EPR PORTAL FOR PLASTICS

A PROJECT REPORT

Submitted by

NIHAL K (TKM20MCA-2026)

to

The APJ Abdul Kalam Technological University

In partial fulfillment of the requirements for the award of the degree of

MASTER OF COMPUTER APPLICATIONS

Thangal Kunju Musaliar College of Engineering
Kerala

DEPARTMENT OF COMPUTER APPLICATIONS

JULY 2022

DECLARATION

I undersigned hereby declare that the project report on **EPR PORTAL FOR PLASTICS**, submitted for partial fulfillment of the requirements for the award of degree of Master of Computer Applications of the APJ Abdul Kalam Technological University, Kerala is a bonafide work done by me under supervision of Dr. Fousia M Shamsudeen. This submission represents my ideas in my own words and where ideas or words of others have been included,I have adequately and accurately cited and referenced the original sources. I also declare that I have adhered to ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact or source in our submission. I understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not been previously formed the basis for the award of any degree, diploma or similar title of any other University..

Kollam
18-07-2022

NIHAL K

DEPT. OF COMPUTER APPLICATIONS TKM COLLEGE OF ENGINEERING

KOLLAM

2021 - 22

CERTIFICATE

This is to certify that the report entitled **EPR PORTAL FOR PLASTICS** submitted by **NIHAL. K** (TKM20MCA-2026) to the APJ Abdul Kalam Technological University in partial fulfillment of the Masters degree in Computer Applications is a bonafide record of the project work carried out by him under our guidance and supervision. This report in any form has not been submitted to any other University or Institute for any purpose.

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Date:19-07-2022

TO WHOM IT MAY CONCERN

This is to certify that Mr. Nihal K from TKM College of Engineering, Kollam is pursuing the internship on **"EPR Portal For Plastics"** project at **Knowledge Lens Pvt Ltd** starting from 2nd May 2022 to till 22nd July 2022. During the period of his training with us he is found punctual, hardworking, and inquisitive.

We wish him all the success in future endeavors.

Yours Truly,

For **Knowledge Lens Pvt Ltd**.

Jayashree S

HR Manager

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Acknowledgement

First and foremost I thank GOD almighty and my parents for the success of this project. I owe sincere gratitude and heart full thanks to everyone who shared their precious time and knowledge for the successful completion of my project.

I am extremely grateful to **Dr. Fousia M Shamsudeen**, Head of the Department, Department of Computer Applications, for providing me with best facilities.

I would like to thank my coordinator and project guide **Prof. Vaheetha Salam**, Department of Computer Applications, who motivated me throughout the project .

I would like to thank my external coordinator **Mr. Amal G Jose** and **Mr. Chandrakanth Gottam**, Knowledge Lens, who guided me throughout my work.

I profusely thank all other faculty members in the department and all other members of TKM College of Engineering, for their guidance and inspirations throughout my course of study.

I owe my thanks to my friends and all others who have directly or indirectly helped me in the successful completion of this project.

NIHAL. K

ABSTRACT

EPR PORTAL FOR PLASTICS, provides framework for implementation of Extended Producer Responsibility.The Ministry of Environment, Forest and Climate Change (MoEFCC), hereinafter referred to as The Ministry , notified Plastic Waste Management(PWM) Rules , 2016 on 18 March 2016 and the Solid Waste Management Rules, 2016 on 8 April 2016. As plastic waste is part of solid waste, both the rules apply to manage plastic waste in the country. The rules cast Extended Producer Responsibility (EPR) on Producer, Importer, Brand Owner for collection and recycling of plastic packaging waste. EPR shall be applicable to both pre-consumer and post-consumer plastic packaging waste.

This portal helps to frame action plan to satisfy the rule introduced by The Ministry of Environment, Forest and Climate Change and thereby manage the plastic waste produced in the country.The ministry would be able to know whether all the plastic manufacturers are working according to the rules. EPR Portal is an extension of the Central Pollution Control Board that would help them in effective implementation and monitoring of the EPR framework at a national level.

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Chapter 1

Introduction

EPR PORTAL FOR PLASTICS, is an extension of the Central Pollution board that would help them in effective implementation and monitoring of the EPR framework at a national level. The Plastic Waste Management Rules, 2016, require plastic waste generators to take measures to reduce plastic waste production, to not litter with plastic garbage, to separate waste at the source, and to transfer separated waste to local bodies or agencies authorised by local bodies. Local governments, gramme panchayats, trash generators, retailers, and street vendors are also mandated to control plastic waste by the foundations.

The regulations assign Extended Producer Responsibility (EPR) to Producers, Importers, and Brand Owners for the purpose of collecting and recycling plastic packaging garbage. EPR shall apply to both pre- and post-consumer plastic waste packaging. The regulation establishes the basis for implementing Extended Producer Responsibility. The rule established the roles and obligations of Producers, Importers, Brand Owners, CPCB/SPCBs/PCCs, recyclers, and waste processors for the efficient application of the EPR.

The Central Pollution panel requires their existing portal to be upgraded along with additional features that has got to be developed that may help them in effective implementation and monitoring of the EPR framework at a national level.

1.1 Objective

The goal is to accomplish the following:

- To assist stakeholders to spot the most effective suitable EPR Model.
- To assist PIBO in framing EPR Action Plan.
- To guide PIBO with PWM Registration and effective EPR implementation processes.
- To assist EPR executors and monitors identify varied opportunities within the Plastic Waste Management Sector.
- To encourage the states to be learned from best performers and adopt suitable methodologies for monitoring and rule enforcement.
- To splice up the Plastic Waste Management Eco-system.

1.2 Company Profile

The discovery of hidden insights from Big Data is automated and made simple with the help of Knowledge Lens's range of lenses. Our goal is to transform dark data into actionable business insights. We are big data technology nerds with a broad spectrum of massive data projects ranging from big data engineering to data science and considerable industry expertise.

1.2.1 Products

- **iLens(Intelligent Lens)**
  One platform is offered by iLens for the intelligent integration of numerous devices or sensors in major businesses, the manufacturing sector, homes, commercial buildings, etc. In order to record statistical data in real time, iLens offers a MQTT interface for smooth integration of various sensor devices in the field. iLens is prepared to create alerts, alarms supported the foundations, and supported pre-configured rules.
- **Mlens**
  You can manage disaster recovery for your big data and platforms with MLens, a one-step solution. Features of MLens :

1. Big Data Backup Migration
2. Automated Disaster Recovery
3. Data Encryption, compression Archival
4. High Speed Batch Data Ingestion
5. Monitoring Scheduling
6. Secured Access controls

- **AiLens**

  The next-generation AI platform offers a shared workspace with an experiment designer, a modelling feature engineering workbench, and integrations for enterprise security and DevOps with the repository of AI/ML assets.

  AiLens is a computer science intelligent assistant designed with a single graphical user interface for creating Data Engineering and AI/ML pipelines. The unified AI orchestrator in AiLens allows users to launch model executions on any runtime, including Tensorflow, SparkML, H2O, MxNet, Theano, PyTorch, and AWS / Azure, via a console. Due to the meta model-driven platform, AiLens is somewhat adaptable because the user experience remains constant regardless of new technology developments. Our software stands out from the competition by a wide margin thanks to its intuitive job submission and monitoring structure, secure integration with external entities, built-in encryption, and support for role-based access control. Key features are:

  1. Any AI Stack, Any AI Algorithm, Anywhere
  2. Unified AI Orchestrator
  3. Simplified User Experience
  4. Intelligent Assistant for AI
  5. Integrated Data Preparation AI Modelling Environment
  6. Seamless Enterprise Security Integration

- **GLens**

  The GLens product package for monitoring ambient air quality, industrial emissions, and effluent discharges uses real-time data acquisition, monitoring, and analytics. A complete solution for all industrial environmental demands is offered by GLens DAS

Software, GLens Server Platform, and GLens Environ Data Logger. The platform has a relatively plug-and-play format that allows it to connect to any analyzer, sensor, or device and acquire data in real time. The key features of GLens are::

1. Rest based open protocol for multi-client deployment.
2. Real time alerts and alarms with SMS and Email integration.
3. Remote calibration and configuration of analyzers.
4. Plug and play complete protocol integration with any analyzer make and model. – Integrated and data quality codes as per ISO 7168.
5. Integrated analytics and predictive models for effective pollution control.
6. Live consolidated industry dashboards.

1.2.2 Services

- **Big Data Engineering Services**

  We provide complete architectural, design, programming, testing, and deployment services for large data protection.

- **Big Data Security Services**

  We are a specialised consulting organisation that provides Big Data Services.

- **Big Data Analytics Services**

  Using our pre-built analytical Lens, we uncover insights from a variety of data sources.

- **Big Data Competency Development**

  Although we lack specialised Big Data knowledge, we provide one of the best Big Data Competency Development programmes for the organisation.

Chapter 2

Literature Survey

Literature review is that the comprehensive study and interpretation of literature that relates to a selected topic.When doing a literature review, research questions are defined, and then relevant literature is sought for and analysed to address these issues. By reanalyzing the study's data, it is possible to acquire fresh insights, which is an advantage of literature reviews. A literature review is both a summary and an explanation of the complete and current state of information on a topic as contained in academic books and journal articles. There are two types of literature reviews you may be required to write in college: one is written as a stand-alone assignment in a course, while the other is done as an introduction to or preparation for a longer piece of writing, typically a thesis or research report. The primary objective and perspective of your review, as well as the hypothesis or thesis argument you develop, depend on the type of review you are writing. You can learn the distinctions between these two types by reading published literature reviews or the introductory chapters of theses and dissertations in your subject area. Note the framework of their arguments and the manner in which they approach the issues.

