Smart Parking Management

Submitted in partial fulfillment of the requirements of the degree of

BACHELOR OF COMPUTER ENGINEERING

By

Janavi Kharat (21202010)

Guide:

Prof.Rahul Ambekar

Department of Computer Engineering

A. P. SHAH INSTITUTE OF TECHNOLOGY, THANE

(2021-2022)

A. P. SHAH INSTITUTE OF TECHNOLOGY

CERTIFICATE

This is to certify that the Mini Project 2B entitled **Smart Parking Management** is a bonafide work of **Janavi Kharat (21202010)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **Bachelor of Engineering** in **Computer Engineering.**

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(Name and Sign)

Guide

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(Name and Sign)

Head of Department

A. P. SHAH INSTITUTE OF TECHNOLOGY

Project Report Approval for SE

This Mini project report entitled **Smart *Parking Management*** by **Janavi Kharat (21202010)** is approved for the degree of ***Bachelor of Engineering*** in ***Computer Engineering***, ***2021-22***.

Examiner Name Signature 1._____

2._____

Date:

Place:

Declaration

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Janavi Kharat (21202010)

Date:

Abstract

Due to the increasing population in urban cities, there is an exponential rise in the number of vehicles which is leading to major problems leading to poor traffic management and congestion. Thus, everyone is facing a hassle for parking space, as there are less options available for parking. Car parking in present day has become a major issue especially in urban areas with lack of proper parking facilities. It is a troublesome work to find a parking space in most metropolitan areas, especially during the rush hours and, it is not yet convenient to build new parking lots due to insufficient available areas.

Our project, Smart Parking System can be a step to improve the parking spot conundrum in cities. Drivers should be able to find a free parking space faster, which reduces congestion and various other negative externalities and at the same time it can be way to earn revenue for the user or any organization that accommodate a parking space.

CONTENTS

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Chapter 1

INTRODUCTION

The number of vehicles in cities has increased dramatically due to rapid economic development. However, the infrastructure for accommodating these vehicles has grown relatively slow. Alleviating the pressure on the urban transport system and solving the 'parking difficulty' problem have thus become hot topics recently. To alleviate the problems, the smart parking system has been developed. With the implementation of the smart parking system, patrons can easily locate and secure a vacant parking space at any car park deemed convenient to them. Vehicle ingress and egress are also made more convenient with the implementation of hassle-free payment mechanism. With vehicle detection sensors aplenty on the market, the choices made may defer due to the different requirements in addition to its pros and cons.

1.1 Description

The idea of Smart Cities is slowly gaining pace with the ever-increasing technologies. We could save our time for the things which are essential rather than searching for parking spots. To solve this problem, we have developed an application which provides an easy way for reservation of parking slots. In this application users and commercial organizations can lend their personal space as a parking spot. User can view various parking areas and check whether parking space is available or not. If the booking space is available, then he can book it for a specific time slot and the rates are filtered accordingly. This system provides some other additional feature for user.

1.2 Problem Formulation

The idea of Smart Cities is slowly gaining pace with the ever-increasing technologies. We could save our time for the things which are essential rather than searching for parking spots. To solve this problem, we have developed an application which provides an easy way for reservation of parking slots. In this application users and commercial organizations can lend their personal space as a parking spot. User can view various parking areas and check whether parking space is available or not. If the booking space is available, then he can book it for a specific time slot and the rates are filtered accordingly. This system provides some other additional feature for user.

Chapter 2

Literature Review

As a part of literature survey, we explored bout some applications of parking system that already exist in the market. The aim is to observe how these applications work and to recognize the areas on which they can be improved

The Smart Parking Management System - With growing, Car parking increases with the number of car users. With the increased use of smartphones and their applications, users prefer mobile phone-based solutions. This paper proposes the Smart Parking Management System (SPMS) that depends on Arduino parts, Android applications, and based on IoT. This gave the client the ability to check available parking spaces and reserve a parking spot. IR sensors are utilized to know if a car park space is allowed. Its area data are transmitted using the WI-FI module to the server and are recovered by the mobile application which offers many options attractively and with no cost to users and lets the user check reservation details. With IoT technology, the smart parking system can be connected wirelessly to easily track available locations

Smart Parking Application - The ever increasing population has led to chaotic city traffic. As a result of the process of searching a parking lot becomes tedious. It is time consuming task leading to discomfort. The fuel consumption is on an increasing side due to such scenarios. The increase in vehicular traffic creates a negative impact on the environment. In the wake of smart city times these issues lead us to the need of a „smart" solution. In order to resolve these issues and satisfy the increasing demand for the parking areas, parking management organizations are trying to implement better and technologically advanced solutions. A cloud based smart parking application will enable real time parking availability monitoring and reservation thereby providing better services to the end users as well as reduce the workload of the parking administrator.

Chapter 3

Problem Statement

In the modern society, there is an ever-increasing number of vehicles. This is leading to problems such as large urban parking lots becoming inefficient, increasing difficulty to find open spaces in busy parking lots, as well as the increasing need to devote larger areas of land for additional parking spaces. One may ask, why are these problems significant?

