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PUC CERTIFICATE RENEWAL REMAINDER

A Mini Project Report

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE and **ENGINEERING**

By

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CERTIFICATE

This is to certify that the project report entitled "**PUC CERTIFICATE RENEWAL REMAINDER**" is the Bonafide record of project work carried out under my supervision by

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during the academic year 2022-2023, in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering of Jawaharlal Nehru Technological University, Vijayanagaram (JNTUGV). The results embodied in this project report have not been submitted to any other University or Institute for the award of any Degree or Diploma.

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DECLARATION

We hereby declare that the project report entitled "**PUC CERTIFICATE RENEWAL REMAINDER**" has been written by us and has not been submitted either in part or whole for the award of any degree, diploma or any other similar title to this or any other university.

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ABSTRACT

The rapid urbanization and escalating vehicular population have significantly contributed to the deterioration of air quality, posing serious health and environmental concerns worldwide. To address this pressing issue, the present mini-project proposes an innovative solution, the "Pollution Under Control Renewal Reminder" (PUCRR), which aims to automate the process of renewing pollution under control (PUC) certificates for vehicles.

The PUCRR system utilizes cutting-edge technology, like web-based technology, to streamline and enhance the PUC certificate renewal process. The project's primary objectives are to promote compliance with pollution control norms, reduce air pollution, and encourage sustainable transportation practices

The PUCRR operates through a user-friendly interface accessible to vehicle owners, regulatory authorities, and PUC Centers. Vehicle owners can register their vehicles on the platform and receive timely reminders about upcoming PUC certificate expirations.

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Keywords: Automated Notification System, Regulatory Collaboration, Environmental Impact Assessment.

References: https://puc.parivahan.gov.in

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1. INTRODUCTION

1.1 Motivation

Pollution is an escalating global crisis that poses significant threats to our environment, health, and future generations. It is a pressing issue that demands immediate attention and action. One of the key contributors to pollution is vehicular emissions, which release harmful pollutants into the atmosphere, deteriorating air quality and exacerbating climate change. In an effort to combat this problem, governments and regulatory bodies worldwide have mandated the Pollution Under Control (PUC) certificate to ensure that vehicles meet emission standards.

However, despite these regulations, compliance rates for obtaining and renewing PUC certificates remain alarmingly low. Many vehicle owners either neglect or forget to renew their certificates regularly, leading to an increase in pollution levels. This critical issue necessitates an innovative solution to raise awareness and encourage proactive actions among vehicle owners.

Implementing a mini project focused on Pollution Under Control Certificate Reminders presents a unique opportunity to make a tangible impact on environmental sustainability. The project aims to address the following motivational factors:

1. **Environmental Preservation**: By promoting timely PUC certificate renewals, the project directly contributes to reducing vehicular emissions, which is a major contributor to air pollution. Improved air quality can significantly enhance the health and well-being of the local community while safeguarding natural resources and ecosystems.

2. **Public Health Benefits**: Air pollution has been linked to a host of respiratory and cardiovascular diseases, adversely affecting human health. By reminding vehicle owners to obtain and renew their PUC certificates, the project plays a vital role in safeguarding public health and reducing the burden on healthcare systems.

3. **Sustainable Development**: Environmental sustainability is crucial for achieving long-term economic and social development. By ensuring vehicles comply with emission standards, the project aligns with sustainable development goals and fosters a cleaner and greener environment for future generations.

4. **Technological Innovation**: Implementing a Pollution Under Control Certificate Reminder system can involve cutting-edge technologies such as mobile applications, IoT devices, and data analytics. This project provides an excellent opportunity to showcase and develop technological skills while addressing a real-world environmental challenge.

5. **Scalability and Replicability**: Once successfully implemented, the project can serve as a model for other regions facing similar pollution-related issues. Its scalability and replicability can inspire and motivate other communities to adopt similar approaches, amplifying its impact across a wider spectrum.

This, mini project on Pollution Under Control Certificate Reminders aligns with the urgent need to address pollution and its detrimental effects on our environment and health. By combining technology, community engagement, and the project holds the potential to create a sustainable and cleaner future for our planet. Through our collective efforts, we can make a meaningful contribution towards pollution control and pave the way for a greener and healthier world.

1.2 Problem Statement

Background:

Pollution caused by vehicular emissions is a pressing environmental challenge with severe consequences for public health and the ecosystem. Governments and regulatory authorities worldwide have implemented Pollution Under Control (PUC) certificate regulations to mitigate vehicular pollution. The PUC certificate serves as evidence that a vehicle complies with the prescribed emission standards. However, despite these measures, a significant number of vehicle owners fail to obtain or renew their PUC certificates regularly.

Problem Description:

The lack of timely renewal of Pollution Under Control certificates poses a critical problem, exacerbating pollution levels and impacting the environment and public health. The problem can be attributed to various factors, including lack of awareness, negligence, forgetfulness, and a dearth of effective reminders for certificate renewal. The consequences of this issue include:

1. **Increased Air Pollution**: Vehicles emitting harmful pollutants without valid PUC certificates contribute significantly to air pollution. The resulting deterioration of air quality poses health risks to the population, particularly vulnerable groups such as children, the elderly, and individuals with respiratory conditions.

2. **Health Impacts**: Exposure to pollutants from non-compliant vehicles can lead to a range of health issues, including respiratory illnesses, cardiovascular diseases, and even premature mortality. This puts additional strain on healthcare systems and impacts the overall well-being of communities.

3. **Environmental Degradation**: Vehicular pollution adversely affects the environment, leading to the degradation of ecosystems, soil quality, and water bodies. This jeopardizes biodiversity and disrupts the delicate balance of nature.

Project Objective:

The primary objective of the mini project is to design and implement an innovative Pollution Under Control Certificate Reminder system that addresses the aforementioned problem. The system should leverage technology and community engagement to encourage vehicle owners to obtain and renew their PUC certificates prompt.

2. EXISTING SYSTEM

Existing systems for the implementation of a mini project on Pollution Under Control (PUC) certificate reminders can be categorized into the following areas:

1. **Government and Regulatory Websites/Apps**: Many countries or regions have official government websites or mobile applications that allow vehicle owners to check their PUC certificate status and obtain reminders for renewal. These systems typically require vehicle registration details to access the information.

2. **SMS/Email Reminders**: Some regions implement SMS or email reminder services for PUC certificate renewals. Vehicle owners who have registered their contact information with relevant authorities receive automated reminders close to the expiration date.

3. **In-Person Notifications**: In certain areas, government officials or authorized personnel may conduct physical checks at pollution checkpoints or during routine traffic stops. They notify vehicle owners whose PUC certificates are expired or nearing expiration, urging them to renew promptly.

While these existing systems have proven to be somewhat effective, they still face certain limitations. Many vehicle owners might not be aware of the availability of such services, and the reminder frequency might not be optimized for maximum impact. Additionally, some systems may lack integration and may not have the ability to provide personalized reminders based on vehicle-specific renewal dates.

3. PROPOSED SYSTEM

The proposed systm for the mini project on Pollution Under Control (PUC) Certificate Reminder aims to efficiently address the issue of low PUC certificate compliance rates and contribute to controlling pollution caused by vehicular emissions. The system will leverage modern technologies and community engagement strategies to raise awareness, improve accountability, and foster a cleaner and greener environment. Here's an outline of the key components of the proposed system:

1. **User-Friendly Mobile Web Application**:
   - Develop a user-friendly mobile web application compatible with both Android and iOS platforms.
   - The application should allow vehicle owners to register their vehicles by entering necessary details such as registration number and contact information.

2. **PUC Certificate Database**:
   - Create and maintain a centralized database to store PUC certificate details for registered vehicles.
   - The database will store information like certificate expiration dates, vehicle types.

3. **Automated Reminder System**:
   - Implement an automated reminder system integrated with the database.
   - The system will generate timely reminders for PUC certificate renewals and send them to registered vehicle owners via SMS or push notifications.