2.1 Purpose of the Literature Review

1. It chooses top-notch research papers or studies that are pertinent, significant, important, and valid and summarises them into a single comprehensive report to provide readers with quick access to information on a certain issue.

2. By requiring them to describe, assess, and compare original research in this particular field, it gives researchers who are starting their research in a new area a great place to start.

3. It makes sure that researchers don't repeat already completed studies.

4. It can indicate potential directions for future research or suggest topics to concentrate on.

5. It emphasises the important findings.

6. It points up gaps, discrepancies, and inconsistencies in the literature.

7. It offers a helpful critique of the methods and strategies used by other researchers.

2.2 Related Works

The impact of plastic trash is one of the most significant factors influencing national and regional health. Even though plastic is one of the most important commodities in the area market and industry, plastic trash has become a major issue for regional environmental health indicators since it is related to land, coastal, and oceanic life. Numerous piles of plastic from the land make their way to the coast or ocean, where they endanger all forms of life. This work aims to establish a model for regional monitoring of plastic waste. The model is developed using "online" population numbers derived from regional statistical data and the number of public marketplaces. The regional distribution of plastic garbage is displayed using GIS technologies. This study may serve as a paradigm for combining quantitative and spatial data. As part of a complete waste management scenario included in a geospatial database, the first phase of this research determined that the computation of plastic trash formation at the population level for regional assessment was basic and significant. The second phase is the construction of a model design draught for estimating plastic trash production based on a numerical model and a geographical model developed using GIS technology. As the economic activity of central

Java is 5.82 times lower than that of other Java islands, the third stage of model development utilised 15 kg/person/year as the foundation for numerical plastic waste assessment. In its fourth phase, this research used Google Map to estimate the locations of public markets in order to collect spatial data and improve the spatial model of plastic waste distribution in Central Java. Evaluation of plastic waste is an important step for remote sensing and GIS approaches. This study analysed per capita utilising data from the Central Java Statistics Agency for the years 1990, 2000, 2010, and 2018. Using national population data from the BPS multiplied by Indonesia's trash production rate of 0.52 kg/capita/day (kgppd) for plastic waste estimate, percentage of waste generation, and in accordance with the economic characteristics of the Central Java region. Plastic trash assessment based on national population figures from the BPS multiplied by Indonesia's waste production rate of 0.52 kg/capita/day (kg/ppd) for plastic waste estimation, percentage of waste generation, and connects to a commonly seen economic feature in Central Java.[1]

Currently, around 6.3 billion metric tonnes of plastic waste are produced worldwide. If this scenario is not resolved, it is believed that the world would "swim" in plastic if nothing is done. According to studies, microplastics have invaded areas that were previously regarded to be virgin (uncontaminated), such as the Arctic. There are few hypotheses on the health impacts of microplastics. Evidently, though, they have found their way to our tables as flavourings or fish that we consume. In addition, photos of whales that have died from ingesting plastics and other aquatic creatures that have been entangled and suffocated have appeared. Plastic usage has increased substantially over the years, mostly due to the fact that it is an inexpensive, moldable material that, unlike paper, keeps food fresh for extended periods. In recent years, there has been a rise in the development of plastic materials that are less durable, making recycling more challenging. These polymers are considered single-use plastics, and it is believed that just 9 percent of all plastics produced globally have been recycled. To safeguard the environment and its people, there has never been a greater need to investigate plastics as an alternative energy source and for material recovery. [2]

Due to humankind's rising production and use of plastic, plastic trash becomes one of the world's most pressing issues. By 2050, the world may require plastics in the oceans far more than fish. Consequently, it poses a threat to the global environment, economy, and human health. According to the most recent worldwide data, the majority of ordinary plastic garbage is either landfilled, recycled, or burned. Recycling is the least utilised strategy. Degradation

of polymers might take anywhere from 100 to 600 years. They disintegrate into microscopic particles known as ”microplastics” in terrestrial and aquatic environments, which may enter the human body via organic phenomena, skincare products, and drinking water. Before providing the best recommendations for worldwide governments, this study report discussed some global data and issues with handling plastic waste. The introduction, conclusions, and discussion parts were concealed in 90 of the 143 assessed materials, which included papers, books, and websites from a few international organisations. According to the report, both national and international agencies are responsible for controlling plastic waste. The majority of countries lack laws that particularly handles ”plastic trash” as opposed to ”waste in general.” Furthermore, regulations must be vigorously enforced in nations where they are being broken. Individuals' participation in the development of new, creative tactics by their own governments should increase their awareness. Researchers must give further data about the detrimental impact of microplastics on the ecosystem and public health.[3]

In recent years, developers have had a variety of PHP frameworks to select from. Developers have difficulty deciding which frameworks and support features are most important to include in their project. Due to this, web developers are now increasingly required to have a clear understanding of the various frameworks. In this essay, we compiled a number of research papers on several PHP frameworks and contrasted them in a number of aspects, including: Requests per second, memory requirements, and intervals, Numerous files employing Laravel, CakePHP, Codeigniter, symfony2, Phalcon, Symfony, and Yii, among other PHP frameworks. In terms of request per second and memory utilisation, Laravel performs better than competing MVC frameworks. Phalcon, on the other hand, performs better than other MVC frameworks in terms of time and quantity[4]

The analysis was produced as a result of comparing the PHP frameworks Laravel and CodeIgniter in order to increase efficiency when developing the system for managing competitions, merit awards, and competition inside universities. To create the framework with greater productivity, the tests conducted on the two systems—which were created based on the parameters and indicators established—were recorded and analysed. The software tools used are the PHP frameworks Laravel and CodeIgniter, HTML 5, JavaScript, Bootstrap 3.3.6, Microsoft Visio 2010, JMeter, and Quick Line Counter QLC. The hardware tool used is a computer. According to the results, it can be concluded that the Laravel framework increases productivity while developing a system of managing competitions and merit and

opposition Compared to 68.86 percentage compliance with the Framework CodeIgniter, the University complies with 100 percent of the parameters stated inside the analysis, which is higher. The Laravel Framework was used to create the University's competition, merit, and opposition management system since it increases web application development productivity. It is advised that the institution use the system to effectively automate all procedures using this web application. [5]

The advancement of technology has given the world a new perspective. People need applications that can help them because they are so busy. Anyone who wants to successfully manage and plan his programme without forgetting items, especially the important ones, would benefit from to-do list programmes. By utilising new technology in the interest of the developer and user, JavaScript Frameworks offers assistance in terms of recognition, usability, and integration. In this essay, Angular and Vue will be contrasted as the two primary JavaScript frameworks.[6]

The ability to use a Hadoop cluster environment for processing large amounts of data using cloud-based Hadoop has recently attracted a lot of interest. This eliminates the operational challenges associated with on-site hardware purchases, IT support, and installing and configuring Hadoop components like HDFS and MapReduce. ad-hoc Hadoop as a service supports a pay-per-use business model for massive processing and aids in industry specialisation through the auto-scaling Hadoop cluster capability. In this work, many MapReduce jobs, including Pi, TeraSort, and WordCount, have been implemented on a cloud-based Hadoop system using cloud services from Microsoft Azure. MapReduce job performance has been assessed using relevant CPU execution time with different Hadoop cluster sizes. According to the results of the experiment, CPU execution time for roles decreases as the number of knowledge Nodes in the HDInsight cluster rises. This suggests a nice reaction time with improved performance, which is equivalent to greater customer happiness.[7]

Chapter 3

Methodology

EPR PORTAL FOR PLASTICS is an extension of the Central Pollution Control Board that would help them in effective implementation and monitoring of the EPR framework at a national level.The Central Pollution Control Board is currently running a portal for the registration of PIBOs. The existing portal is based on the Standard Operating Procedure for Registration of Producers, Importers Brand-Owners (PIBOs) Under Plastic Waste Management Rules 2016 prepared by CPCB

EPR – PIBOs/PWP was originally conceived as a Central Monitoring Software for All PIBOs s/ PWP/CPCBs/SPCBs/PCC and so on for ensuring 360 performance check. Utilizing Standard web application service, block chain, cryptography techniques and apply Big Data Techniques for Data Analytics. This essentially requires fully optimised data entry system and regulator portal for achieving cause the application. The reporting systems of this Application though requires intense and dedicated involvement of the Higher-level officers of CPCB. The Reporting Systems adopted by OLD CPCB portal is in principle and closely matches GIZ's reporting requirements from the bottom.

