VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI – 590018, Karnataka

INTERNSHIP REPORT

ON

"AUTOMATED PARKING SYSTEM USING ML"

Submitted in partial fulfilment for the award of degree(18CSI85)

BACHELOR OF ENGINEERING IN COMPUTER SCIENCE

Submitted by:

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4VM20CS042

Conducted at
COMPSOFT TECHNOLOGIES

VIDYA VIKAS INSTITUTE OF ENGINEERING AND TECHNOLOGY

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CERTIFICATE

This is to certify that the Internship titled **"Automated Parking System using ML"** carried out by **Mrs NISARGA V GOWDA,** a bonafide student of VidyaVikas Institute of Engineering and Technology, in partial fulfillment for the award of **Bachelor of Engineering**, in **Computer Science** under Visvesvaraya Technological University,Belagavi, during the year 2022-2023. It is certified that all corrections/suggestions indicated have been incorporated in the report.

The project report has been approved as it satisfies the academic requirements in respect

of Internship prescribed for the course Internship / Professional Practice (18CSI85)

Signature of Guide   **Signature of HOD**   **Signature of Principal**

External Viva:

Name of the Examiner   Signature with Date

1)_____

_____

2)_____

_____

D E C L A R A T I O N

I **NISARGA V GOWDA**, final year student of Computer Science, Vidya Vikas Institute of Engineering and Technology - 570028, declare that the Internship has been successfully completed, in **COMPSOFT TECHNOLOGIES**. This report is submitted in partial fulfillment of the requirements for award of Bachelor Degree in Computer Science, during the academic year 2022-2023.

Date :21/09/2023   :

Place : Mysuru

USN : 4VM20CS042

NAME : NISARGA V GOWDA

OFFER LETTER

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INTERNSHIP OFFER LETTER

Date: 11th August, 2023

Name: **Nisarga Gowda**
USN: **4VM20CS042**
Placement ID: **TIE0408ML141**

Dear Student,

We would like to congratulate you on being selected for the **Machine Learning with Python (Research Based)** Internship position with **Compsoft Technologies**, effective Start Date **11th August, 2023**, All of us are excited about this opportunity provided to you!

This internship is viewed as being an educational opportunity for you, rather than a part-time job. As such, your internship will include training/orientation and focus primarily on learning and developing new skills and gaining a deeper understanding of concepts of **Machine Learning with Python (Research Based)** through hands-on application of the knowledge you learn while you train with the senior developers. You will be bound to follow the rules and regulations of the company during your internship duration.

Again, congratulations and we look forward to working with you!.

Sincerely,

Nithin K. S
Project Manager
COMPSOFT TECHNOLOGIES
No. 363, 19th main road,
1st Block Rajajinagar
Bangalore - 560010

A C K N O W L E D G E M E N T

This Internship is a result of accumulated guidance, direction and support of several important persons. We take this opportunity to express our gratitude to all who have helped us to complete the Internship.

We express our sincere thanks to our Principal, for providing usadequate facilities to undertake this Internship.

We would like to thank our Head of Dept of CSE, for providing us an opportunity to carry out Internship and for his valuable guidance and support.

We would like to thank our guide, Compsoft Technologies for guiding us during the period of internship.

We express our deep and profound gratitude to our guide, Guide name, Assistant/Associate Prof, for her keen interest and encouragement at every step in completing the Internship.

We would like to thank all the faculty members of our department for the support extended during the course of Internship.

We would like to thank the non-teaching members of our dept, for helping us during the Internship.

Last but not the least, we would like to thank our parents and friends without whose constant help, the completion of Internship would have not been possible.

NISARGA V GOWDA
4VM20CS034

ABSTRACT

Urbanization and population growth have exacerbated the challenges of parking in cities worldwide. Traditional parking systems struggle to accommodate the increasing number of vehicles efficiently, leading to congestion, pollution, and frustration among urban dwellers. In response to these challenges, Automated Parking Systems (APS) have emerged as a promising solution to revolutionize urban mobility.