The three main problems that the increasing number of vehicles and the decreasing efficiency of modern busy parking lots are:

- Valuable time wasted from inconvenient and inefficient parking lots
- More fuel consumed while idling or driving around parking lots, leading to more CO2 emissions being produced
- Potential accidents caused by abundance of moving vehicles in disorganized parking lots

Chapter 4
Objective and Scope

4.1 Objective:

The system provides details of the vacant parking slots in the vicinity and reduces the traffic issues due to illegal parking in the vicinity. It is designed with an objective to meet the requirements of controlled parking that offers effortless parking tactics to the authorities. Because of that there will be no towing issues. And our vehicle has been parked as a secure condition. There is no risk for vehicle owner for parking the car. Maintain records in short time of period. Determines the parking area is full or not. Enhances the visitor's experience

4.2 Scope:

In the modern age. Many people have vehicles. Vehicle is now a basic need. Everyplace is under the process of urbanization. There are many corporate offices and shopping centers etc. There are many recreational places where people used to go for refreshment. So, all these places need a parking space where people can park their vehicles safely and easily. Every parking area needs a system that records the detail of vehicles to give the facility. These systems might be computerized or non-computerized. With the help of computerized system, we can deliver a good service to customer who wants to park their vehicle into the any organization's premises.

This project Smart Parking Management can become a steppingstone to make a city a 'smart city'. This can be developed in future for wider areas so that it can help people on a large scale. In future this application can be implemented on the existing operation systems like ios and windows. And it would be viable to add some extra features like extend the time period of booked slot and should be possible to send message to user before expired time period.

Chapter 5

Experimental Setup

5.1 Hardware Requirements:

1.8GHz CPU with four or more cores
8GB RAM, 256GB of available HDD or SSD storage space.

5.2 Software Requirements:

Frontend: HTML, CSS
Backend: Python
Developing Environment: PyCharm IDE

5.3 Libraries Used:

1. django.core.serializers.json - Django's serialization framework provides a mechanism for "translating" Django models into other formats. Usually these other formats will be text-based and used for sending Django data over a wire, but it's possible for a serializer to handle any format

2. urllib - Urllib package is the URL handling module for python. It is used to fetch URLs (Uniform Resource Locators). It uses the urlopen function and is able to fetch URLs using a variety of different protocols. Urllib is a package that collects several modules for working with URLs, such as: urllib

3. json - JSON is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays. It is a common data format with diverse uses in electronic data interchange, including that of web applications with servers.

4. Smtplib - The smtplib is a Python library for sending emails using the Simple Mail Transfer Protocol (SMTP). The smtplib is a built-in module; we do not need to install it. It abstracts away all the complexities of SMTP

Chapter 6

System Design

6.1 Main Modules

Module 1: Home page
The home page or dashboard is the main page which is connected to the rest of the system. It has the sign up/ sign in page which is necessary to book or lend your space. It has a search button that searches the nearest available parking spot near you. It also shows the recently viewed parking spots

Module 2: Sign up/Sign in
The sign up/ sign in page is a typical sign up and login page where you enter your email id and password and log in to your account. You can also sign up and create a new account

Module 3: Parking Details
The parking details has the details regarding the parking spot. It has the name of the owner, the address of the space, the cost of the space. It also has the option to book the place then and there by entering the date and time in the area provided there.

Module 4: Your Book Space
In this module, we get to get book the parking space. But before booking you need to have an account in the system.

Module 4: Lend Your Space
This module lets you enter your details and the details of your parking spot, so that he or she can then loan their area for parking as per their price.

Module 5: Admin Log
The admin log has all the details of the system. All the parking spots that have been approved by the user or the ones that are rejected. It has all the details of the user and their respective parking spots