3.1 Module Description

3.1.1 Module I (Registration of PIBOS)

- Portal to autocalculate categorywise/statewise EPR targets as per EPR Regulations
- Initial tie-up with PWPs not mandated
- Processing details to be included in the Returns to be filed. Module for filing of returns under preparation
- Processing fees to be split between CPCB/ SPCB.
- Based on upgradation of existing portal and shall be applicable till March 2022; may be further extended, if required
- Application for registration to be rejected / accepted within seven days by CPCB/SPCB/PCC, as applicable

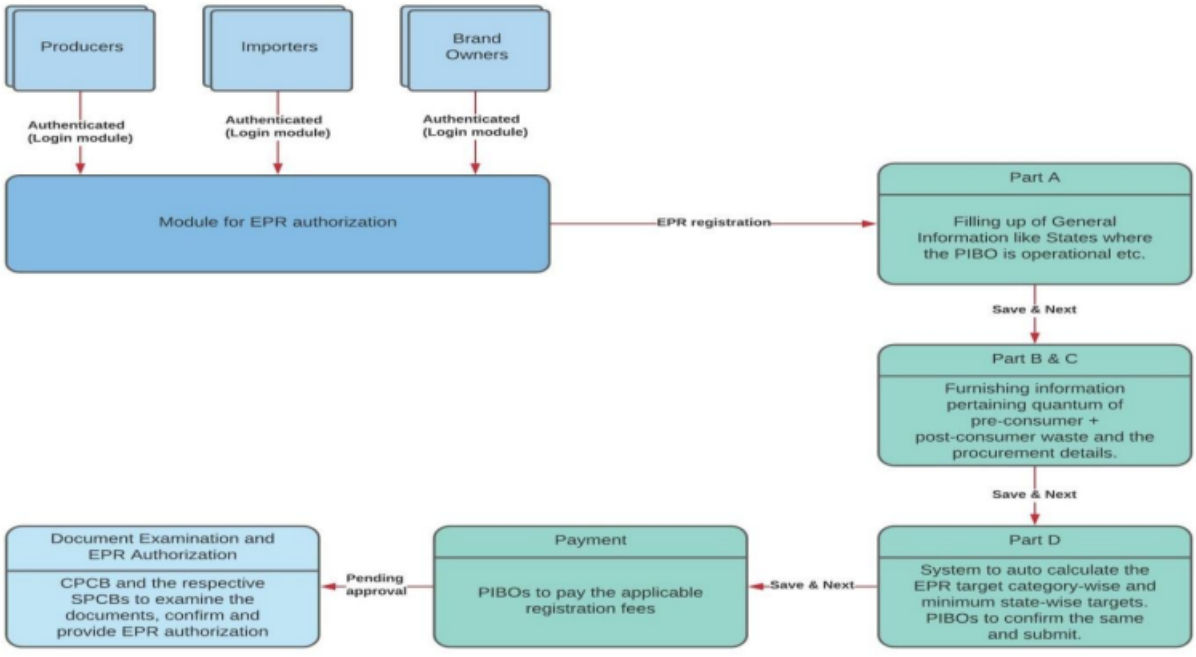

Figure 3.1: Module 1 flow chart

3.1.2 Module II (Registration of PWPs)

- Applicant to submit details–PAN, GST, Aadhar other details as per EPR
- Regulations
- Coding of plastic waste /processing technology / product
- Processing capacity in terms of category of plastic waste processed and production capacity in terms of category of product produced to be provided
- Plants details including GPS location, geotagged pictures of production area, type, capacity and pictures of plant machinery to be provided
- Application for registration to be rejected/ accepted within fifteen days by concerned SPCB/PCC

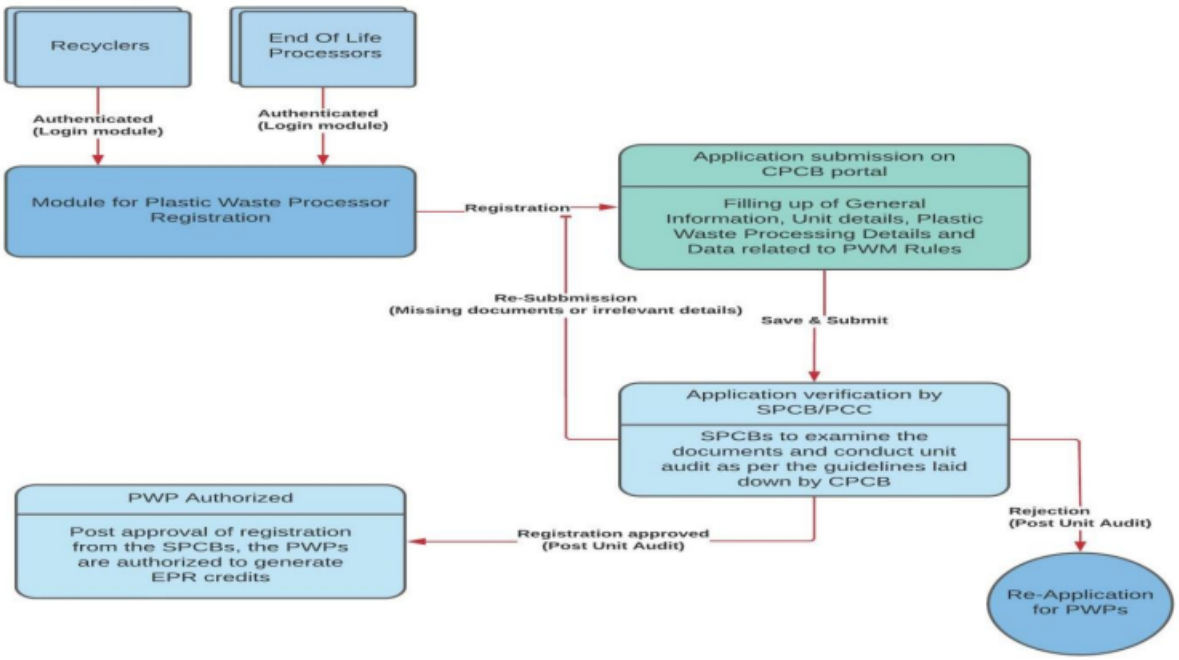

Figure 3.2: Module 2 flow chart

3.2 RESTFul Webservices

REST is an HTTP-based architecture based on web standards. It is centred on resources, where each component is a resource and resources are accessed via a standard interface utilising ”HTTP” protocols.

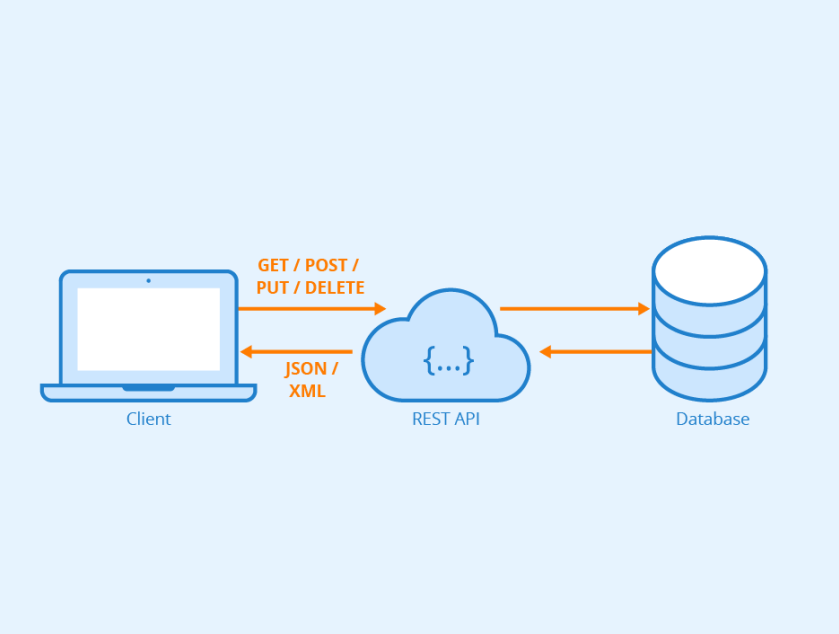

Figure 3.3: REST working Diagram

3.2.1 Working

It is helpful to divide the process into two parts in order to comprehend how RESTful APIs transmit data between clients and applications.

3.2.2 Client Request

A client is an application or anybody who utilises the API’s services. Your software would be the client if you were connecting with a web site such as Instagram or YouTube. If you requested a URL, your browser would be considered the client.

The most common HTTP methods are:

- GET: To retrieve a resource.
- POST: To create a new resource.

- PUT: To edit or update an existing resource.
- DELETE: To delete a resource.

Examples of HTTP requests include an HTTP GET request to Instagram's API and a POST request to upload a new photo. A contact centre platform that interfaces with an auto-attendant application may use the PUT command to modify or delete a custom greeting.

3.2.3 Server Response

The exact information that an API gives a client is referred to as a resource. Anything from hashtags to profiles, comments, web links, tweets, etc. might be included in this. Each resource is stored on a server and has a special name called a resource identifier.

When a client uses a RESTful API to submit a request, the server sends the client's system a standardised representation of the resource's state. This means that instead of sending the client the actual resource, the server instead sends a representation of the resource's state, or the status of the resource at a specific timestamp.

To make responses easier to understand, they are returned in a simple format. JSON (JavaScript Object Notation) is a popular format because both humans and machines can understand it. and and excels in its strides toward promoting web accessibility. It's also compatible with many other programming languages.

Some alternative API data formats include XML, YAML, CSV, HTML, and plain text.

3.3 System Specifications

The application development architecture recognized for this project is specified in this section on the basis of requirements.

3.3.1 Software Specification

- Designing tools : Angular
- Cloud service used : Azure
- Web server : Nginx
- Web Browser : Any web browser
- Database : MySQL
- Backend: php codeIgniter Framework

3.3.2 Software Description

Angular

Angular is a platform that facilitates the creation of web-based applications. Angular includes declarative templates, dependency injection, end-to-end tools, and integrated testing. Effective solutions to development problems. Angular enables developers to construct Web applications, mobile applications, and desktop applications.

Features:

- Components : Components facilitate the division of applications into several components. This contributes to improved application maintenance over time.
- TypeScript :This is a superset of JavaScript that Microsoft maintains.
- Services :A service is a piece of code that several application components may utilise in concert. For example, a data component that extracted information from a database may be made accessible as a shared service for use by several applications. Environmental setup.