This abstract provides an overview of the key components and benefits of APS. The system combines cutting-edge technologies, including artificial intelligence, sensor networks, and robotics, to create a seamless parking experience for both vehicle owners and urban planners. AVPS offers numerous advantages, including reduced traffic congestion, lower carbon emissions, improved land utilization, and enhanced user convenience.

This abstract also explores the underlying principles of APS, such as vehicle detection, autonomous navigation, and centralized control systems. Additionally, it highlights the potential challenges and concerns, such as cybersecurity and the need for infrastructure upgrades, that must be addressed to fully realize the potential of APS.

As cities strive to become smarter and more sustainable, APS represents a pivotal step forward in reimagining urban transportation. This abstract aims to shed light on the transformative power of APS and its potential to reshape the future of urban mobility.

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CHAPTER 1

COMPANY PROFILE

1. <u>COMPANY PROFILE</u>

A Brief History of Company

Company, was incorporated with a goal "To provide high quality and optimal Technological Solutions to business requirements of our clients". Every business is a different and has a unique business model and so are the technological requirements. They understand this and hence the solutions provided to these requirements are different as well. They focus on clients requirements and provide them with tailor made technological solutions.They also understand that Reach of their Product to its targeted market or the automation of the existing process into e-client and simple process are the key features that our clients desire from Technological Solution they are looking for and these are the features that we focus on while designing the solutions for their clients.

Company is a Technology Organization providing solutions for all web design and development, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Compsoft Technologies. specialize in ERP, Connectivity, SEO Services, Conference Management, effective webpromotion and tailor-made software products, designing solutions best suiting clients requirements.

we strive to be the front runner in creativity and innovation in software development through their well-researched expertise and establish it as an out of the box software development company in Bangalore, India. As a software development company, they translate this software development expertise into value for their customers through their professional solutions.

They understand that the best desired output can be achieved only by understanding the clients demand better. At our Company we work with them clients and help them to defiine their exact solution requirement. Sometimes even they wonder that they have completely redefined their solution or new application requirement during the brainstorming session, and here they position themselves as an IT solutions consulting group comprising of high caliber consultants.

They believe that Technology when used properly can help any business to scale and achieve new heights of success. It helps Improve its efficiency, profitability, reliability; to put itin one sentence " Technology helps you to Delight your Customers" and that is what we wantto achieve.

CHAPTER 2

ABOUT THE COMPANY

2. <u>**ABOUT THE COMPANY**</u>

We are a Technology Organization providing solutions for all web design and development, Researching and Publishing Papers to ensure the quality of most used ML Models, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Compsoft Technologies specialize in ERP, Connectivity, SEO Services, Conference Management, effective web promotion and tailor-made software products, designing solutions best suiting clients requirements. The organization where they have a right mix of professionals as a stakeholders to help us serve our clients with best of our capability and with at par industry standards.They have young, enthusiastic, passionate and creative Professionals to develop technological innovations in the field of Mobile technologies, Web applications as well as Business and Enterprise solution. Motto of our organization is to "Collaborate with our clients to provide them with best Technological solution hence creating Good Present and Better Future for our client which will bring a cascading a positive effect in their business shape as well". Providing a Complete suite of technical solutions is not just our tag line, it is Our Vision for Our Clients and for Us, We strive hard to achieve it.

Services provided by Compsoft Technologies.

• Core Java and Advanced Java

• Research and Development/Improvise of ML Models

• Web services and development

• Dot Net Framework

• Python

• Selenium Testing

• Conference / Event Management Service

• Academic Project Guidance

• On The Job Training

• Software Training

CHAPTER 3

INTRODUCTION

3. <u>INTRODUCTION</u>

Introduction to ML

In an era defined by an abundance of data and rapid technological advancements, Machine Learning (ML) has emerged as a groundbreaking field at the intersection of computer science and artificial intelligence. ML represents a transformative approach to solving complex problems and making data-driven decisions by enabling computers to learn from data patterns and improve their performance without explicit programming. This introduction provides a fundamental overview of Machine Learning and its significance in today's world. In the age of data-driven decision-making and automation, Machine Learning has emerged as a pivotal technology that has the potential to transform industries and redefine our relationship with technology. Machine Learning is a subfield of Artificial Intelligence (AI) that focuses on the development of algorithms and models that enable computers to learn and make predictions or decisions from data, without being explicitly programmed.