4. **Data Security and Privacy**:

- Ensure robust data security measures to protect user information and prevent unauthorized access to the database.
- Comply with relevant data protection and privacy regulations to build trust among users.

5. **Scalability and Replicability**:

- Design the system with scalability in mind to accommodate a growing number of registered vehicles and users.
- Document the project's implementation process and lessons learned to facilitate its replication in other regions.

By implementing this proposed system, we can effectively combat the issue of low PUC certificate compliance rates and contribute to pollution control efforts. The integration of technology, community engagement, and data-driven approaches will create a comprehensive solution that empowers individuals, fosters environmental responsibility, and ultimately leads to a healthier and cleaner living environment for everyone.

4. SOFTWARE REQUIREMENTS

4.1 Frontend Technologies

4.1.1 HTML and CSS using Bootstrap Framework

By leveraging the features offered by HTML and CSS using the Bootstrap framework, the Pollution Under Control Certificate Reminder Mini Project can deliver an engaging, responsive, and user-friendly front-end interface. The combination of intuitive navigation, interactive elements, and data representation will raise awareness about pollution control and foster active participation in obtaining and renewing PUC certificates, contributing to a cleaner and healthier environment.

Key Features:

1. **Responsive Web Design**: With Bootstrap, the user interface will be designed to be responsive, ensuring that the certificate reminder system can be accessed seamlessly on various devices such as desktops, laptops, tablets, and smartphones. This enhances user experience and accessibility for a broader audience.

2. Customizable Templates: Bootstrap provides a wide range of pre-designed templates and components, enabling developers to quickly create visually appealing and customizable interfaces for the certificate reminder system. The use of themes can help align the design with the project's focus on pollution control.

3. Intuitive Navigation: The Bootstrap framework facilitates the creation of a user-friendly navigation system. A well-organized menu and intuitive layout

ensure that users can effortlessly access relevant information, increasing the chances of compliance with certificate renewal requirements.

4. Form Validation: Incorporating Bootstrap's form validation features ensures that users provide accurate and complete information when submitting their details for certificate reminders. This reduces errors and enhances the overall effectiveness of the system.

5. Interactive Elements: Utilizing Bootstrap's JavaScript plugins, developers can add interactive elements like pop-ups, tooltips, and modals to the user interface. These features can be leveraged to display pollution-related facts, statistics, and impact information, raising awareness about the importance of PUC certificates.

6. Visual Data Representation: The use of Bootstrap's charting components allows for the creation of visual representations of pollution levels, compliance rates, and environmental improvements. Data visualization helps users understand the impact of their actions and motivates them to contribute to pollution control.

7. Localization Support: Bootstrap supports multi-language and multi-regional development, enabling the certificate reminder system to reach a diverse audience effectively. Localizing content can foster a stronger connection with users and encourage participation from various regions.

8. Browser Compatibility: Bootstrap ensures cross-browser compatibility, making the certificate reminder system accessible on popular web browsers like Chrome, Firefox, Safari, and Edge. This widens the reach of the project, accommodating users with different browser preferences.

9. Performance Optimization: The lightweight nature of Bootstrap ensures faster loading times and improved performance. A well-optimized system will encourage users to engage with the project without facing frustrating delays.

10. Accessibility Features: Bootstrap incorporates accessibility features, making the certificate reminder system inclusive and usable for individuals with disabilities. Implementing appropriate contrast, ARIA labels, and keyboard navigation ensures compliance with web accessibility guidelines.

11. Collaborative Development: Bootstrap's popularity and extensive community support facilitate collaborative development. Multiple developers can work together on the project, leading to faster implementation and ongoing maintenance.

Use Cases:

1. User Registration and Login:

- HTML and CSS will be used to design the user registration and login pages.
- Bootstrap components like forms and buttons will be employed for a responsive and visually appealing user interface.
- CSS will be used to style the form elements and ensure a seamless user experience.

2. Dashboard for Vehicle Owners:

- HTML and CSS will be utilized to create an interactive dashboard for vehicle owners.
- Bootstrap grid system and cards will be used to display essential information,

such as PUC status and renewal dates, in an organized manner.

- CSS will be applied to enhance the overall look and feel of the dashboard, making it user-friendly and engaging.

3. PUC Certificate Reminder Notifications:

- HTML will be used to create notification templates for sending reminders to vehicle owners.

- Bootstrap's pre-designed components and styles will ensure consistent and visually appealing email notifications.

- CSS will be applied to customize the email templates and align them with the project's branding.

4. Vehicle Search and Details Page:

- HTML and CSS will be utilized to design a search page where users can enter vehicle details to check PUC status.

- Bootstrap's form components and styling will enhance the search form's usability and responsiveness.

- The search results page, displaying detailed PUC information, will also be created using HTML and CSS with Bootstrap's responsive design principles.

5. Notification Settings and Preferences:

- HTML and CSS will be used to design the user's notification settings page.

- Bootstrap's form components will facilitate easy customization of notification preferences.

- CSS will be applied to enhance the layout and readability of the settings page.

6. Responsive Design for Mobile Devices:

- HTML, CSS, and Bootstrap's responsive design features will be used to ensure that the application is accessible and functional on various devices, including smartphones and tablets.

- The UI will automatically adjust to different screen sizes, providing a seamless experience for users on the go.

7. Error Handling and Validation:

- HTML and CSS will be used to design error messages and validation alerts to guide users in completing forms correctly.

- Bootstrap's form validation components will be employed to ensure data accuracy and prevent incorrect input.

Development Tools:

1. HTML (Hypertext Markup Language):

HTML serves as the building blocks of web pages, defining the structure and content of the project. It allows you to create different elements such as headers, paragraphs, buttons, forms, and more. When developing the Pollution Under Control Certificate Reminder, HTML will be used to create the user interface and layout, ensuring that the information is presented in a clear and organized manner.

2. CSS (Cascading Style Sheets):

CSS is responsible for styling and formatting the HTML elements, providing a visually appealing look and feel to the project. With CSS, you can customize fonts, colors, margins, padding, and other visual aspects. It enables you to create an

aesthetically pleasing design that aligns with the project's theme and purpose. For the Pollution Under Control Certificate Reminder, CSS will be utilized to design an engaging and user-friendly interface.

3. Bootstrap Framework:

Bootstrap is a popular front-end framework that offers pre-designed components and responsive utilities, streamlining the development process and ensuring consistency across various devices and screen sizes. By using Bootstrap, you can save time and effort in creating common UI elements like navigation bars, buttons, modals, and more. This framework is ideal for building a mobile-friendly and accessible user interface for the Pollution Under Control Certificate Reminder.

4. Code Editor:

A code editor is a crucial tool for writing, editing, and managing HTML and CSS code efficiently. There are various code editors available, such as Visual Studio Code, Sublime Text, or Atom, which provide features like syntax highlighting, auto-completion, and code debugging to enhance productivity during development.

5. Version Control System:

A version control system (VCS) such as Git is essential for tracking changes in the codebase and collaborating with other developers effectively. Using Git allows you to keep a record of code changes, revert to previous versions if needed, and manage multiple branches for different features or fixes.

6. Browser Developer Tools:

Modern web browsers come equipped with built-in developer tools that assist in

debugging, inspecting elements, and optimizing performance. These tools are invaluable for testing and fine-tuning the project's layout and behavior across different browsers.

7. Responsive Design Testing Tools:

To ensure that the Pollution Under Control Certificate Reminder is responsive and functions correctly on various devices, using responsive design testing tools is essential. Tools like BrowserStack or Responsinator help validate the project's responsiveness on different screen sizes and resolutions.