- Editor :There are several editors available for Angular development, including Visual Studio Code.

  MySQL

  MySQL is an effective data storage and management system. Typically, a database stores data in an organised format. It has been tested with a number of compilers to check for flaws and inconsistencies.

Features:

- Open-Source : MySQL is an open-source application that anybody may download, use, and edit. It is straightforward and free to use. The MySQL source code may be studied and altered to meet specific requirements. The application is governed by the GNU General Public License, or GPL, which specifies what may and cannot be done with it.
- Quick and Reliable :MySQL effectively saves data in memory, ensuring that it is consistent and not duplicated. Therefore, MySQL allows for rapid data access and manipulation.
- Scalable : Scalability is the capacity of a system to run without issue with little quantities of data, large amounts of data, clusters of machines, etc. The MySQL server facilitates the management of large databases.
- Data Types :It includes a variety of data types, including unsigned and signed integers, floats, doubles, characters, variable characters, text, blobs, dates, times, datetimes, timestamps, years, and more.
- Character Sets : It supports a variety of character sets, such as German, Ujis, latin1 (cp1252 character encoding), and other Unicode character sets.

php codeIgniter Framework

A PHP MVC framework called CodeIgniter is used to create web apps quickly. CodeIgniter offers libraries that are preconfigured for connecting to databases and carrying out a variety of tasks, like sending emails, uploading files, managing sessions, etc.

Features:

- Small footprint: Nearly 2MB of source code makes up the CodeIgniter framework. This makes understanding CodeIgniter's operation simple. Additionally, it makes upgrading and deploying it easier.

- Blazing fast : Applications that load quickly tend to be more popular among users. You will notice that modern frameworks load in less than a second after installation if you have experience with them. CodeIgniter often loads in under 50 milliseconds. When using the CodeIgniter framework, you don't have to spend the additional effort on optimization that you would if you were using another framework.
- Loosely coupled : TThe built-in functionalities are designed to function largely independently of other components. This makes upkeep and improvement straightforward.
- MVC Architecture :Model-View-Controller is an architectural structure used by the PHP CodeIgniter framework. When using online apps, it is industry best practise. Data, business logic, and display are separated by MVC.

3.4 System Design

System Design for the EPR Project is acheived by successfully implementing the design concepts like Abstraction , Modularity , Data Structure etc.

3.4.1 Architectural Design

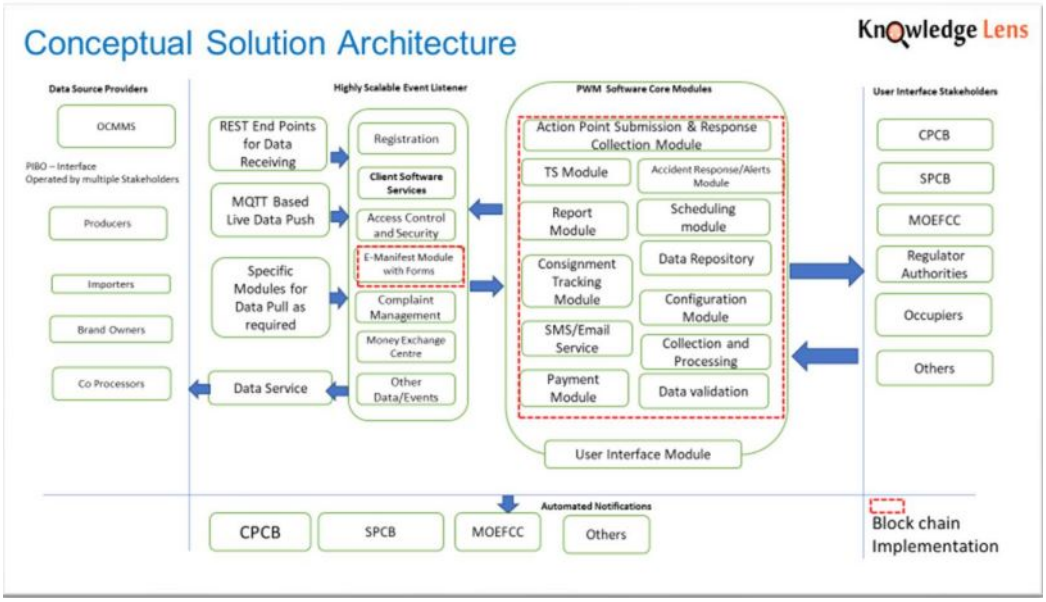

Figure 3.4: Architectural Design

The link between the main structural pieces of the programme is defined by the software architecture of a computing system, which is the system's structure made up of software

components, their externally observable attributes, and the interaction between them. The interplay of the subsystems inside the analysis model, as well as the analysis models themselves, can be used to deduce the modular structure of a computer programme. The main goal is to create a modular programme structure and show how the modules relate to one another. Architectural design is the process of defining the subsystems that make up a system and creating the framework for subsystem control and communication. A description of the software architecture is the result of the design process. The users provide or receive data to and from the backend using Data Service.Based on different Event Listeners the data is distributed to the respective modules and runs the corresponding actions and result is given back to the user.

3.5 User Interface Design

EPR UI is the component for viewing and generate various reports over the data acquired from Analyzer.

- Real time data charts and reports.
- Latest Directions issued by CPCB
- Easy access and range of filter options
- List of Apps by CPCB
- Different UI corresponding to different users.

3.6 Input Design

The process of transferring user-generated inputs to a computer-based representation is known as input design. How input is handled during design decisions determines how data are accepted for computer processing. As part of the overall system design, input design requires careful consideration and includes defining the channels through which activities are to be carried out. In terms of the tools needed and the labour involved, gathering input data is the most expensive component of the system. Data is received for computer processing in input design, and input to the system is done by mapping with the aid of some map support or linkages. The most

frequent reason for data processing failures is inaccurate input data. The following factors are taken into account when designing input.

- What data to input?

  The initial step s input design is to determine what data to input. The input design of EPR roject has made so as to reduce the user inputs to the process. The user is provided with as to enable him/her to browse through specific categories to reach his choke and just need to select one among the choice.

- What medium to use?

  The built-in functionalities are designed to function largely independently of other components. This makes upkeep and improvement straightforward.

In this EPR Project's , all the text boxes are validated. If any mandatory field is not filled then it will display the message.
The features of the input design of EPR Project are:

- Input design is carried out in order to have the most effective means of user and system interaction.
- There have been steps done to reduce user inputs.
- The process is simplified for various project users and extra steps are removed.
- By using a password, the user is given additional security.

The project EPR accepts various kind of input from of users and Administrator .The input forms are made to be as user-friendly as possible, with logical grouping of similar data and controls aligned such that the user feels at ease inputting data into the system. Always work on the assumption that mistakes will happen. They must be discovered during entry and fixed before the data is stored or processed. All approved Users' user IDs and passwords guarantee the system's security. Only individuals whose IPs are enabled in the cloud processing engine are able to access the web as a security measure for the admin module.

3.7 Output Design

The output of the system is the information and outcomes it generates. The pagination, column header format, and location attributes are all provided. This determines the information to be delivered, chooses the layout and output medium, arranges the information's display in a way that is acceptable for mes, and selects the method for sending the output to the intended recipient.

EPR Project was able to provide users with required format and precision.The output displayed was able to convey the accurately to the users. A well-designed form was used in the project with clarity stated captions and self-instructing.

Chapter 4

RESULT AND DISCUSSION

The primary quality control method used in software development is testing. Following the coding stage, testing purposes are served by running the accessible computer programmes. Testing must find flaws made during the earlier phase as well as those introduced during development. So, the purpose of testing is to find programme requirements, design, or coding flaws.

- A programme is tested by being run with the goal of identifying any errors.
- A excellent test case is one that has the highest chance of spotting an error that hasn't been identified yet.
- A test that finds an error that hasn't been found yet is successful.

Our objective is to develop tests that systematically uncover many sorts of issues with minimal time and effort. Testing indicates that software functionalities appear to operate as expected and that performance criteria appear to have been met. The information acquired during testing is an excellent predictor of programme reliability and a partial indicator of software quality as a whole. Testing has one drawback, however: it can only demonstrate the presence of software defects, not their absence.

4.1 Testing and it's types used

The main task following software development is to determine whether the experimental results and the actual results agree. Testing is the process in question. It is employed to ensure that the created system is free from errors.Testing's primary purpose is to find errors and missing operations by running the software. Additionally, it makes sure that the developer satisfies all of the project's goals. Testing's objective is to determine is to identify defects in the developed software as well as ways to increase its correctness, usability, and efficiency. It seeks to gauge a software program's performance, functionality, and specification. The developed programme is put through tests, and the outcomes are compared to the required documentation. Debugging is carried out when there are too many faults that have happened. After debugging, the software is once more tested to make sure there are no errors. Unit testing, integration testing, and system testing are the main testing methodologies used in this project.

- In unit testing, tested to each distinct piece of software. It ensures that the software's many components all function as intended.
- In integration testing, the integrated distinct components are examined to see whether or not the intended purpose was accomplished. It helps us find any problems that might appear after the units are combined.
- The entire piece of software is evaluated during system testing to make sure it meets all the requirements.

4.2 Output Screens and Results

1. Home page:

   This is the main landing page. It includes a login section and navbar which points to different pages which include all the details of pollution control standards.