Machine Learning algorithms allow computers to discover patterns, extract insights, and make informed decisions autonomously based on the data they are provided. This capability has opened up a world of possibilities across various domains, from healthcare and finance to transportation and entertainment. It has the potential to revolutionize fields such as natural language processing, computer vision, recommendation systems, and even autonomous vehicles.

Problem Statement

As urbanization continues to grow at an unprecedented rate, the demand for efficient and space-saving parking solutions in metropolitan areas has reached critical levels. Traditional parking infrastructure is struggling to keep pace with the increasing number of vehicles on the road. Inefficient parking systems lead to congestion, wasted time, and environmental concerns. To address these issues, an Automated Parking System (APS) has been proposed as a potential solution. However, the implementation and adoption of APS come with several challenges.

The problem is the effective implementation and widespread adoption of an Automated Parking System in urban areas to alleviate parking-related challenges. The objective of this project is to develop a comprehensive understanding of the challenges associated with the implementation and adoption of Automated Parking Systems in urban areas. Through research, analysis, and innovative solutions, this project aims to pave the way for the successful deployment of APS that can revolutionize urban mobility, reduce congestion, enhance user experiences, and contribute to a more sustainable and efficient urban environment.

CHAPTER 4

SYSTEM ANALYSIS

4. <u>SYSTEM ANALYSIS</u>

1. Existing System

The existing system is the current state of affairs or processes in place before any changes or improvements are made. In the context of an Automated Parking System (APS), the existing system may include traditional parking infrastructure, such as open parking lots, parking garages, or on-street parking.

2. Proposed System

The proposed system, on the other hand, represents the envisioned or planned changes and improvements to the existing system. In the case of an APS, the proposed system would involve the introduction and implementation of automated technology, including robotics, sensors, and software, to streamline the parking process.

3. Objective of the System

The objective of implementing an APS is multifaceted and can be summarized as follows:

Efficiency: The primary goal of the proposed APS is to significantly improve the efficiency of the parking process. This includes reducing the time it takes for users to park and retrieve their vehicles, minimizing congestion in parking areas, and optimizing space utilization.

Space Saving: Another key objective is to make more efficient use of available space. APS aims to reduce the footprint required for parking, potentially freeing up valuable urban land for other purposes, such as green spaces or real estate development.

User Convenience: The proposed system seeks to enhance the overall user experience. It aims to provide a convenient and hassle-free parking experience for vehicle owners, eliminating the need to search for parking spaces or navigate through crowded parking structures.

Safety and Security: Ensuring the safety and security of both vehicles and users is a critical objective. APS should minimize the risk of accidents, damage to vehicles, and theft while providing a secure environment for users.

Environmental Impact: The system also aims to have a positive environmental impact by reducing emissions associated with circling vehicles in search of parking spots. This aligns with broader sustainability goals.

Economic Viability: Evaluating the economic feasibility of the APS is another objective. It involves assessing the initial implementation costs, maintenance expenses, and the potential return on investment (ROI) for stakeholders, including parking facility operators and local governments.

Scalability and Adaptability: The APS should be designed with scalability and adaptability in mind. It should be capable of accommodating varying needs in different urban areas, from small towns to densely populated cities.

Regulatory Compliance: Ensuring compliance with local, national, and international regulations, safety standards, and liability frameworks is a critical objective. This includes addressing legal and regulatory challenges associated with automated parking systems.

User Acceptance: Overcoming user skepticism and ensuring user acceptance is essential. The system should be designed to be user-friendly and provide clear benefits to users.

Integration: Seamlessly integrating APS with the existing urban infrastructure and transportation systems is a key objective to minimize disruptions and maximize efficiency.

Accessibility: Ensuring that the APS is accessible to individuals with disabilities and complies with accessibility regulations is a matter of inclusivity and social responsibility.

In summary, the objective of implementing an Automated Parking System is to revolutionize the parking experience by improving efficiency, space utilization, user convenience, and safety while addressing environmental, economic, regulatory, and accessibility considerations. The proposed system aims to overcome the limitations of the existing parking infrastructure and create a more sustainable and user-friendly urban environment.

