagrams.	Abhay, Aarohi, Ankur	Abhay - Prepared ER Diagram & Clubbed all Diagrams in Synopsis Aarohi - Shared Synopsis Content Aayush - Shared Synopsis Content	
4	07-Sep-2022	Final Synopsis Submission	Abhay, Aarohi, Ankur	Abhay - Prepared ER Diagram & Clubbed all Diagrams in Synopsis Aarohi - Shared ER Diagram Ankur - Shared DFD Diagram	
5	10-Sep-2022	Discussion on Both the Modules - Customer Side Module & Desk Side Module	Abhay, Aarohi, Aayush, Ankur	We presented Hard Copy of Synopsis to Sir. Sir Remarks - References page needs to added be in the synopsis	
6	11-Sep-2022	Started to work on Frontend, Backend , Facial Recognition System, Qr Code Generation	Abhay, Aarohi, Aayush, Ankur	In CSM we discussed on - Customer ticketing portal & Qr Generation In TSM we discussed on - Facial Recognition System & its implementation	
7	13-Sep-2022	1st phase of testing - FrontEnd working [succesful] 2nd phase of testing - Qr code Generation [Successful] 3rd Phase of testing - Backend Development & Integration [Not Done]	Abhay, Aarohi, Aayush, Ankur	Aarohi - Worked on Frontend [Html, Css, JS, Bootstrap] Aayush - Worked on Qr generation system Ankur - Worked on Facial Recognition System Abhay - Worked on Backend [Php, APIs for Authentication] & Coordinated all members work	
8	14-Sep-2022	3rd Phase of testing, again - Backend Development & Integration [Successful]	Abhay, Aayush	Aarohi - Created all Webpages as discussed Aayush - Qr code feature identified [Deployment Sucessful] Ankur - Identified Facial Recognition System[Deployment Remains] Abhay - Backend Development & Integration Completed Backend Deployment Successful	
9	15-Sep-2022	Backend & Qr code Integration Succesfull	Abhay, Aarohi, Aayush, Ankur	Customer Side Module Completed , Ticket Desk Module Remains	
10	17-Sep-2022	Deployment completed on GitHub	Abhay, Aarohi, Aayush, Ankur	Everything Done	
11	21-Sep-2022	Submitted Project Description Details	Abhay	On Classroom	
12	10-Oct-2022	Presented LogBook + Video Model	Abhay, Aarohi, Aayush, Ankur	Sir Directed For Final Presentation [Complete Docs + Running Code]	
13	21-10-22	Submitted Complete Project Along with Documentations	Abhay, Aarohi, Aayush, Ankur	Project Accepted.	

Source Code

GitHubLink ->

https://github.com/GOURBOY/Acro_Minor_Project_1a