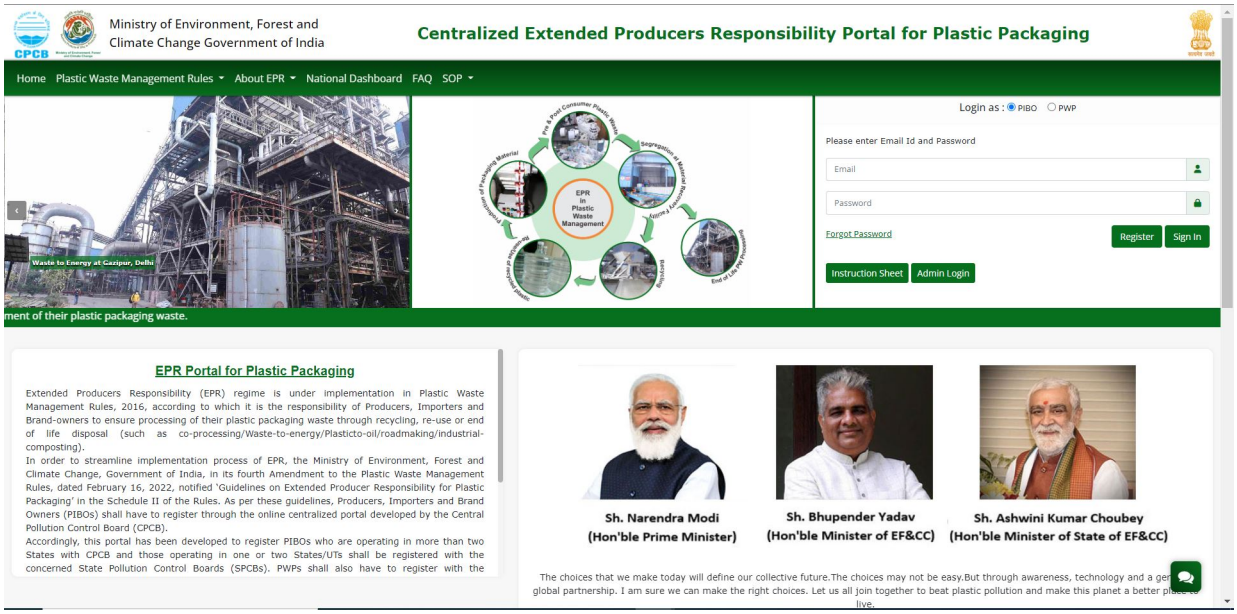

Figure 3.1: Home Page

2. Login section

   The user need to select the category of the user for successfull login.

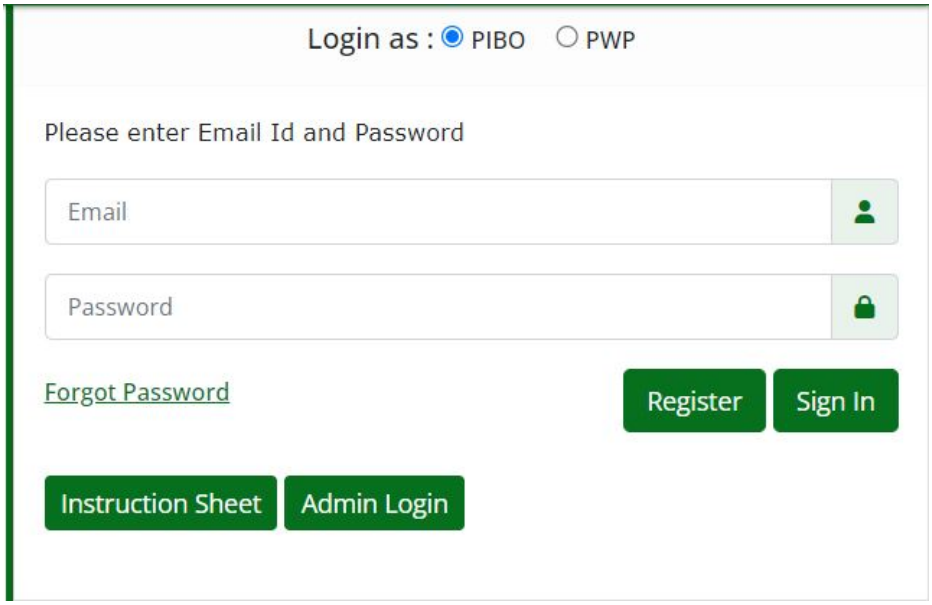

Figure 3.2: Login Section

3. Registration Page

   This is the registration form for registering in the cpcb portal.

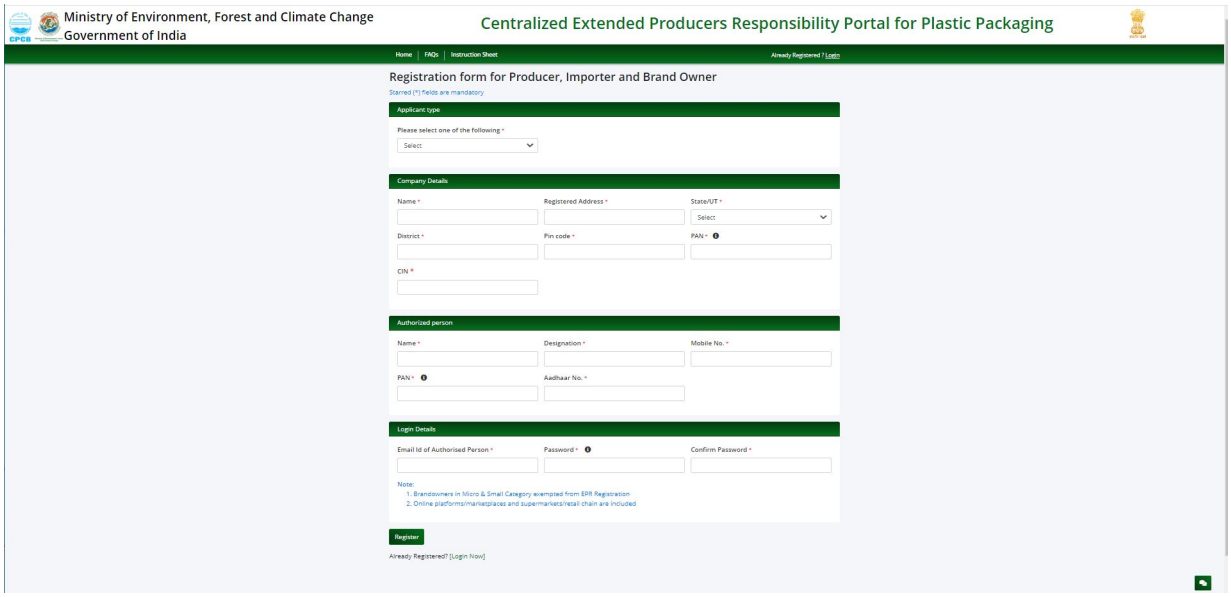

Figure 3.3: Registration Page

4. PWP Dashboard

   This is the main landing page for PWP user. PWP user account is activated only after successfull payment and accepted by CPCB/SPCB user.

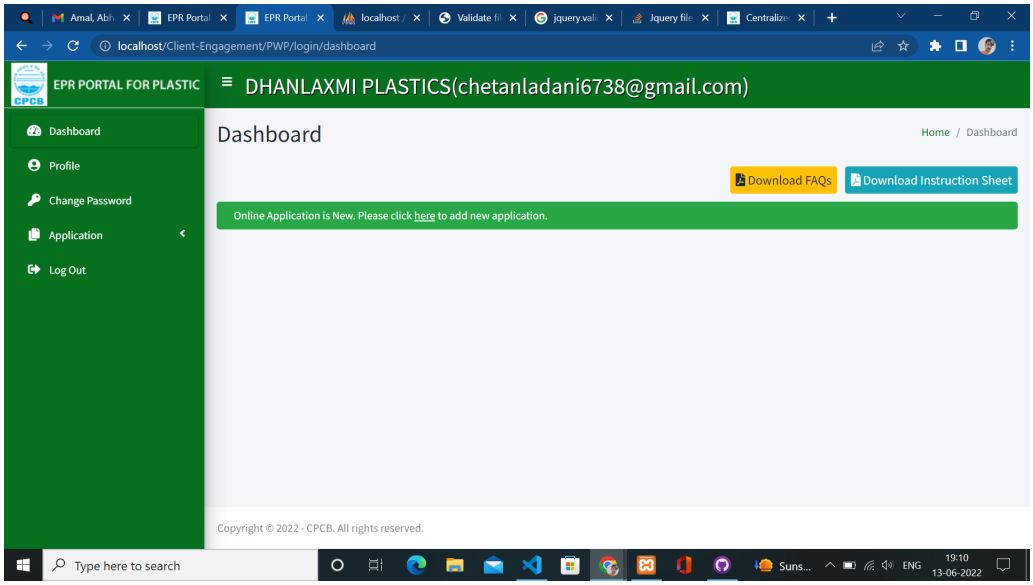

Figure 3.4: PWP Dashboard

5. PIBO Dashboard

   This is the main landing page for PIBO user. PIBO user account is activated only after successfull payment and accepted by CPCB/SPCB user.