4.2 Backend Technologies

4.2.1 Django

Django, a high-level Python web framework, is an excellent choice for developing the back-end of the Pollution Under Control Certificate Reminder project. Its robust features and efficient design enable developers to build a powerful and scalable application to address the pollution challenge effectively. Here are some key features of Django that make it an ideal framework for this project:

1.Model-View-Template(MVT) Architecture: Django follows the MVT architecture, which provides a clear separation of concerns. This structure helps in organizing the codebase, making it easier to manage and maintain. The models handle data related to PUC certificates, views manage the application logic, and templates handle the user interface.

2.Admin Interface: Django offers a built-in admin interface, which allows easy management of PUC certificate data. Authorized personnel can access and update the database through a user-friendly admin dashboard, simplifying administrative tasks.

3.Database Abstraction: Django provides database abstraction, allowing developers to work with various database systems without changing the code. This flexibility enables the application to accommodate different database engines and handle data efficiently.

4.URL Routing: Django's URL routing system helps in mapping URLs to views, ensuring proper handling of user requests. This feature is crucial in implementing reminder notifications and handling various endpoints related to the PUC certificate.

5.Form Handling and Validation: Django's form handling and validation functionalities simplify data entry and ensure the accuracy and integrity of user-submitted information. This ensures that vehicle owners provide the necessary details for the certificate reminder service.

6. Authentication and Security: Securing user data and ensuring authorized access is vital for any application. Django provides built-in authentication features, including user login and registration, to protect sensitive information and manage user access effectively.

7.Task Queues and Scheduling: Django integrates well with task queues like Celery, allowing the implementation of background processes for sending automated reminder notifications. This ensures that users receive timely reminders to renew their PUC certificates.

8. RESTful APIs: Django Rest Framework (DRF) enables the creation of RESTful APIs, facilitating seamless communication between the front-end and back-end components. This is crucial for mobile app integration or third-party services that may interact with the application.

9.Caching: Django supports caching mechanisms that help improve application performance by storing frequently accessed data in memory. Caching can be utilized to optimize queries and reduce response times, making the certificate reminder service more efficient.

10.Testing Support: Django encourages writing unit tests and provides excellent testing support. This allows developers to verify the functionality of the application and ensure that reminder notifications are sent accurately and on time.

11.Internationalization and Localization: Django offers robust internationalization and localization support, making it possible to provide the certificate reminder service in multiple languages and adapt to different regional requirements.

4.3 Hardware Requirements

Just an electronic device:

The beauty of the development using django is its accessibility. It is designed to be accessed seamlessly from a variety of devices, including smartphones, PCs, laptops, and more. Whether you're on the go and need to quickly check information on your phone or sitting at your desk with a powerful computer, my web application adapts to your device, providing a consistent and user-friendly experience. With a responsive design, it automatically adjusts its layout, content, and functionality to ensure optimal viewing and interaction, regardless of the screen size or device capabilities. So, no matter where you are or what device you have at hand, accessing my web application is effortless and enjoyable

So, the only hardware requirement is any electronic device is compatible.

5. SCOPE OF THE PROJECT

The scope of the project includes, but is not limited to:

1. Reminder Mechanism: Developing an automated and user-friendly system that sends timely reminders to vehicle owners about PUC certificate expiry dates via SMS, mobile applications, or email notifications.

2. Data Management*:* Creating a database to store vehicle and certificate details, enabling the system to generate personalized reminders based on individual renewal timelines.

3. Community Awareness: Conduct awareness campaigns to educate the public about the importance of PUC certificates, the adverse effects of vehicular pollution, and the benefits of compliance.

4. Collaboration with Authorities: Collaborating with relevant governmental bodies and stakeholders to ensure seamless integration with existing databases and systems for accurate certificate verification.

5. Measuring Impact: Evaluating the project's effectiveness by tracking compliance rates and comparing pollution levels before and after the implementation of the reminder system.

6. LITERATURE SURVEY

Introduction:

The issue of air pollution and its impact on the environment and public health has gained considerable attention in recent years. Vehicular emissions play a significant role in contributing to air pollution. However, the compliance rates for obtaining and renewing PUC certificates remain suboptimal, necessitating innovative approaches to raise awareness and encourage timely certificate renewals. This literature survey aims to explore existing research and projects related to pollution under control certificate reminders to identify potential strategies and best practices.

1. Pollution Control and Vehicle Emission Standards:

Several studies focus on the impact of vehicular emissions on air quality and the environment. These works highlight the importance of adhering to emission standards and the role of PUC certificates in mitigating pollution. They provide a strong theoretical foundation for understanding the significance of certificate reminders in improving compliance rates.

2. Technological Interventions for Pollution Control:

Numerous research papers discuss the use of technology to address environmental challenges. Mobile applications, Internet of Things (IoT) devices, and data analytics have been employed to track emission levels, vehicle performance, and PUC certificate expiry dates. These studies shed light on how technology can be harnessed to develop efficient certificate reminder systems.

3. Data Privacy and Security Considerations:

Since the project may involve collecting and storing vehicle and owner data, it is crucial to explore research on data privacy and security. Understanding best

practices for safeguarding sensitive information will ensure compliance with legal and ethical standards.

4. Scalability and Replicability of Projects:

Research on the scalability and replicability of similar projects in different regions can help assess the feasibility of implementing the mini project in other areas. Understanding the factors that contribute to successful scalability will aid in planning for long-term impact.

7. MODULES

PUC CERTIFICATE RENEWAL REMAINDER: Modules Overview

Implementing a mini project on Pollution Under Control (PUC) Certificate Reminders requires breaking down the overall idea into smaller, manageable modules. Each module serves a specific function and contributes to the project's success. Here are the key modules for the project:

1. User Registration and Vehicle Information Module:

This module allows vehicle owners to register on the platform by providing their personal details and vehicle information, including the vehicle registration number and engine number.

2. PUC Certificate Expiry Tracking Module:

The system will keep track of PUC certificate expiry dates based on vehicle registration numbers and engine numbers. It will calculate the next due date for each vehicle based on local regulations.

3. Reminder Generation Module:

This module will generate automated reminders to vehicle owners when their PUC certificates are about to expire. Reminders can be sent via SMS or push notifications, depending on the user's preferences.

4. Multi-channel Communication Module:

This module facilitates communication with vehicle owners through various channels like SMS and in-app notifications, ensuring higher reach and engagement.

5. Renewal Status Update Module:

Allow users to update the system when they have renewed their PUC certificate, which will prevent unnecessary reminders and maintain an accurate database.

6. Feedback and Support Module:

Allow users to provide feedback, suggestions, or seek support through the platform. This module ensures continuous improvement based on user experiences and needs.

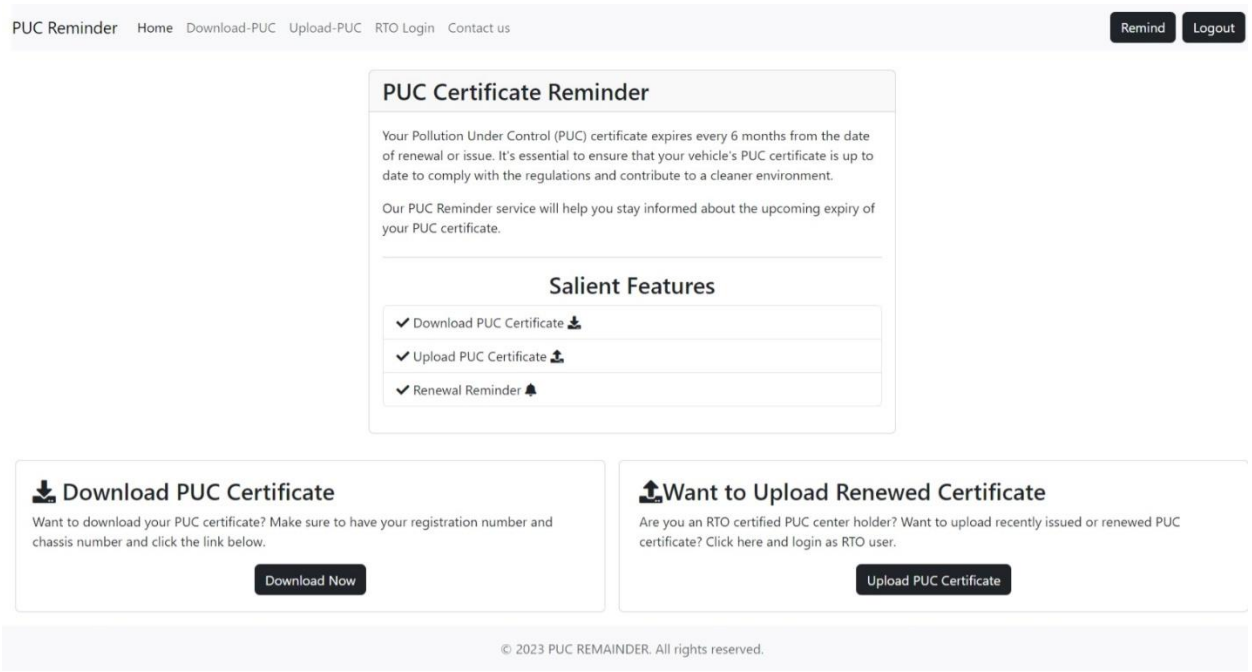
7. Integration with Government Database Module:

If possible, integrate the system with the government's vehicle registration database to access real-time vehicle information and ensure accuracy.

8. Privacy and Data Security Module:

Implement robust data protection measures to safeguard user data and ensure compliance with privacy regulations.

By dividing the project into these modules, it becomes more manageable to develop and implement each part systematically. Each module plays a crucial role in ensuring the success of the Pollution Under Control Certificate Reminder project and contributes to its effectiveness in curbing pollution and promoting environmental sustainability.


PUC Reminder
Home
Download-PUC
Upload-PUC
RTO Login
Contact us
Remind
Logout
PUC Certificate Reminder
Your Pollution Under Control (PUC) certificate expires every 6 months from the date of renewal or issue. It's essential to ensure that your vehicle's PUC certificate is up to date to comply with the regulations and contribute to a cleaner environment.
Our PUC Reminder service will help you stay informed about the upcoming expiry of your PUC certificate.
Salient Features
✔ Download PUC Certificate
✔ Upload PUC Certificate
✔ Renewal Reminder
Download PUC Certificate
Want to download your PUC certificate? Make sure to have your registration number and chassis number and click the link below.
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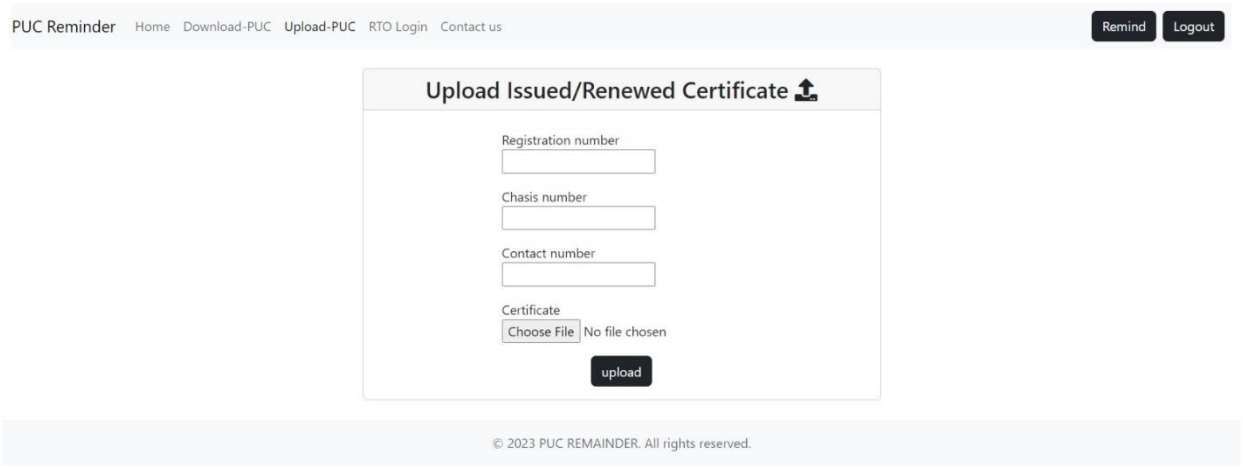
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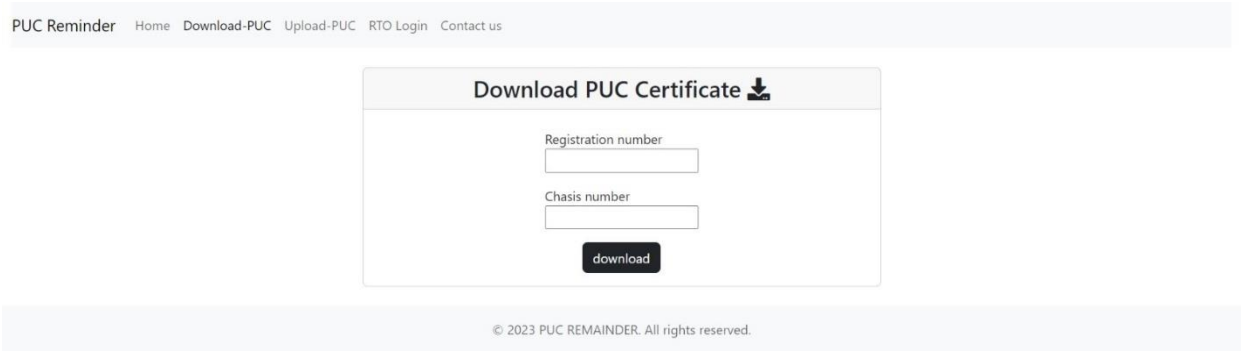
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RTO Login
Contact us
Download PUC Certificate
Registration number
Chasis number
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8.SYSTEM DESIGN

1. Objective:

The primary objective of the Pollution Under Control (PUC) Certificate Reminder Mini Project is to develop a user-friendly and efficient system that sends timely reminders to vehicle owners for obtaining and renewing their PUC certificates. The system aims to increase compliance rates, reduce vehicular emissions, and promote environmental sustainability.

2. System Architecture:

The system will be based on a client-server architecture, where the client-side will comprise mobile applications, and the server-side will host the data and processing logic. The system will also integrate with a database for storing vehicle-related information and certificate expiration dates.

3. Components:

The key components of the system are as follows:

a. Web Application (Client-side):

The web application will be developed for all browsers. It will provide a user-friendly interface for vehicle owners to register their vehicles, input relevant details (such as vehicle number, PUC certificate number, and expiry date), and set notification preferences.

b. Database:

A centralized database will be used to store vehicle-related information, including registration details, PUC certificate numbers, and expiration dates. This database will facilitate data retrieval and update operations for the server.

c. Server-side Application:

The server-side application will handle the core logic of the system. It will include modules for:

- **User Registration and Authentication:** To manage user accounts and ensure data security.
- **Data Validation:** To validate user input and prevent incorrect or incomplete information.
- **Certificate Expiry Management:** To monitor PUC certificate expiration dates and trigger reminders.
- **Notification Service:** To send timely reminders to users via push notifications, email, or SMS.
- **Reporting and Analytics:** To generate periodic reports on compliance rates, user engagement, and system performance.

d. Notification Gateway:

The notification gateway will be responsible for delivering reminders to vehicle owners through push notifications, emails, or SMS, based on their chosen notification preferences.

4. System Flow:

The flow of the Pollution Under Control Certificate Reminder system is as follows:

1. **Authorization**: RTO staff and PUC Center staff will be allowed to login by providing their assigned username and password.

2. **Certificate Upload/Download**: PUC Center staff can upload the renewed or issued certificate using their authorized username and password and general users can download their PUC certificate using their registration and chasis numbers.