CHAPTER 5

REQUIREMENT ANALYSIS

5. <u>REQUIREMENT ANALYSIS</u>

Hardware Requirement Specification

Designing an Automated Parking System (APS) integrated with Machine Learning (ML) involves a combination of hardware components to facilitate the ML algorithms' operation. The following are hardware requirements for an ML-driven APS:

1.Sensors and Cameras:

- **Camera Systems**: High-resolution cameras with wide-angle lenses and low-light capabilities for vehicle detection, recognition, and surveillance.
- **LIDAR Sensors**: 3D LIDAR sensors can provide precise distance and depth information for object detection and obstacle avoidance.

2.Data Processing Unit:

- **GPU (Graphics Processing Unit)**: High-performance GPUs are crucial for accelerating ML model training and real-time inference. NVIDIA GPUs are commonly used for ML applications.
- **CPU (Central Processing Unit)**: A powerful CPU is required for handling system management, communication, and non-ML tasks.

3.Memory:

- **RAM (Random Access Memory)**: Ample RAM is necessary for loading and running large ML models and datasets efficiently.

4.Storage:

- **Solid-State Drive (SSD)**: Fast SSD storage is essential for storing large datasets, model checkpoints, and log files.
- **Hard Disk Drive (HDD)**: Additional HDD storage may be required for long-term data storage and backup.

5.Communication Hardware

- **Ethernet/Wi-Fi**: Reliable network connectivity for data exchange between APS components and external servers or cloud platforms.
- **Bluetooth/RFID**: Short-range communication for vehicle identification and access control.

6.Microcontrollers and Embedded Systems:

- **Microcontrollers (e.g., Raspberry Pi)**: Embedded systems can be used for edge computing, data preprocessing, and interfacing with sensors and cameras.
- **Microcontrollers**. These can be used for managing access control, gates etc.

7.Power Supply:

- **Uninterruptible Power Supply (UPS)**: To ensure system reliability and prevent data loss during power outages.

8.Vehicle Guidance Hardware:

- **Mechanical Lifts or Conveyor Systems**: To transport vehicles to and from parking spaces within the APS.
- **Autonomous Vehicle Guidance System**: Robotic actuators and sensors for precise parking maneuvers in self-parking systems.

9.User Interfaces:
- **Kiosks or Touchscreen Displays**: To provide users with information, ticketing, and payment options.
- **LED Displays**: For displaying real-time parking availability and navigation instructions.

10.Security Hardware:
- **Surveillance Cameras**: Additional cameras for monitoring security and safety within the parking area.
- **Access Control Systems**: Biometric or card-based access control devices for secure entry and exit.

11.Environmental Sensors:
- **Temperature and Humidity Sensors**: To monitor environmental conditions within the parking facility.

12.Backup and Redundancy Hardware:
- **Redundant Servers and Power Supplies:** To ensure system availability and data integrity in case of hardware failures.

13.Maintenance and Service Equipment:
- **Tools and Equipment**: Necessary for routine maintenance, repair, and calibration of sensors and hardware components.

14.Emergency Systems:
- **Fire Suppression Systems**: To mitigate fire hazards within the parking facility.
- **Emergency Stop Buttons**: For immediate system shutdown in critical situations.

15.Physical Infrastructure:
- **Parking Bays, Racks, and Structures**: Depending on the APS design, robust infrastructure to accommodate vehicles and support automated systems.

16.Environmental Considerations:
- **Cooling Systems**: To prevent overheating of high-performance hardware components.
- **Dust and Particle Filters**: For maintaining cleanliness and functionality of sensitive equipment.

Software Requirement Specification

Designing an Automated Parking System (APS) integrated with Machine Learning (ML) involves a combination of software components to facilitate the operation of ML algorithms, manage data, and ensure the system's functionality. Here are the software requirements for an ML-driven APS:

1.Operating System:
- **Linux or Unix-based OS**: A stable and secure operating system is preferred for hosting ML models and applications. Popular choices include Ubuntu, CentOS, or Red Hat Enterprise Linux.