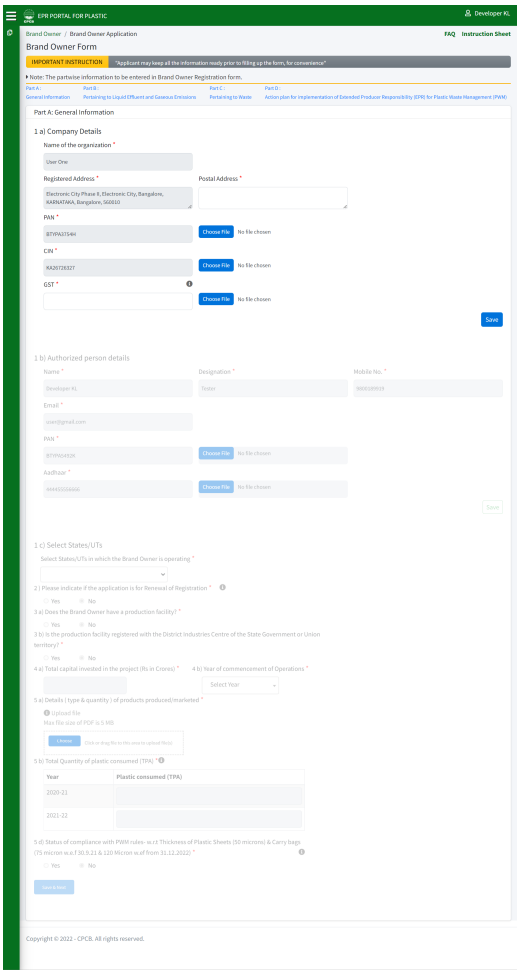

Figure 3.5: PIBO Dashboard

Chapter 5

CONCLUSION

The EPR Portal For Plastics project aimed to minimize user efforts to monitor and control plastic pollution as per industrial rules and regulations. The system's necessity has been determined in an initial effort. A thorough research that is user-friendly and simple to use has been created to satisfy user needs. This particular system has been attractively built so that even a user with little technical expertise might utilise it without difficulty.

5.1 Future Enhancement

The system is designed in such a way that addition of new modules can be done without much difficulty. In order to make the system as versatile and user-friendly as possible, the advanced characteristics of this technology were taken into consideration. All SRS requirements have now been implemented in the system.

REFERENCES

[1] A. A., Alalfi, M. H., Cordy, J. R., Dean, T. R. Almonaies, "Towards a framework for migrating web applications to web services. In Proceedings of the 2011 Conference of the Center for Advanced Studies on Collaborative Research," , 2011, p. 229.

[2] Z. S. Mazhandu and E. Muzenda, "Global Plastic Waste Pollution Challenges and Management," 2019 7th International Renewable and Sustainable Energy Conference (IRSEC), 2019, pp. 1-8, doi: 10.1109/IRSEC48032.2019.9078268.

[3] A. Alqattaf, "Plastic Waste Management: Global Facts, Challenges and Solutions," 2020 Second International Sustainability and Resilience Conference: Technology and Innovation in Building Designs(51154), 2020, pp. 1-7, doi: 10.1109/IEEECONF51154.2020.9319989.

[4] H. Abutaleb, A. Tamimi and T. Alrawashdeh, "Empirical Study of Most Popular PHP Framework," 2021 International Conference on Information Technology (ICIT), 2021, pp. 608-611, doi: 10.1109/ICIT52682.2021.949167

[5] O. C. Novac, D. E. Madar, C. M. Novac, G. Bujdosó, M. Oproescu and T. Gal, "Comparative study of some applications made in the Angular and Vue.js frameworks," 2021 16th International Conference on Engineering of Modern Electric Systems (EMES), 2021, pp. 1-4, doi: 10.1109/EMES52337.2021.9484150.

[6] A. Bhardwaj, V. K. Singh, Vanraj and Y. Narayan, "Analyzing BigData with Hadoop cluster in HDInsight azure Cloud," 2015 Annual IEEE India Conference (INDICON), 2015, pp. 1-5, doi: 10.1109/INDICON.2015.7443472.

[7] John Savill, "Managing Azure," in Microsoft Azure Infrastructure Services for Architects: Designing Cloud Solutions , Wiley, 2020, pp.359-397, doi: 10.1002/9781119596608.ch11.

[8] U. M. Ibrahim, S. A. Adeshina, S. Thomas, A. N. Obadiah, S. Hussein and O. E. Aina, ”Design and Implementation of a Plastic Waste Sorting System,” 2019 15th International Conference on Electronics, Computer and Computation (ICECCO), 2019, pp. 1-4, doi: 10.1109/ICECCO48375.2019.9043197.

[9] F. Shaikh, N. Kazi, F. Khan and Z. Thakur, ”Waste Profiling and Analysis using Machine Learning,” 2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA), 2020, pp. 488-492, doi: 10.1109/ICIRCA48905.2020.9183035.

[10] C. Raghumani Singh and M. Dey, ”Solid waste management of Thoubal Municipality, Manipur- a case study,” International Conference on Green technology and environmental Conservation (GTEC-2011), 2011, pp. 21-24, doi: 10.1109/GTEC.2011.6167636.