3. **Data Storage**: The server will store the user data, including vehicle information and notification preferences, in the centralized database

4. **Reminder Generation**: RTO admin when logged in can click on remind button and automatically backend will send messages based upon their expiration status, the server will generate reminders for the upcoming or overdue PUC certificates.

5. **Notification Delivery**: The notification gateway will deliver reminders to the users.

5. Security Considerations:

To ensure data security and user privacy, the system will implement encryption protocols for data transmission and storage. User authentication will be enforced to prevent unauthorized access to sensitive information. Regular security audits and updates will be performed to address potential vulnerabilities.

6. Scalability:

The system will be designed with scalability in mind, allowing for the addition of new users, vehicles, and notification methods without significant performance degradation. Cloud-based hosting solutions may be used to handle increased loads efficiently.

7. User Experience:

The web application will be developed with a focus on user experience and intuitive navigation. It will offer easy-to-understand instructions for registration and certificate input, ensuring a smooth user experience.

8. Technology Stack:

The system can be developed using the following technologies:

- Front-end: HTML, CSS, BOOTSTRAP, JAVASCRIPT
- Back-end: Django for server-side logic
- Database: mysql
- Notification: pywhatkit (python library)
- Security: SSL/TLS encryption, OAuth2 for user authentication

By implementing this system design, the Pollution Under Control Certificate Reminder Mini Project will play a vital role in promoting pollution control, enhancing environmental sustainability, and fostering a greener future for our communities.

9.APPLICATIONS

The applications of PUC RENEWAL REMINDER issues air pollution and its impact on the environment and public health has gained considerable attention in recent years. Vehicular emissions play a significant role in contributing to air pollution. However, the compliance rates for obtaining and renewing PUC certificates remain suboptimal, necessitating innovative approaches to raise awareness and encourage timely certificate renewals. This literature survey aims to explore existing research and projects related to pollution under control certificate reminders to identify potential strategies and best practices.

1. **Authorization**: RTO staff and PUC Center staff will be allowed to login by providing their assigned username and password.

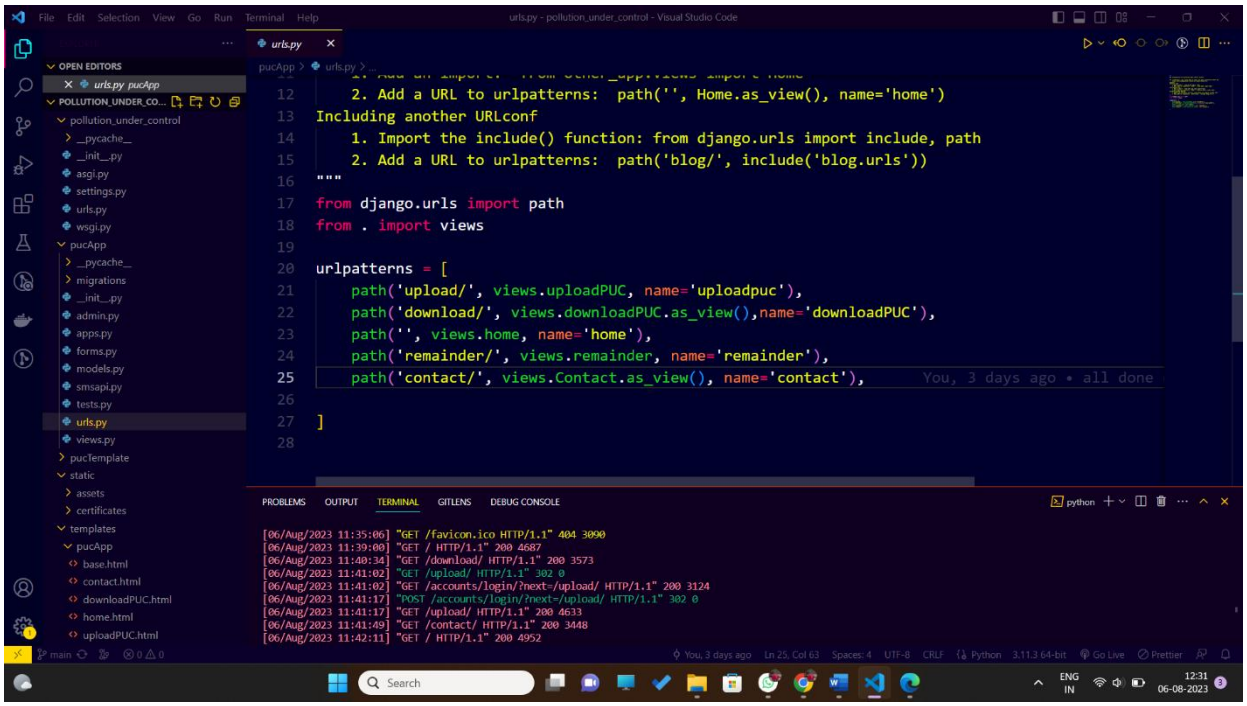
2. **Certificate Upload/Download**: PUC Center staff can upload the renewed or issued certificate using their authorized username and password and general users can download their PUC certificate using their registration and chasis numbers.

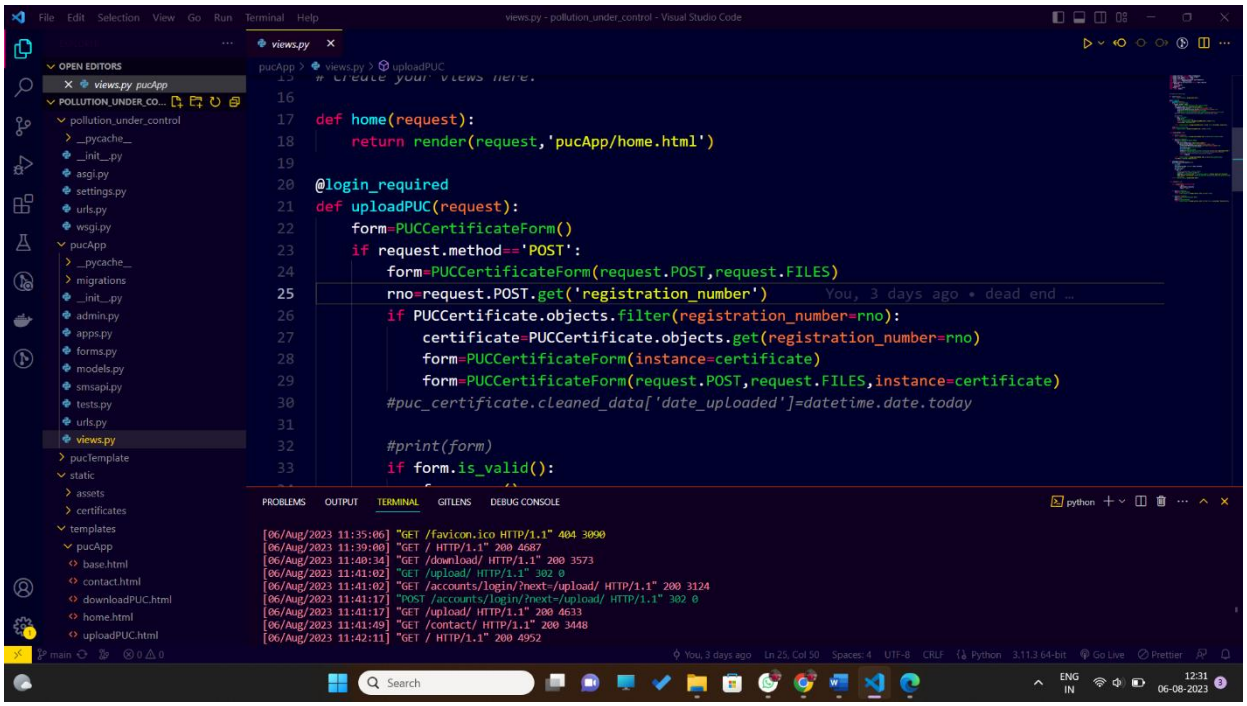
3. **Data Storage**: The server will store the user data, including vehicle information and notification preferences, in the centralized database