6.2 Flow of Modules:

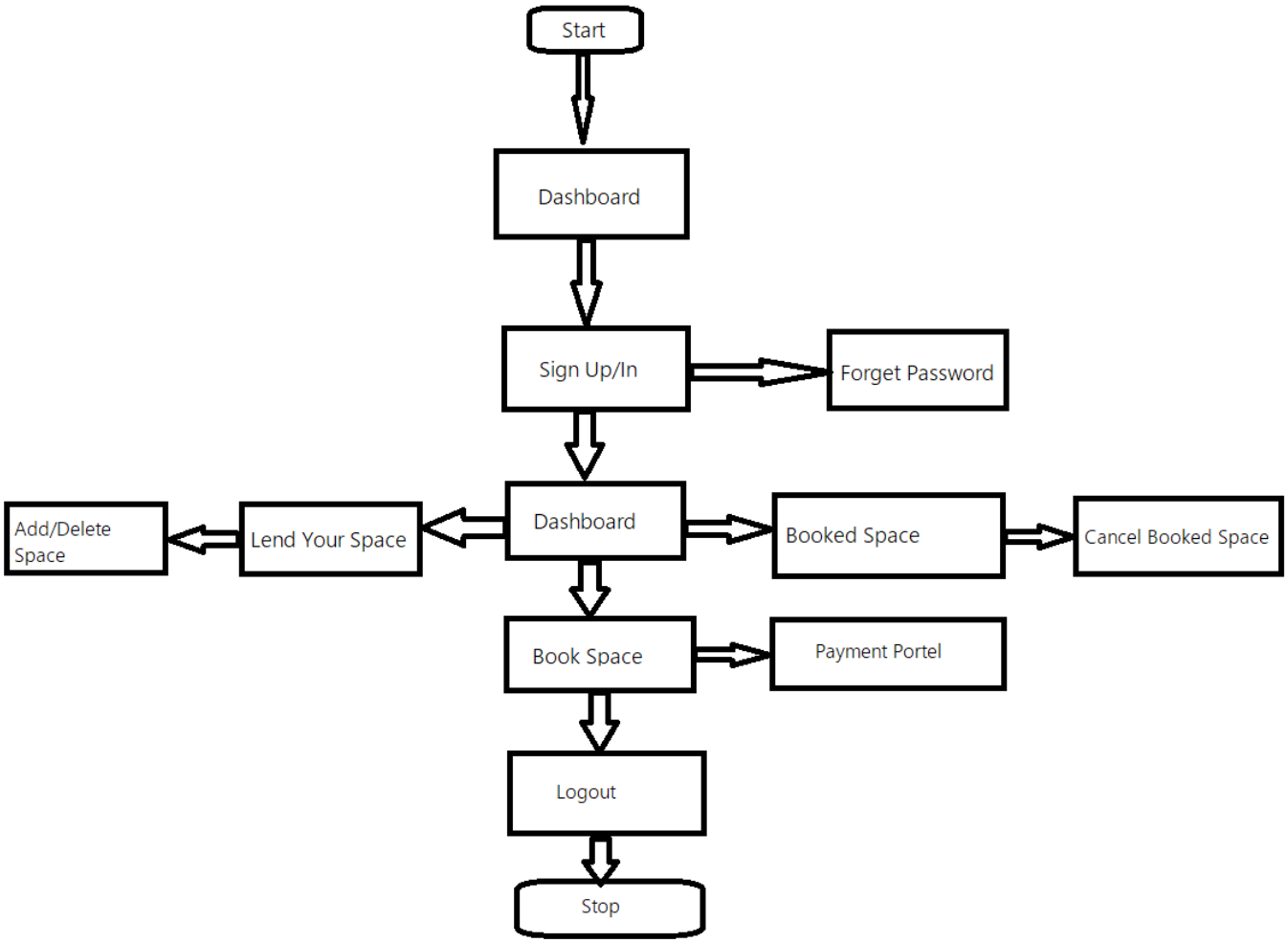

Fig: the flow of modules – Smart Parking Management

Chapter 7

Implementation

7.1 Code

```
from django.core.serializers.json import DjangoJSONEncoder
from django.shortcuts import render, redirect
from .models import Parkingspace,Login,Bookedspc
import urllib
import random
import json
from datetime import date
from django.core import serializers
from django.core.files.storage import FileSystemStorage
from django.http import HttpResponseRedirect,JsonResponse
import smtplib
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
import os
from django import template

current_Logedin_user = ""
loginstatus = 'NotLogedin'
cardclicked = ""
upbtnclicked = 0
delbtnclicked = 0
username = ''
genotp = 0
emailcheck = ''
cardpickedprice = 0
expdate = ""
```

Fig: Code

```
adminlogin = ""
adminloginstatus = ""
cncclicked = 0
def jsonfileupdate():
    dashboardview = Parkingspace.objects.all().filter(status = "Approved")
    parkingdb = serializers.serialize("json", dashboardview)
    with open("C:\\Users\\admin\\Desktop\\ParkItDown\\mysite\\main\\static\\mysite\\dash.json", "w") as f:
        jasoned = json.loads(parkingdb)
        json.dump(jasoned, f)
def dashboard(response):
    global current_Logedin_user,cardclicked,loginstatus
    context = {}
    search_city = ""
    #parkingdb = serializers.serialize("json", Parkingspace.objects.all())
    parkingdb = Parkingspace.objects.all()
    #dashboardjson = json.dumps(parkingdb)
    #print(dashboardjson)
    cardclicked = response.POST.get("dashbtn")
    #current_Logedin_user = 'Aman'
    if response.POST.get("dashbtn"):
        return redirect('/Details')
    jsonfileupdate()
    nameofuser = ""
    user_details = Login.objects.filter(email=str(current_Logedin_user)).first()
    if user_details != None:
        nameofuser = user_details.name
```

Fig: Code

```
        nameofuser = user_details.name
    if response.POST.get("logout"):
        current_Logedin_user = ""
        loginstatus = "NotLogedin"

        with open("C:\\Users\\admin\\Desktop\\ParkItDown\\mysite\\main\\static\\mysite\\dash.json", "w") as f:
            f.truncate()
        return HttpResponseRedirect('sign')
    return render(response, "main/dashboard.html", {'nameofuser':nameofuser,'parkingspc': parkingdb,'search_city': search_city,'loginstatus':loginstatu

def addandmgspace(response):
    global upbtnclicked,current_Logedin_user,loginstatus
    uploaded_img = ''
    uploaded_doc = ''
    print(len(current_Logedin_user))
    if len(current_Logedin_user) > 1:
        dashboardview = Parkingspace.objects.filter(email=str(current_Logedin_user))
        parkingdb = serializers.serialize("json", dashboardview)
        with open("C:\\Users\\admin\\Desktop\\ParkItDown\\mysite\\main\\static\\mysite\\dash.json", "w") as f:
            jasoned = json.loads(parkingdb)
            json.dump(jasoned, f)
    else:
        with open("C:\\Users\\admin\\Desktop\\ParkItDown\\mysite\\main\\static\\mysite\\dash.json", "w") as f:
            f.truncate()
    if response.POST.get("spacesubmit"):
        addspace = Parkingspace()
```