APPENDIX

Screenshots

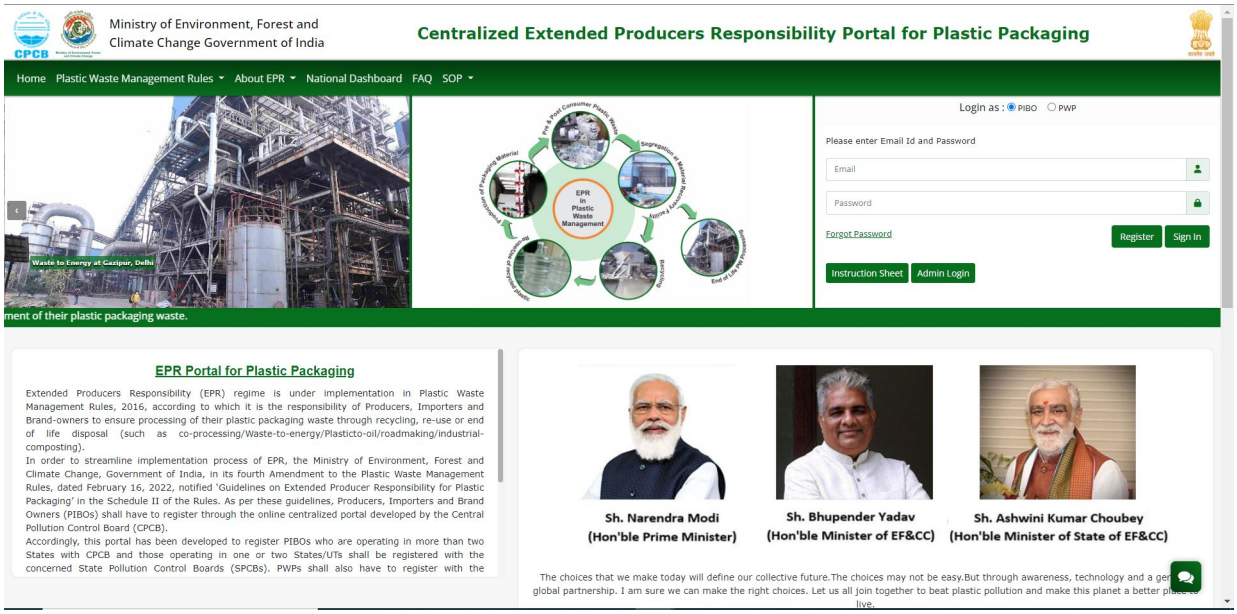

Figure A.1: Login Page

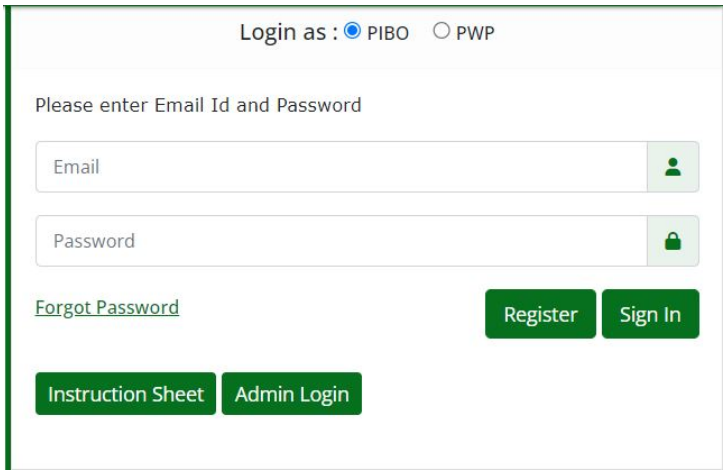

Figure A.2: Login Section

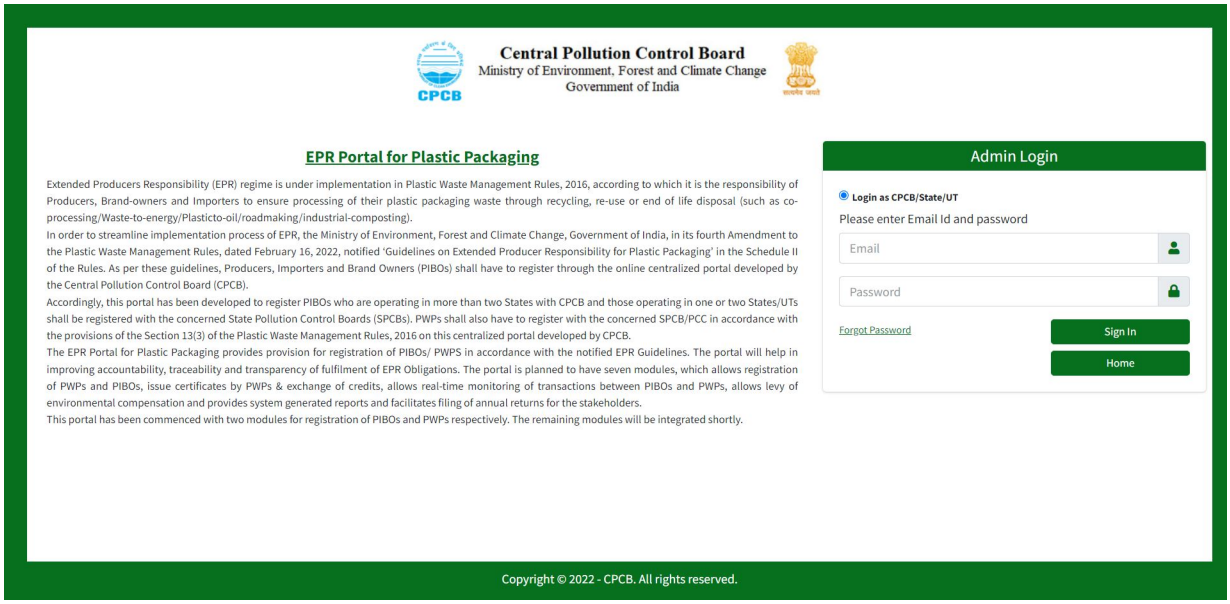

Figure A.3: Admin Login

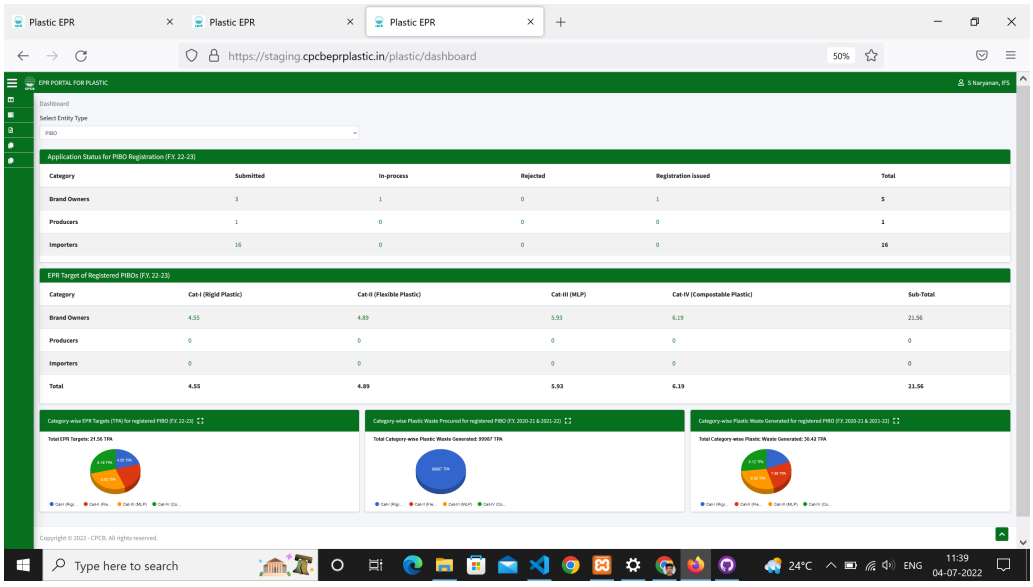

Figure A.4: Admin Dashboard

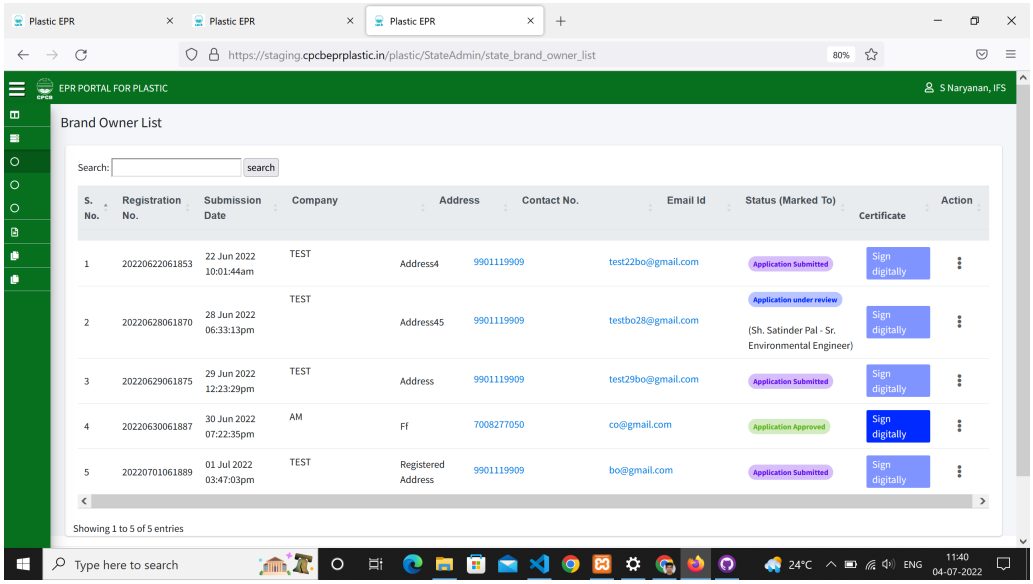

Figure A.5: Admin : View Brand Owners

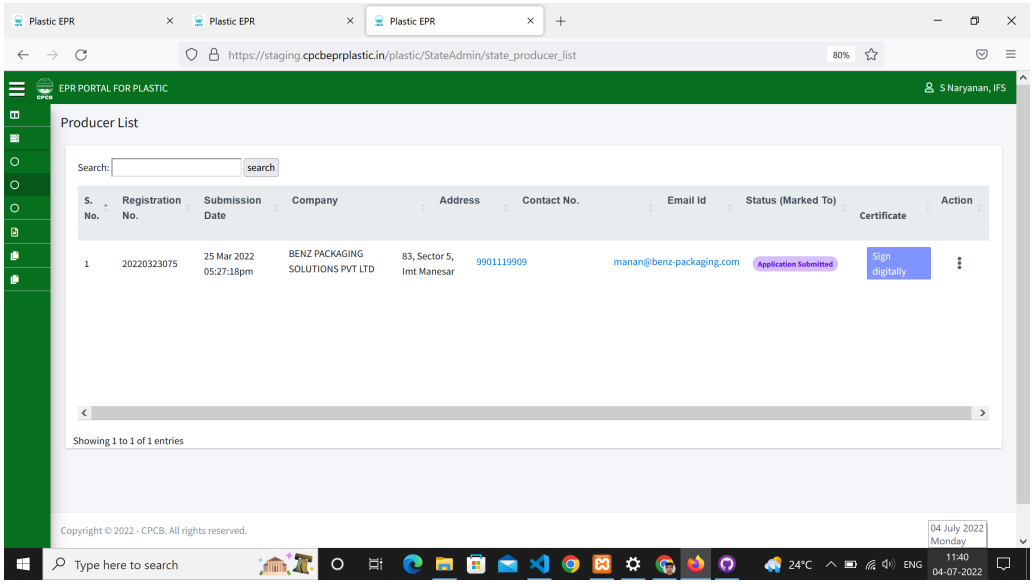

Figure A.6: Admin : View Producers