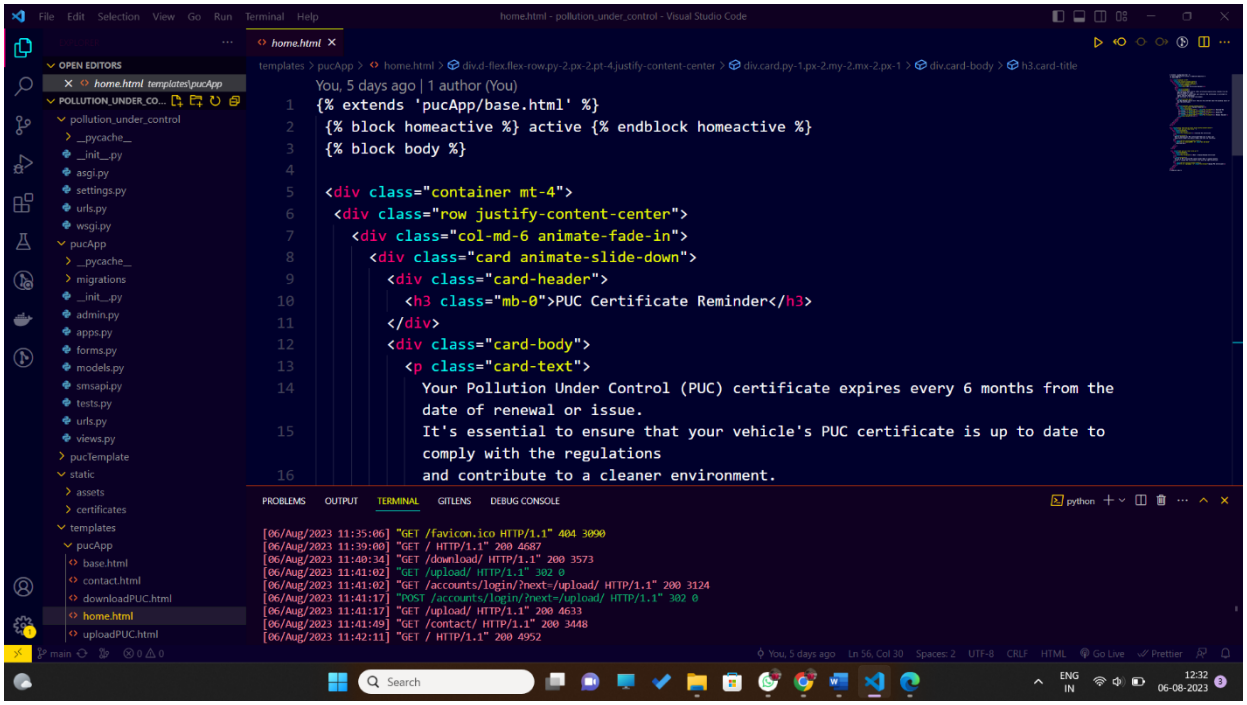
4. **Reminder Generation**: RTO admin when logged in can click on remind button and automatically backend will send messages based upon their expiration status, the server will generate reminders for the upcoming or overdue PUC certificates.

5. **Notification Delivery**: The notification gateway will deliver reminders to the users.

10.SAMPLE CODE

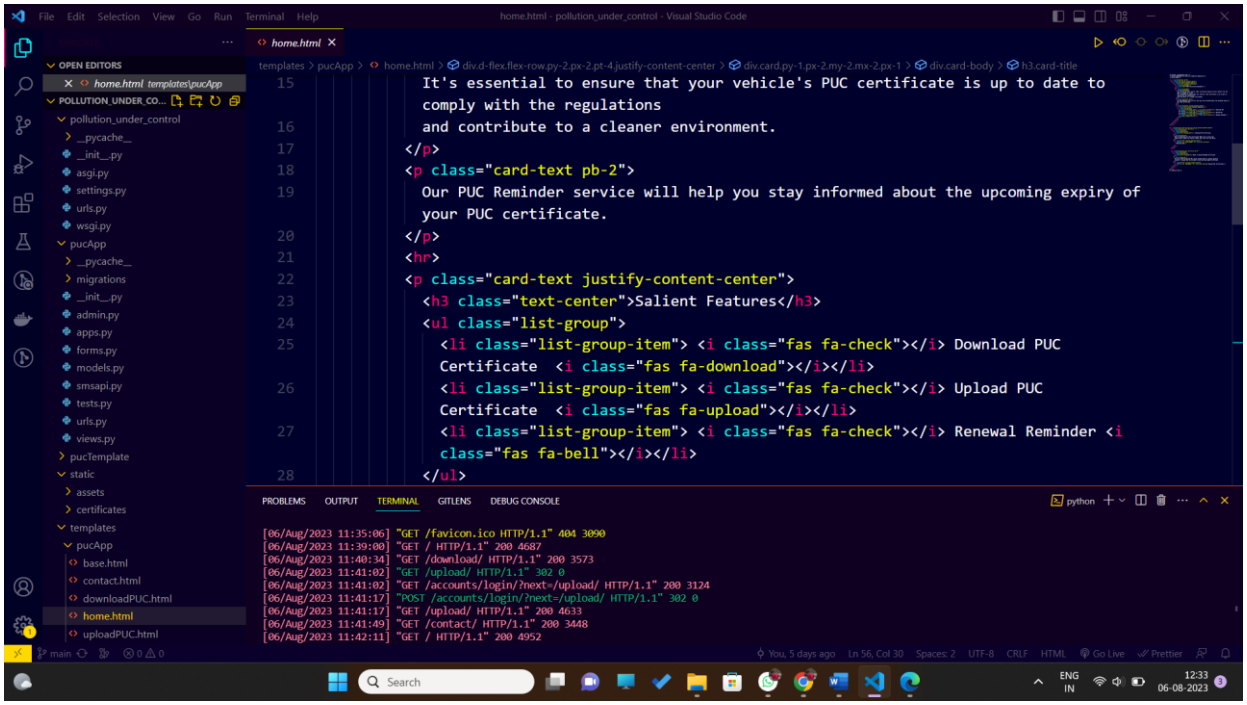





home.html - pollution_under_control - Visual Studio Code
home.html
templates > pucApp > home.html > div.d-flex.flex-row.py-2.px-2.pt-4.justify-content-center > div.card.py-1.px-2.my-2.mx-2.px-1 > div.card-body > h3.card-title
You, 5 days ago | 1 author (You)
{% extends 'pucApp/base.html' %}
{% block homeactive %} active {% endblock homeactive %}
{% block body %}

<h3 class="mb-0">PUC Certificate Reminder</h3>

Your Pollution Under Control (PUC) certificate expires every 6 months from the date of renewal or issue.
It's essential to ensure that your vehicle's PUC certificate is up to date to comply with the regulations
and contribute to a cleaner environment.
PROBLEMS OUTPUT TERMINAL GITLENS DEBUG CONSOLE
[06/Aug/2023 11:35:06] "GET /favicon.ico HTTP/1.1" 404 3090
[06/Aug/2023 11:39:00] "GET / HTTP/1.1" 200 4687
[06/Aug/2023 11:40:34] "GET /download/ HTTP/1.1" 200 3573
[06/Aug/2023 11:41:02] "GET /upload/ HTTP/1.1" 302 0
[06/Aug/2023 11:41:02] "GET /accounts/login/?next=/upload/ HTTP/1.1" 200 3124
[06/Aug/2023 11:41:17] "POST /accounts/login/?next=/upload/ HTTP/1.1" 302 0
[06/Aug/2023 11:41:17] "GET /upload/ HTTP/1.1" 200 4633
[06/Aug/2023 11:41:49] "GET /contact/ HTTP/1.1" 200 3448
[06/Aug/2023 11:42:11] "GET / HTTP/1.1" 200 4952


home.html - pollution_under_control - Visual Studio Code
home.html
templates > pucApp > home.html > div.d-flex.flex-row.py-2.px-2.pt-4.justify-content-center > div.card.py-1.px-2.my-2.mx-2.px-1 > div.card-body > h3.card-title
It's essential to ensure that your vehicle's PUC certificate is up to date to comply with the regulations
and contribute to a cleaner environment.