2.Machine Learning Frameworks and Libraries:
- **TensorFlow**: A versatile ML framework developed by Google, commonly used for training and deploying deep learning models.
- **PyTorch**: Another popular deep learning framework that offers flexibility and ease of use.

- **Scikit-Learn:** A library for traditional machine learning algorithms and data preprocessing.
- **OpenCV**: For computer vision tasks, such as image and video processing.
- **Keras**: High-level API that can work with TensorFlow or other backend libraries.

3.Data Management and Databases:
- **Database Management System (DBMS)**: To store and manage user and transaction data.
- **PostgreSQL, MySQL, MongoDB, or Cassandra**: Depending on the specific data requirements.
- **Apache Kafka or RabbitMQ**: For real-time data streaming and event processing.
- **Data Warehousing Solutions**: For storing and analyzing historical data for predictive analytics.

4.Development and Programming Languages:
- **Python**: Widely used for ML development and data analysis.
- **Java or C**++: For low-level programming, interfacing with hardware components, and developing embedded systems.

5.Web and Application Development:
- **Web Server**: Apache, Nginx, or similar for hosting user interfaces and web-based applications.
- **Front-end Frameworks**: HTML5, CSS, JavaScript, and popular front-end libraries and frameworks like React, Angular, or Vue.js.
- **Back-end Frameworks**: Django, Flask, or Express.js for building server-side applications.
- **Mobile App Development**: If providing a mobile app for users, iOS (Swift) and Android (Java/Kotlin) development platforms.

6.Cloud Services:
- **Cloud Computing Platforms**: AWS, Azure, Google Cloud, or similar platforms for scalable and flexible infrastructure.
- **Serverless Computing**: For event-driven functions and services.

7.Data Analytics and Visualization:
- **Data Analytics Tools**: Jupyter Notebook, RStudio, or similar tools for data exploration and model development.
- **Data Visualization**: Libraries like Matplotlib, Seaborn, Plotly, or Tableau for creating visualizations.

8.Security and Authentication:
- **Authentication and Authorization**: Implementing secure user access control using OAuth, JWT, or other authentication protocols.
- **Encryption**: SSL/TLS for securing data in transit and encryption at rest.

9.Monitoring and Logging:
- **Monitoring Tools**: Prometheus, Grafana, ELK Stack (Elasticsearch, Logstash, Kibana) for system health monitoring and log analysis.

10. Deployment and Containerization:
- **Docker**: Containerization for easy deployment and scaling of APS components.
- **Kubernetes**: Orchestration for managing containers and scaling resources.

11. Development Environment:
- **Integrated Development Environments (IDEs)**: Such as PyCharm, Visual Studio Code, or Jupyter for ML model development.

12. Version Control:
- **Git**: For source code version control and collaboration.

13. Documentation and Collaboration:
- **Documentation Tools**: Sphinx, Doxygen, or other documentation generators.

Collaboration Tools: Slack, Microsoft Teams, or similar for team communication and collaboration.

14. Backup and Recovery:
- **Backup and Disaster Recovery Solutions**: Regular backups and recovery plans for data and system configurations.

15. Compliance and Regulatory Software:
- **Compliance Monitoring**: Software tools to ensure adherence to regulatory requirements, especially in parking and transportation industries.

16. Testing and Quality Assurance:
- **Testing Frameworks**: PyTest, Selenium, or JUnit for automated testing of software components.
- **Continuous Integration and Continuous Deployment (CI/CD)**: Jenkins, Travis CI, or GitLab CI/CD for automated testing and deployment pipelines.

17. Machine Learning Model Deployment:
- **Model Deployment Frameworks**: Tools like TensorFlow Serving, TensorFlow Lite, or ONNX for deploying ML models in production environments.

18. User Interfaces and User Experience (UI/UX):
- **UI Design Tools**: Adobe XD, Sketch, Figma, or similar tools for designing user interfaces.
- **UI/UX Testing**: User testing and feedback collection tools to improve user experience.

19. Compliance and Security Auditing Tools:
- **Security Scanning and Auditing**: Tools to identify vulnerabilities and ensure security compliance.

20. Regulatory Compliance Software:
- **Parking and Transportation Regulations**: Software tools to monitor and ensure compliance with local parking and transportation regulations.