Fig: Code

7.2 Screenshots:

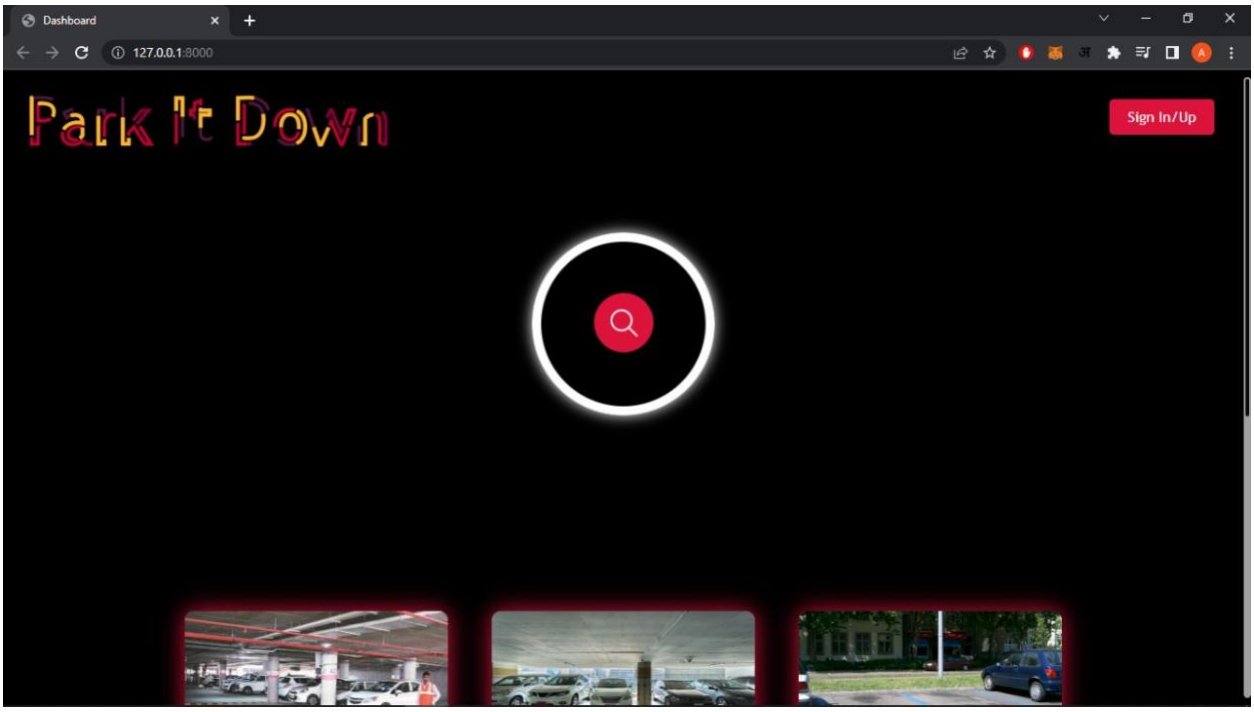

Fig: Dashboard

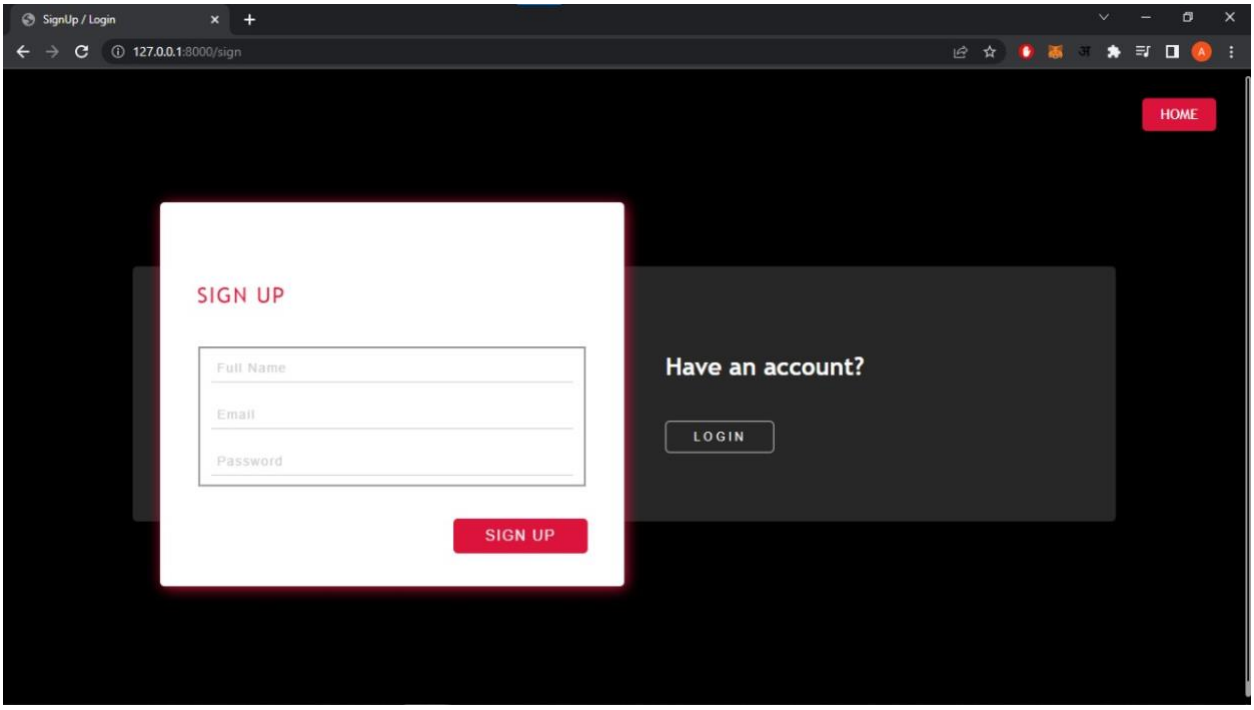

Fig: Sign up

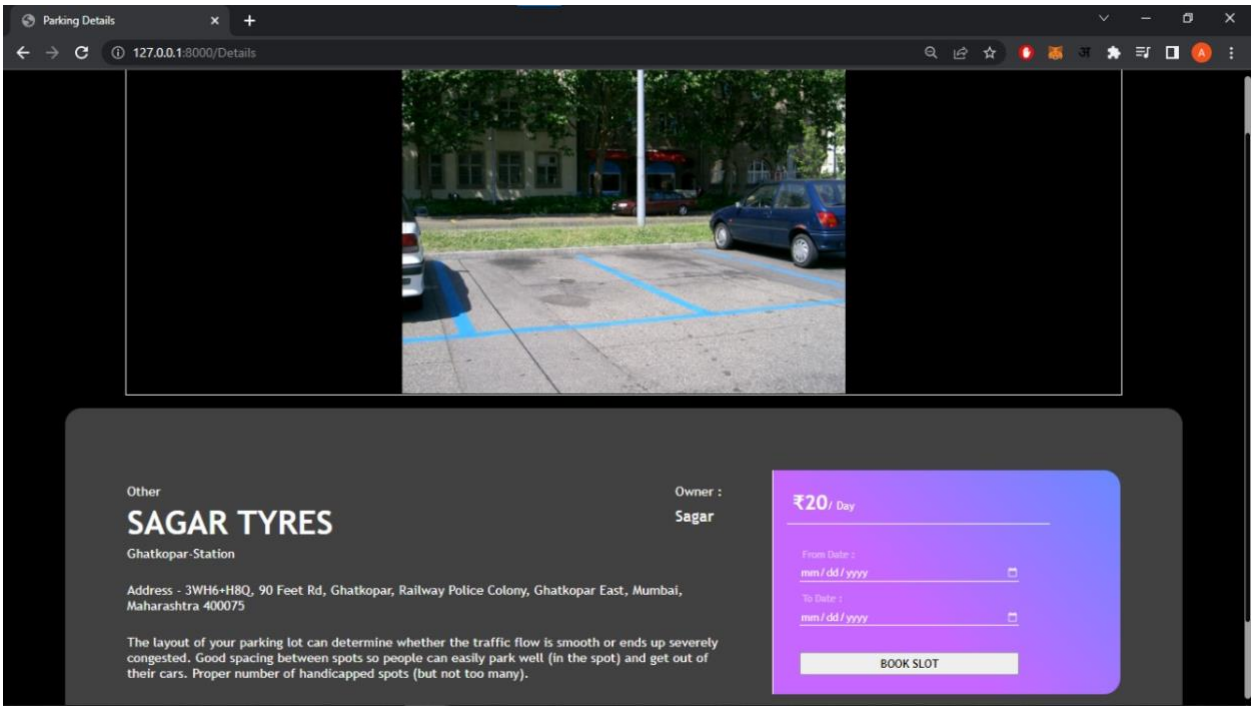

Fig: Parking Details

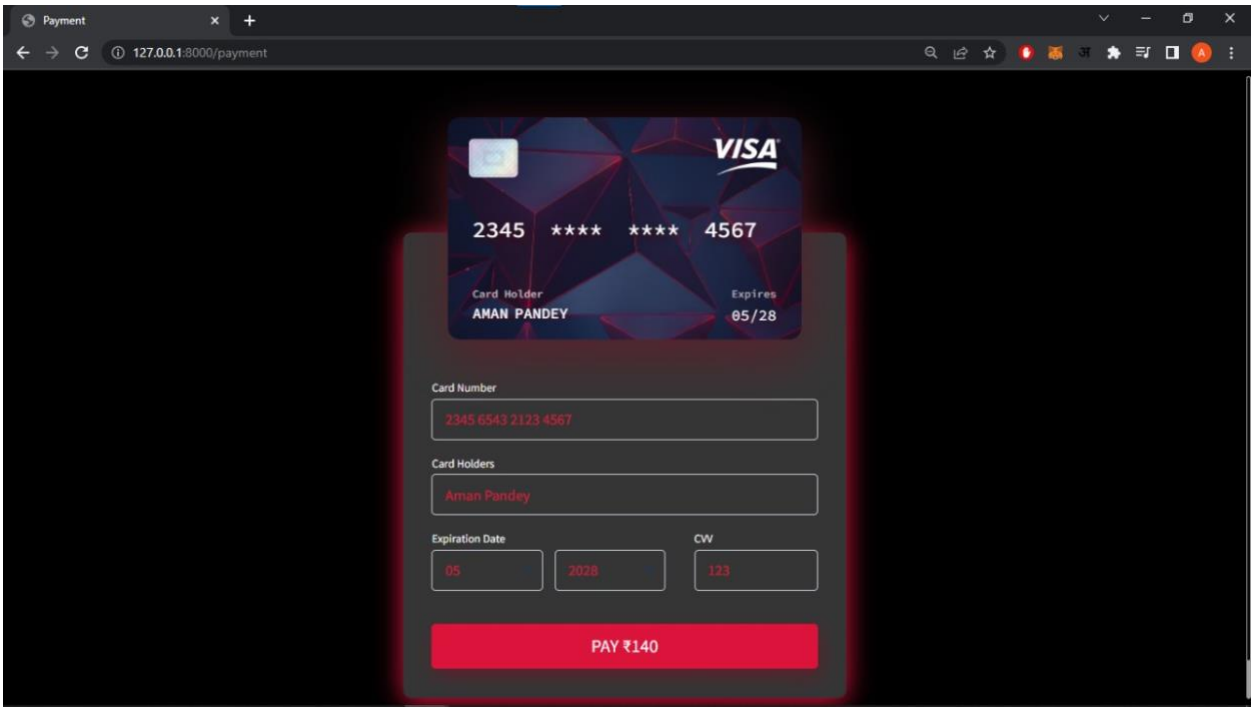

Fig: Payment Page

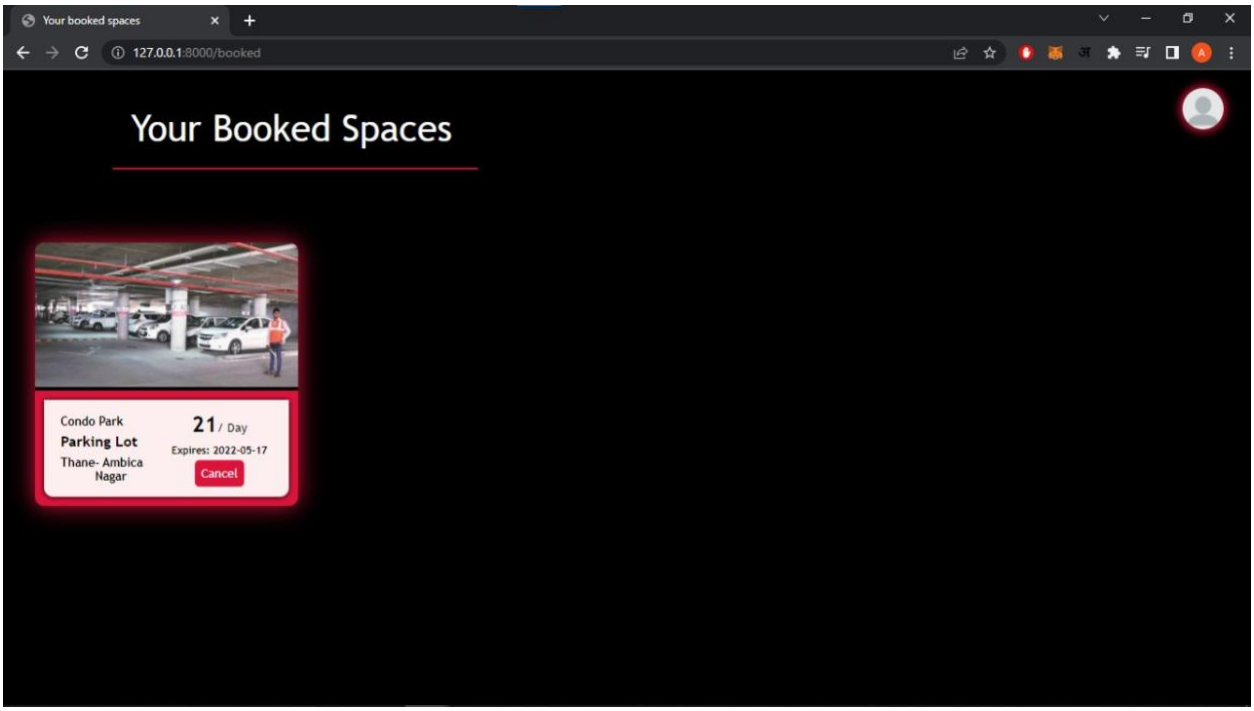

Fig: Booking Slots

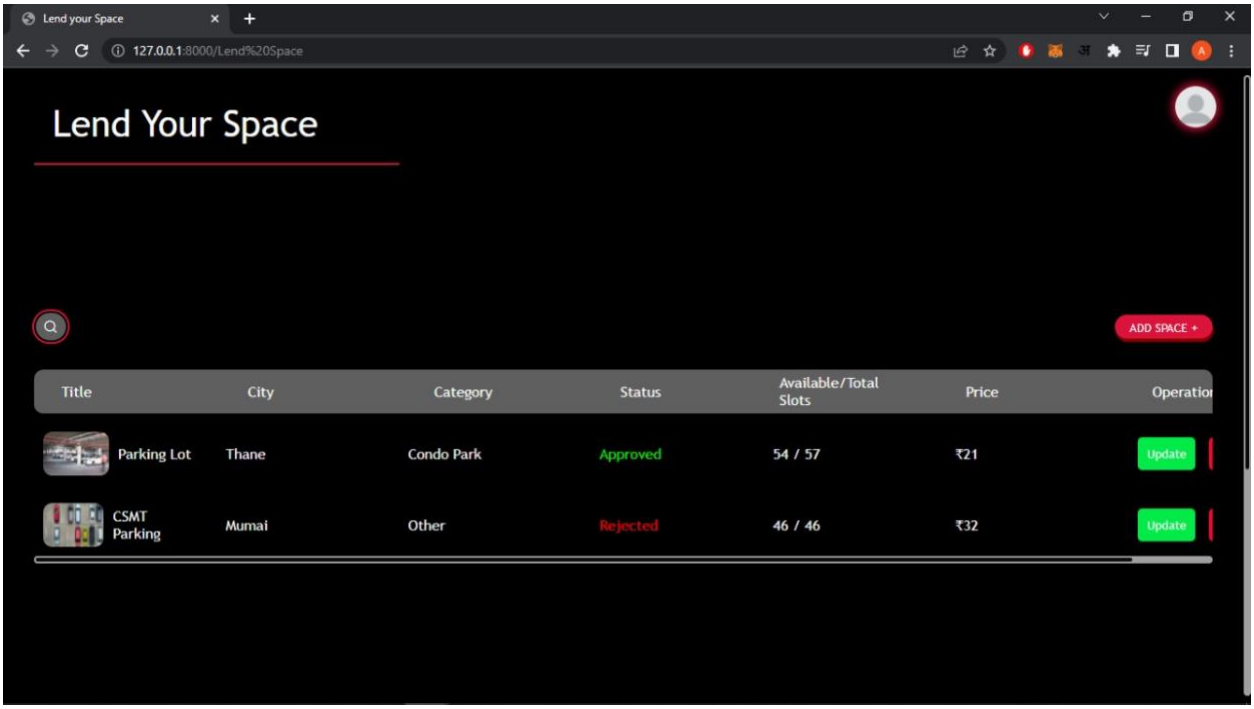

Fig: Your Parking Space

Chapter 8

Result

The Parking management system automates time-consuming processes such as finding vacant spaces near your location by wandering around clueless in the car. Tracking vehicle entries, exit, and processing online payments can be done through