Our PUC Reminder service will help you stay informed about the upcoming expiry of your PUC certificate.

<hr>

<h3 class="text-center">Salient Features</h3>
<ul class="list-group">
<li class="list-group-item"> Download PUC Certificate
<li class="list-group-item"> Upload PUC Certificate
<li class="list-group-item"> Renewal Reminder

PROBLEMS OUTPUT TERMINAL GITLENS DEBUG CONSOLE
[06/Aug/2023 11:35:06] "GET /favicon.ico HTTP/1.1" 404 3090
[06/Aug/2023 11:39:00] "GET / HTTP/1.1" 200 4687
[06/Aug/2023 11:40:34] "GET /download/ HTTP/1.1" 200 3573
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[06/Aug/2023 11:41:02] "GET /accounts/login/?next=/upload/ HTTP/1.1" 200 3124
[06/Aug/2023 11:41:17] "POST /accounts/login/?next=/upload/ HTTP/1.1" 302 0
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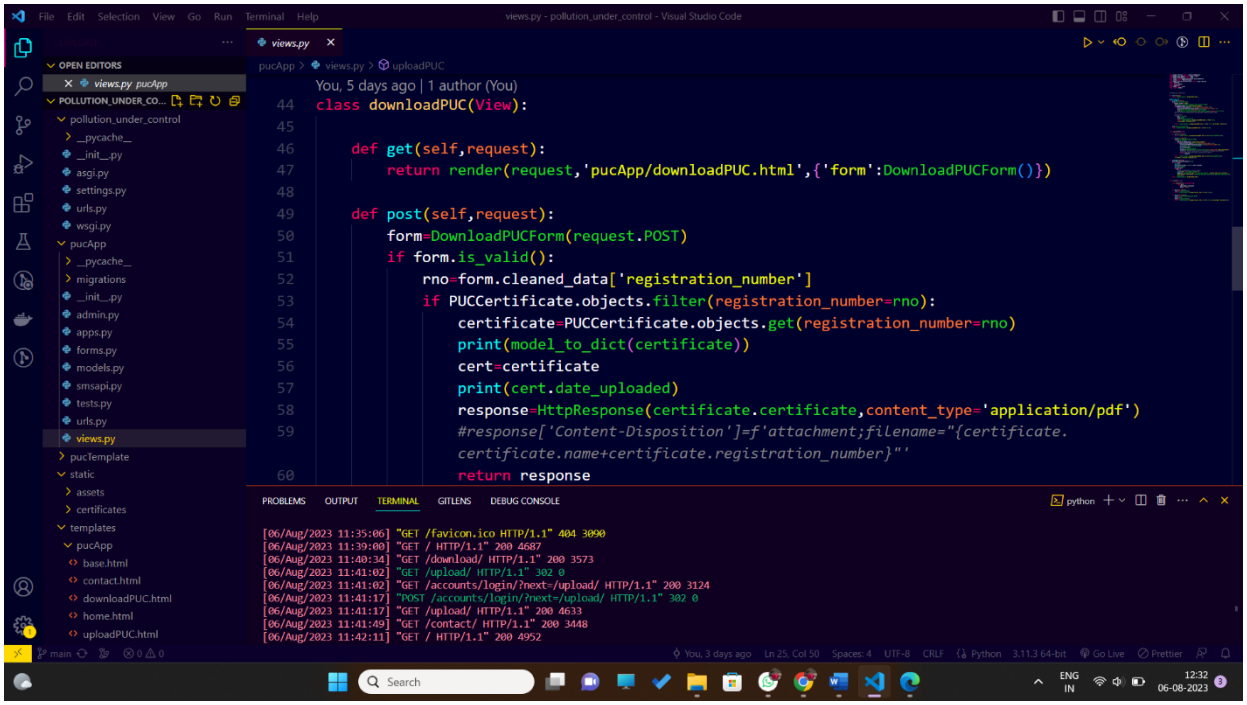
[06/Aug/2023 11:41:49] "GET /contact/ HTTP/1.1" 200 3448
[06/Aug/2023 11:42:11] "GET / HTTP/1.1" 200 4952


views.py - pollution_under_control - Visual Studio Code
views.py
pucApp > views.py > downloadPUC
You, 5 days ago | 1 author (You)
class downloadPUC(View):
def get(self,request):
return render(request,'pucApp/downloadPUC.html',{'form':DownloadPUCForm()})
def post(self,request):
form=DownloadPUCForm(request.POST)
if form.is_valid():
rno=form.cleaned_data['registration_number']
if PUCCertificate.objects.filter(registration_number=rno):
certificate=PUCCertificate.objects.get(registration_number=rno)
print(model_to_dict(certificate))
cert=certificate
print(cert.date_uploaded)
response=HttpResponse(certificate.certificate,content_type='application/pdf')
#response['Content-Disposition']=f'attachment;filename="{certificate.
certificate.name+certificate.registration_number}"'
return response
PROBLEMS OUTPUT TERMINAL GITLENS DEBUG CONSOLE
[06/Aug/2023 11:35:06] "GET /favicon.ico HTTP/1.1" 404 3090
[06/Aug/2023 11:39:00] "GET / HTTP/1.1" 200 4687
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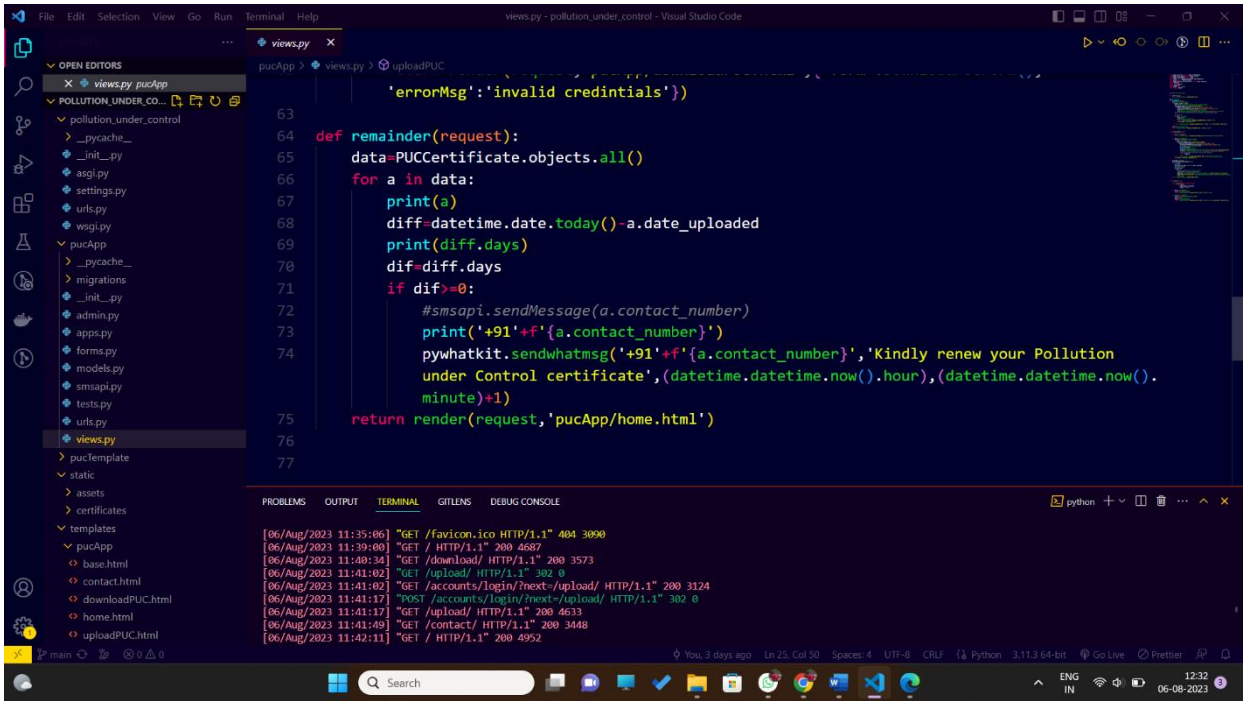
[06/Aug/2023 11:41:49] "GET /contact/ HTTP/1.1" 200 3448
[06/Aug/2023 11:42:11] "GET / HTTP/1.1" 200 4952