CHAPTER 6

DESIGN ANALYSIS

6. <u>DESIGN & ANALYSIS</u>

Design and analysis are fundamental phases in the development of complex systems, including an Automated Parking System (APS) with Machine Learning (ML) integration. These phases are critical for ensuring that the system meets its objectives efficiently and reliably.

Design Phase:

The design phase involves creating a blueprint for the AVPS, encompassing both its hardware and software components. It's a systematic process that lays the foundation for building a robust and efficient system. Here are key aspects of the design phase:

1.System Architecture Design:

Define the overall architecture of the AVPS, including the hardware infrastructure, communication protocols, and software components.

2.Hardware Design:

Specify the hardware components required, such as sensors, cameras, GPUs, microcontrollers, and networking equipment.

Design the physical layout of the parking area, including parking bays, lifts, and conveyors.

3.Software Design:

Outline the software components, including ML models, database management, user interfaces, and communication modules.

Define the flow of data and control between different software components.

4.User Interface (UI/UX) Design:

Create wireframes and mockups of user interfaces for mobile apps, kiosks, and web interfaces.

Ensure a user-friendly and intuitive design to enhance the user experience.

5.ML Model Design:

Define the ML models and algorithms used for tasks such as vehicle detection, recognition, space allocation, predictive analytics, and anomaly detection.

Specify the training datasets and data preprocessing steps.

6.Security Design:

Implement security measures, including authentication and authorization mechanisms, encryption, and access control.

Address security considerations for both hardware and software components.

7.Scalability and Redundancy Design:

Plan for scalability by designing the system to handle increased loads and data volumes.

Implement redundancy and failover mechanisms to ensure high availability.

8.Regulatory Compliance Design:

Ensure that the system design complies with local, national, and international regulations related to parking, safety, and data privacy.

Analysis Phase:

The analysis phase focuses on evaluating the design and ensuring that it aligns with the system's objectives, requirements, and constraints. Here's an overview of key analyses in this phase:

1.Feasibility Analysis:
Assess the technical and economic feasibility of the APS project. Consider factors such as budget, resources, and technology readiness.

2.Risk Analysis:
Identify potential risks associated with the APS implementation and operation. Develop risk mitigation strategies.

3.Performance Analysis:
Conduct performance testing and analysis to ensure that the system meets response time, throughput, and scalability requirements.

4.Security Analysis:
Perform security assessments, including vulnerability scanning and penetration testing, to identify and address security weaknesses.

5.Usability Analysis:
Conduct usability testing with potential users to evaluate the effectiveness and user-friendliness of the UI/UX design.

6.Regulatory Compliance Analysis:
Review the design to ensure that it complies with all relevant regulations and standards, including those related to data privacy, accessibility, and parking regulations.

7.ML Model Evaluation:
Assess the performance of ML models through validation and testing on representative datasets. Analyze the accuracy, precision, recall, and F1-score of the ML models.

8.Scalability Analysis:
Evaluate the system's ability to scale up to accommodate increased traffic and data volume.

9.Reliability and Redundancy Analysis:
Test the reliability of redundancy mechanisms and failover procedures.
Analyze the system's uptime and availability.

10.Cost-Benefit Analysis:
Conduct a cost-benefit analysis to evaluate the return on investment (ROI) of the APS project.

CHAPTER 7

IMPLEMENTATION

7. <u>IMPLEMENTATION</u>

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage in achieving a new successful system and in giving confidence on the new system for the users that it will work efficiently and effectively.

The system can be implemented only after thorough testing is done and if it is found to work according to the specification. It involves careful planning, investigation of the current system and it constraints on implementation, design of methods to achieve the change over and an evaluation of change over methods a part from planning.

Two major tasks of preparing the implementation are education and training of the users and testing of the system. The more complex the system being implemented, the more involved will be the system analysis and design effort required just for implementation.

The implementation phase comprises of several activities. The required hardware and software acquisition is carried out. The system may require some software to be developed. For this, programs are written and tested. The user then changes over to his new fully tested system and the old system is discontinued.