this system. The time saved from all these processes results in huge cost savings on labor and wasted working hours for finding a suitable parking spot.

8.2 Test Cases:

A test case is a set of conditions or variables under which a tester will determine whether a system under test satisfies requirements or works correctly. The process of developing test cases can also help find problems in the requirements or design of an application**.**

Test case 1:

TEST CASE ID	TC001
TEST CASE SUMMARY	Click if OTP is sent to the mail for verification
TEST PROCEDURE	1. Type your Email 2. Sent OTP
TEST DATA	Email Id
EXPECTED RESULT	OTP should be sent on the given email
ACTUAL RESULT	OTP should be sent on the given email
STATUS	Pass

Test case 2:

TEST CASE ID	TC002
TEST CASE SUMMARY	Check if system sends alert for expiration of parking spot through mail
TEST PROCEDURE	1. Automation of date through database
TEST DATA	Date and email field from database
EXPECTED RESULT	System should send an email to the user reminding of expiration of his/her parking spot
ACTUAL RESULT	System should send an email to the user reminding of expiration of his/her parking spot
STATUS	Pass

Chapter 9

Conclusion

The services provided by smart parking have become the essence of building smart cities. This system focuses on implementing an integrated solution for smart parking. The proposed system has several advantages, including finding parking spots and providing you with a reasonable price for these spots. An attractive and effective application was designed for the common people. The application comes with a mail alert that will notify when the expiration of your parking spot is imminent. The system benefits from avoiding wasting time and reducing pollution and fuel consumption. Users can book a car park for more than 24 hours as well which makes it a convenient option for those people who go out for holidays but do not want to leave their automobiles behind.