views.py - pollution_under_control - Visual Studio Code
views.py
pucApp > views.py > uploadPUC
'errorMsg':'invalid credintials'})
def remainder(request):
data=PUCCertificate.objects.all()
for a in data:
print(a)
diff=datetime.date.today()-a.date_uploaded
print(diff.days)
dif=diff.days
if dif>=0:
#smsapi.sendMessage(a.contact_number)
print('+91'+f'{a.contact_number}')
pywhatkit.sendwhatmsg('+91'+f'{a.contact_number}','Kindly renew your Pollution
under Control certificate',(datetime.datetime.now().hour),(datetime.datetime.now().
minute)+1)
return render(request,'pucApp/home.html')
PROBLEMS OUTPUT TERMINAL GITLENS DEBUG CONSOLE
[06/Aug/2023 11:35:06] "GET /favicon.ico HTTP/1.1" 404 3090
[06/Aug/2023 11:39:00] "GET / HTTP/1.1" 200 4687
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[06/Aug/2023 11:41:49] "GET /contact/ HTTP/1.1" 200 3448
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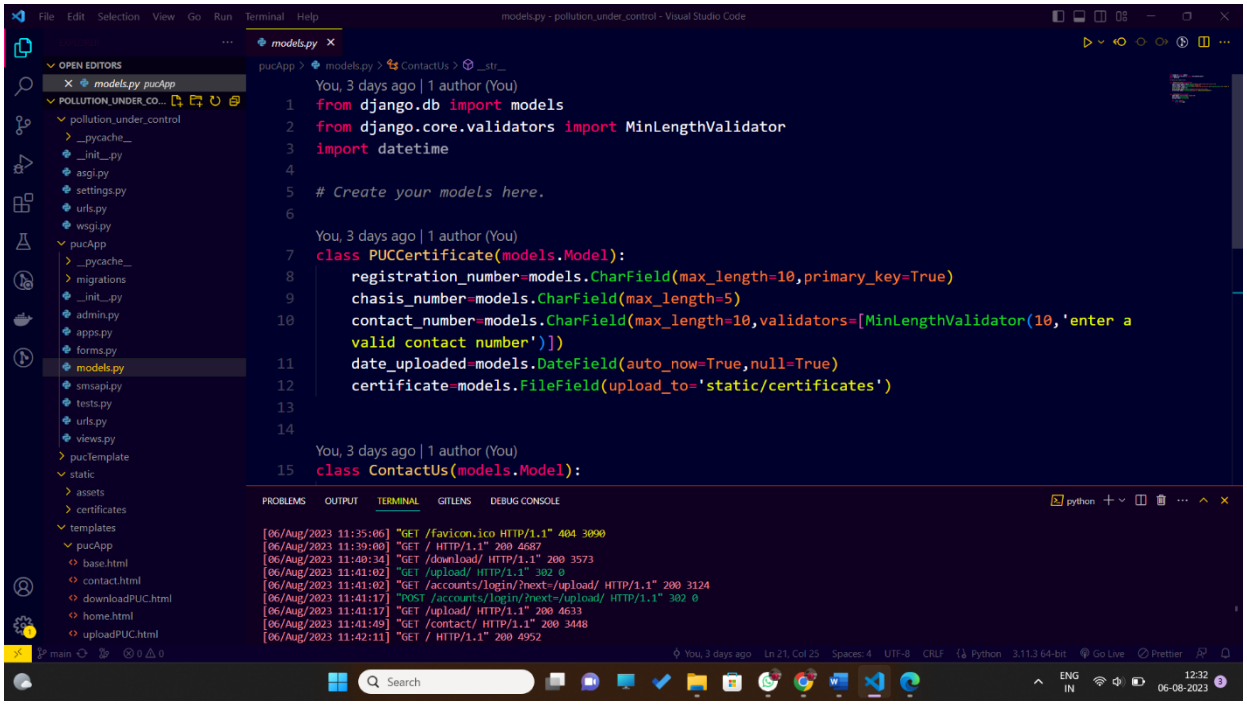
models.py - pollution_under_control - Visual Studio Code
models.py
pucApp > models.py > ContactUs > __str__
You, 3 days ago | 1 author (You)
from django.db import models
from django.core.validators import MinLengthValidator
import datetime
# Create your models here.
You, 3 days ago | 1 author (You)
class PUCCertificate(models.Model):
registration_number=models.CharField(max_length=10,primary_key=True)
chasis_number=models.CharField(max_length=5)
contact_number=models.CharField(max_length=10,validators=[MinLengthValidator(10,'enter a valid contact number')])
date_uploaded=models.DateField(auto_now=True,null=True)
certificate=models.FileField(upload_to='static/certificates')
You, 3 days ago | 1 author (You)
class ContactUs(models.Model):
PROBLEMS OUTPUT TERMINAL GITLENS DEBUG CONSOLE
[06/Aug/2023 11:35:06] "GET /favicon.ico HTTP/1.1" 404 3090
[06/Aug/2023 11:39:00] "GET / HTTP/1.1" 200 4687
[06/Aug/2023 11:40:34] "GET /download/ HTTP/1.1" 200 3573
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[06/Aug/2023 11:41:17] "POST /accounts/login/?next=/upload/ HTTP/1.1" 302 0
[06/Aug/2023 11:41:17] "GET /upload/ HTTP/1.1" 200 4633
[06/Aug/2023 11:41:49] "GET /contact/ HTTP/1.1" 200 3448
[06/Aug/2023 11:42:11] "GET / HTTP/1.1" 200 4952
Search
ENG IN
12:32 06-08-2023

11.CONCLUSION

In conclusion, the implementation of a mini project focused on Pollution Under Control Certificate Reminders is an imperative step towards addressing the critical issue of pollution and its adverse effects on our environment and public health. By leveraging technology, community engagement, and policy advocacy, this project offers a promising approach to combat vehicular emissions and improve air quality.

The motivation behind this project is rooted in the urgent need for environmental preservation, public health benefits, and sustainable development. By promoting timely PUC certificate renewals, the project will contribute significantly to reducing air pollution, safeguarding natural resources, and fostering a cleaner and greener environment for future generations.

Moreover, the project's potential for scalability and replicability offers hope for wider impact as it can inspire other regions facing similar pollution challenges to adopt similar strategies. The project's success will not only contribute to localized pollution control but also advocate for stronger enforcement of pollution control regulations on a broader scale.

Ultimately, the success of this mini project relies on the collaborative efforts of various stakeholders, including government authorities, NGOs, educational institutions, and most importantly, the active participation of the local community. By working together, we can raise awareness, empower citizens, and drive positive behavioral changes toward pollution control.

12.REFERENCES

Some general sources related to PUC Renewal Reminder that you can explore for your literature survey:

- National Informatics Center(Transport Dept):https://puc.parivahan.gov.in/
- The Times Of India Article: https://timesofindia.indiatimes.com/city/delhi/sms-reminders-for-pollution-check-soon/articleshow/59260411.cms