TESTING

The testing phase is an important part of software development. It is the Information zed system will help in automate process of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied. Software testing is carried out in three steps:

1. The first includes unit testing, where in each module is tested to provide its correctness, validity and also determine any missing operations and to verify whether the objectives have been met. Errors are noted down and corrected immediately.

2. Unit testing is the important and major part of the project. So errors are rectified easily in particular module and program clarity is increased. In this project entire system is divided into several modules and is developed individually. So unit testing is conducted to individual modules.

3. The second step includes Integration testing. It need not be the case, the software whose modules when run individually and showing perfect results, will also show perfect results when run as a whole.

CHAPTER 8

SNAPSHOTS

8. <u>SNAPSHOTS</u>
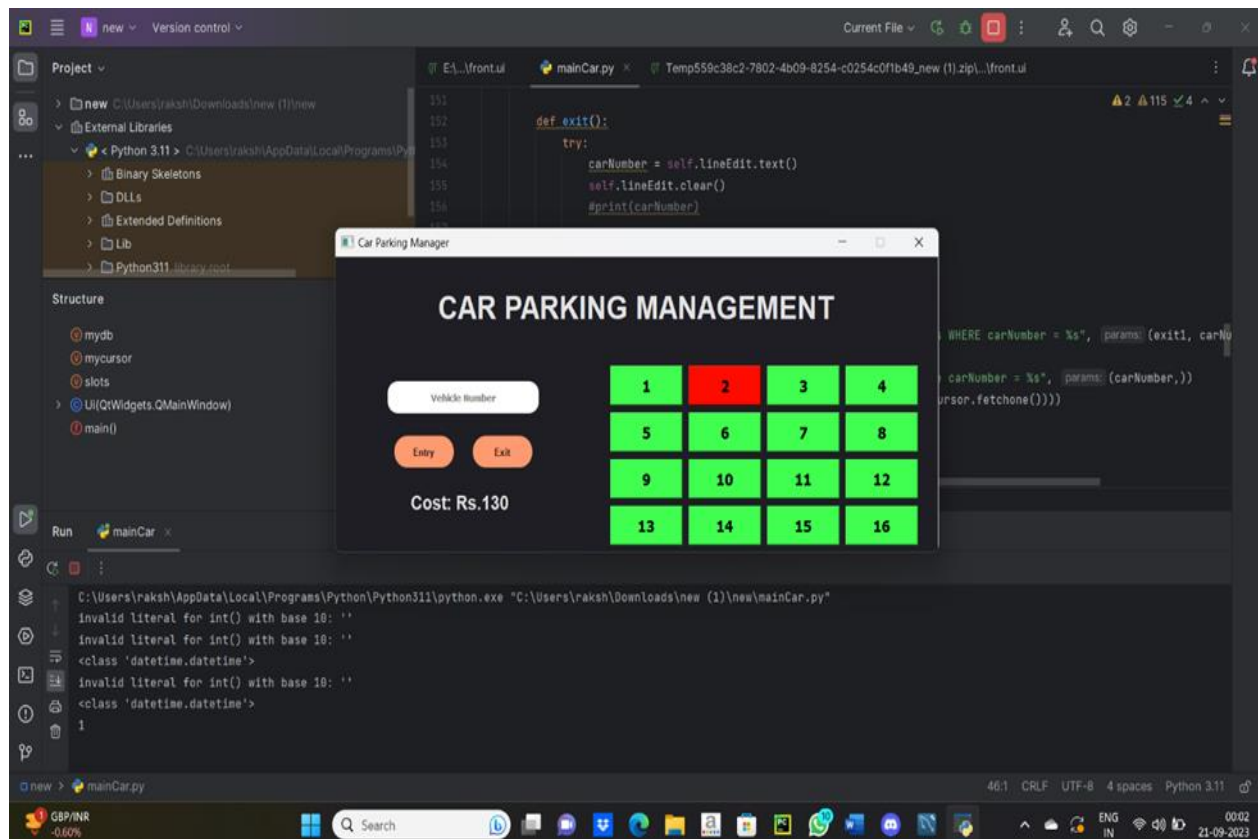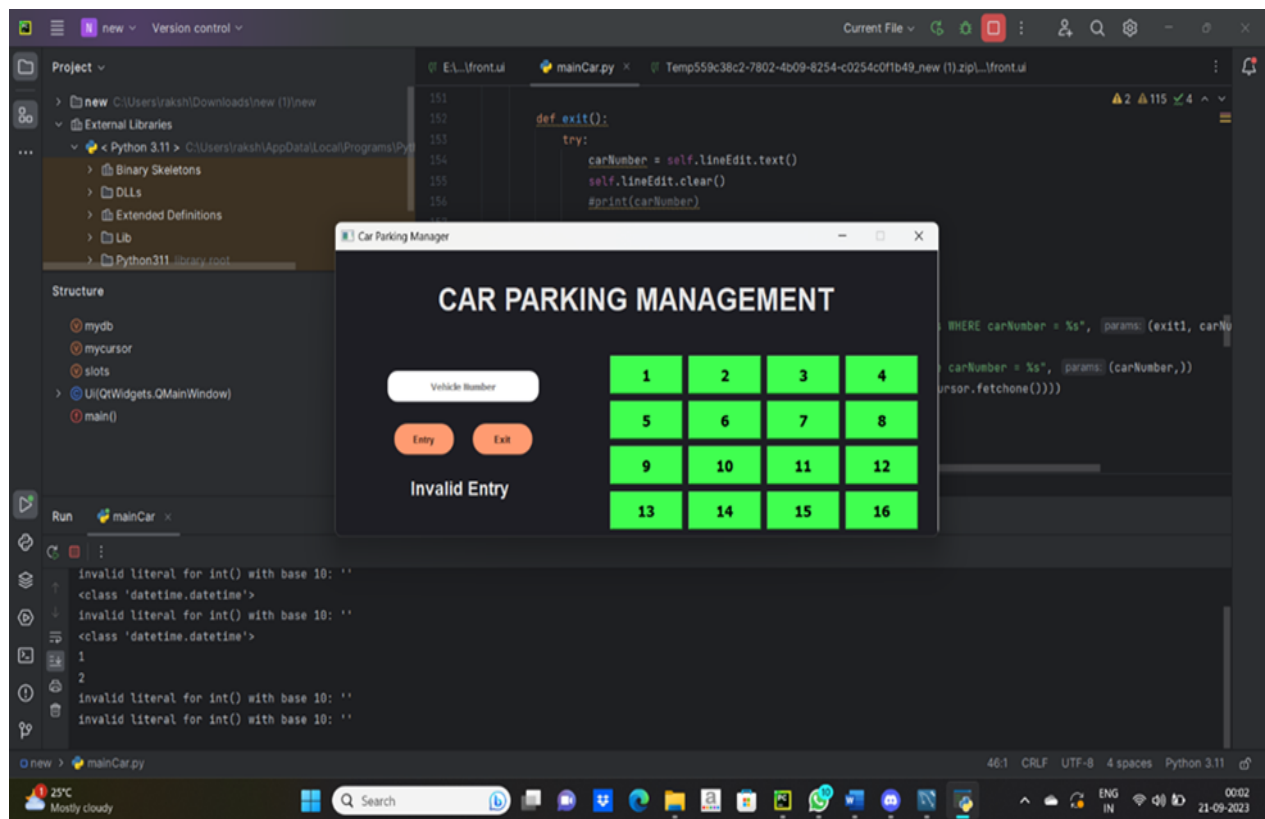
CHAPTER 9

CONCLUTION

9. <u>CONCLUTION</u>

The package was designed in such a way that future modifications can be done easily. The following conclusions can be deduced from the development of the project:

- ❖ Automation of the entire system improves the efficiency

- ❖ It provides a friendly graphical user interface which proves to be better when compared to the existing system.

- ❖ It gives appropriate access to the authorized users depending on their permissions.

- ❖ It effectively overcomes the delay in communications.

- ❖ Updating of information becomes so easier

- ❖ System security, data security and reliability are the striking features.

- ❖ The System has adequate scope for modification in future if it is necessary.

10. <u>REFERENCE</u>

- Github: <u>https://github.com/topics/parking-management?l=python</u>

- GeeksforGeeks

- TIE study materials