References

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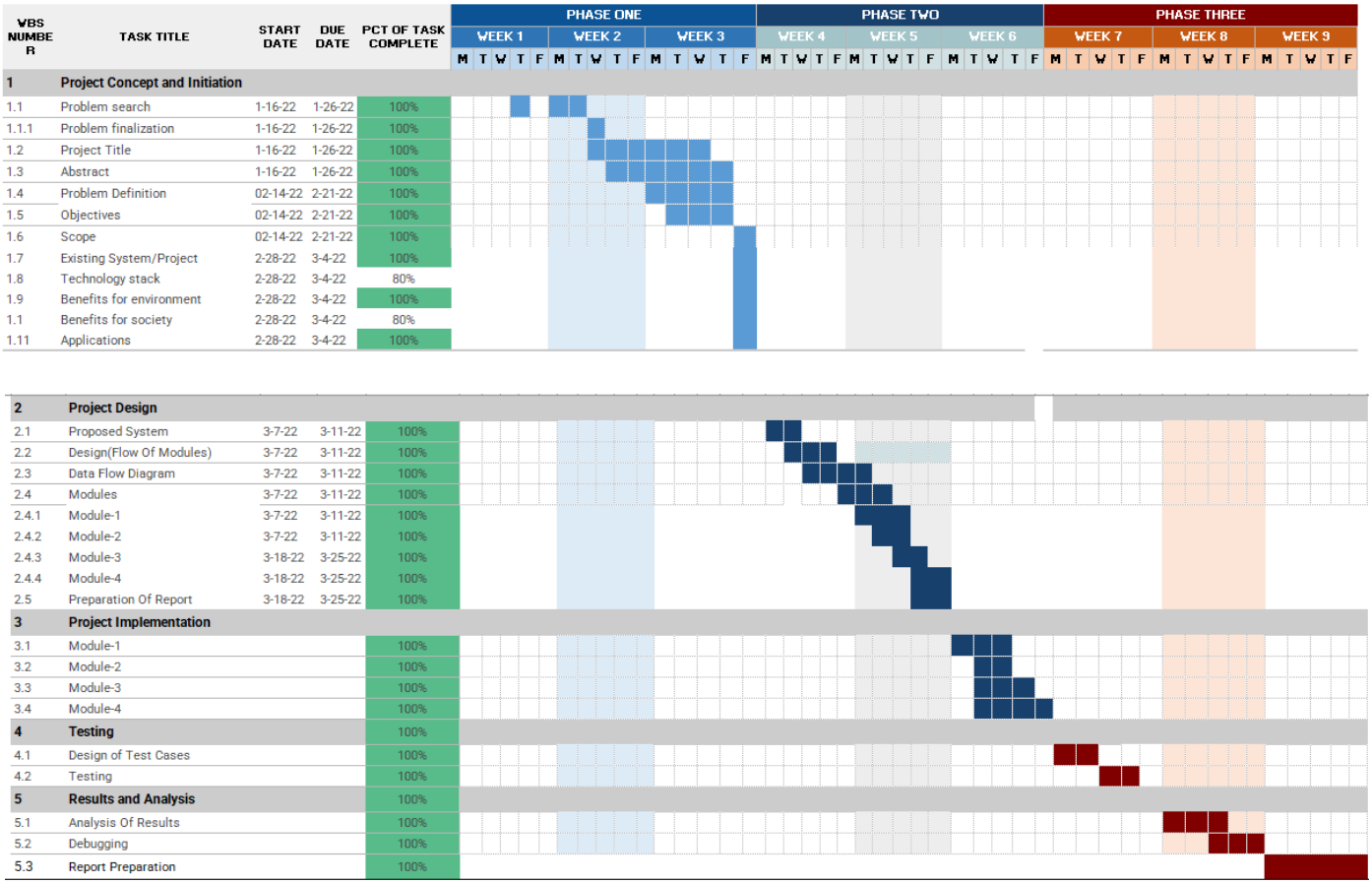
[5]. https://www.djangoproject.com/

[6]. N.H.H.M. Hanif, M.H. Badiozaman and H. Daud, "Smart parking reservation system using short message services (SMS)", in 2010 International Conference on Intelligent and Advanced Systems (ICIAS), June 2010.

Annexure I: Project Planning using Gantt Chart



WBS NUMBER	TASK TITLE	START DATE	DUE DATE	PCT OF TASK COMPLETE
1	**Project Concept and Initiation**			
1.1	Problem search	1-16-22	1-26-22	100%
1.1.1	Problem finalization	1-16-22	1-26-22	100%
1.2	Project Title	1-16-22	1-26-22	100%
1.3	Abstract	1-16-22	1-26-22	100%
1.4	Problem Definition	02-14-22	2-21-22	100%
1.5	Objectives	02-14-22	2-21-22	100%
1.6	Scope	02-14-22	2-21-22	100%
1.7	Existing System/Project	2-28-22	3-4-22	100%
1.8	Technology stack	2-28-22	3-4-22	80%
1.9	Benefits for environment	2-28-22	3-4-22	100%
1.1	Benefits for society	2-28-22	3-4-22	80%
1.11	Applications	2-28-22	3-4-22	100%
2	**Project Design**			
2.1	Proposed System	3-7-22	3-11-22	100%
2.2	Design(Flow Of Modules)	3-7-22	3-11-22	100%
2.3	Data Flow Diagram	3-7-22	3-11-22	100%
2.4	Modules	3-7-22	3-11-22	100%
2.4.1	Module-1	3-7-22	3-11-22	100%
2.4.2	Module-2	3-7-22	3-11-22	100%
2.4.3	Module-3	3-18-22	3-25-22	100%
2.4.4	Module-4	3-18-22	3-25-22	100%
2.5	Preparation Of Report	3-18-22	3-25-22	100%
3	**Project Implementation**			
3.1	Module-1			100%
3.2	Module-2			100%
3.3	Module-3			100%
3.4	Module-4			100%
4	**Testing**			100%
4.1	Design of Test Cases			100%
4.2	Testing			100%
5	**Results and Analysis**			100%
5.1	Analysis Of Results			100%
5.2	Debugging			100%
5.3	Report Preparation			100%