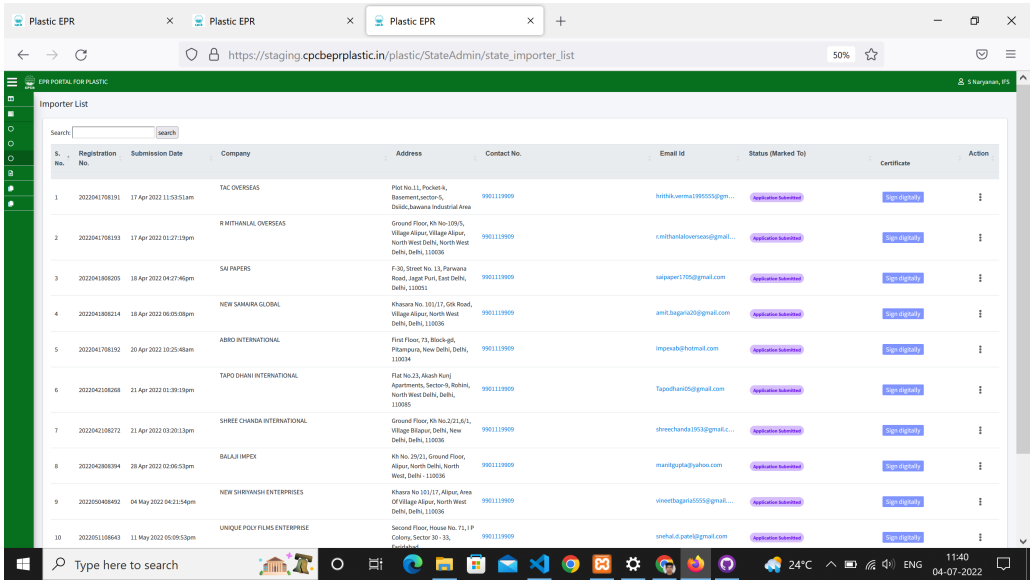

Figure A.7: Admin : View Importers

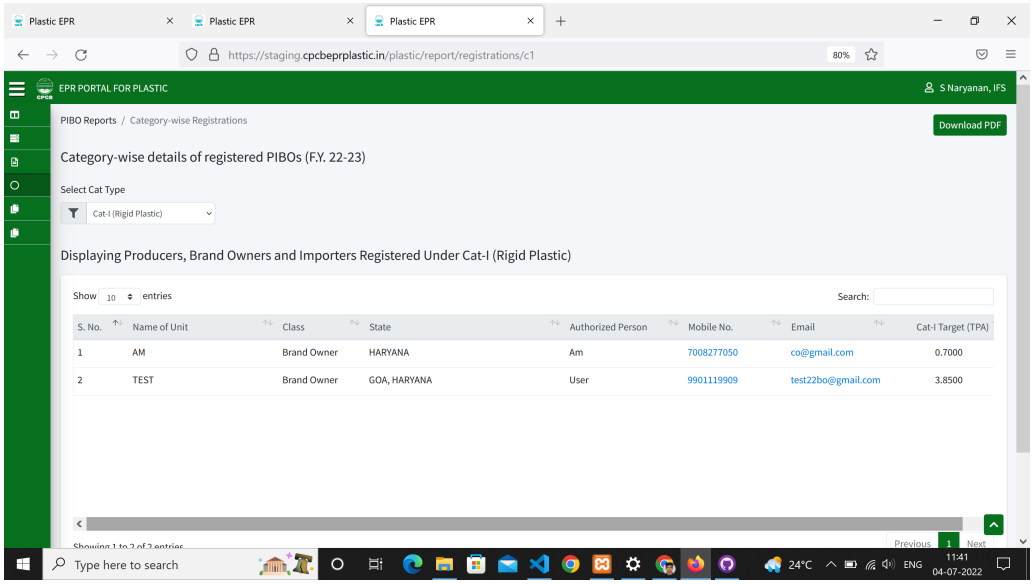

Figure A.8: Admin : View Reports

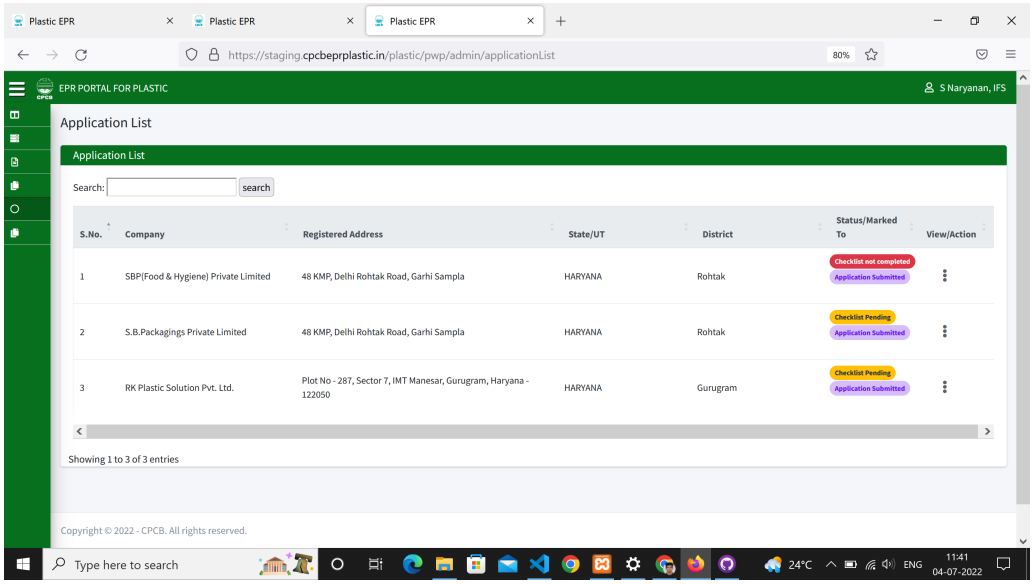

Figure A.9: Admin : View Applications

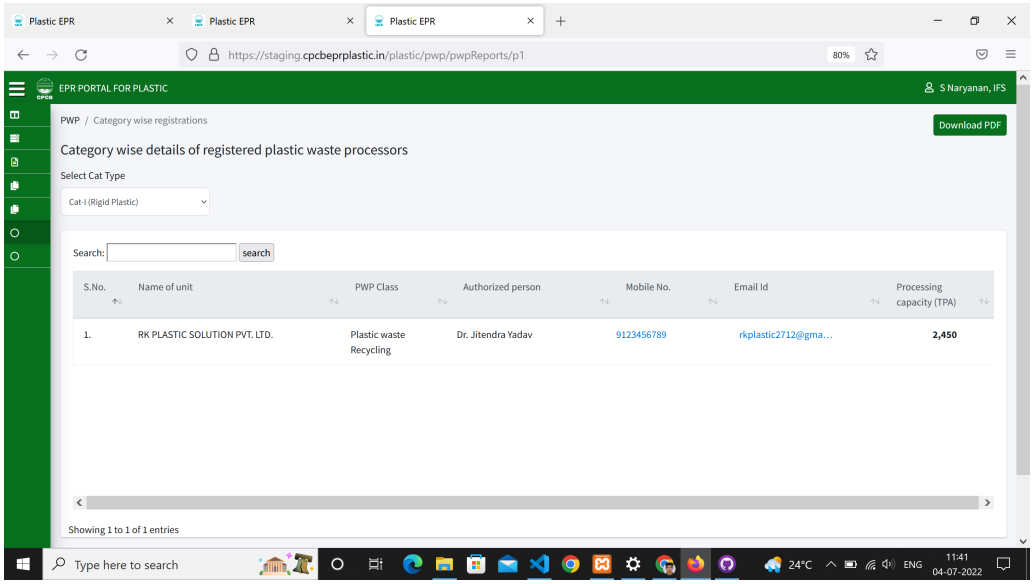

Figure A.10: Admin : View PWP

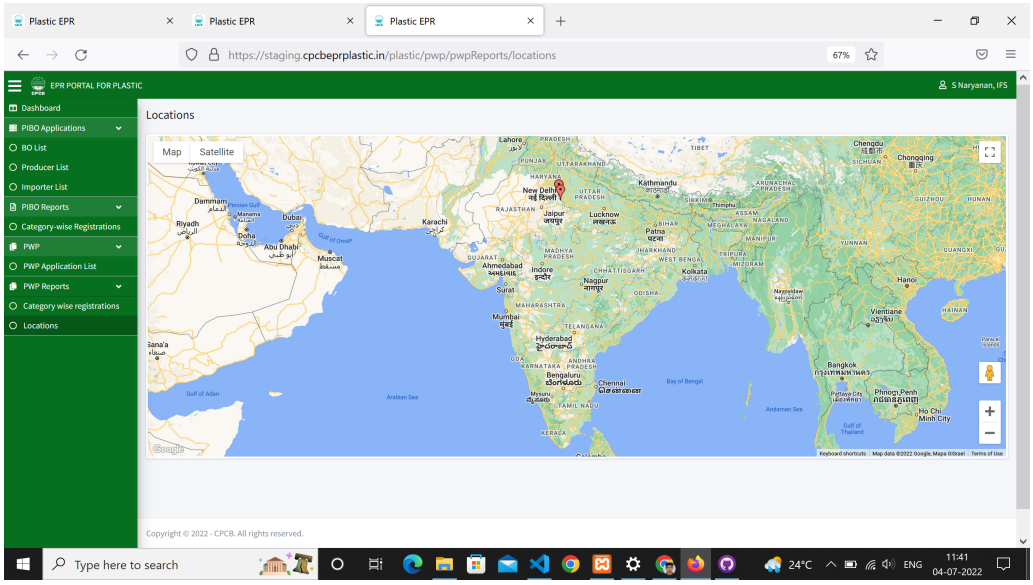

Figure A.11: Admin : View Location

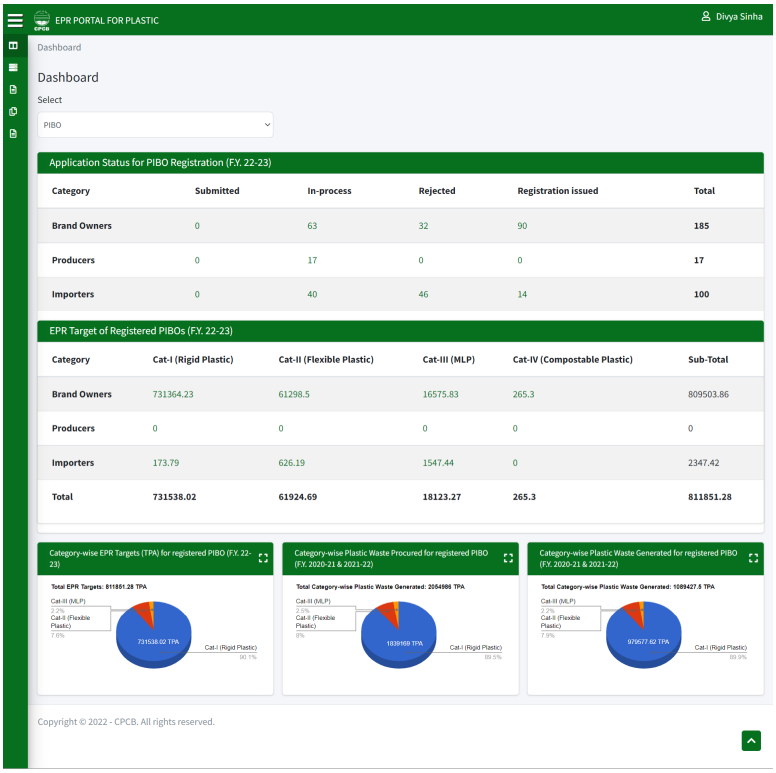

Figure A.12: CPCB Dashboard

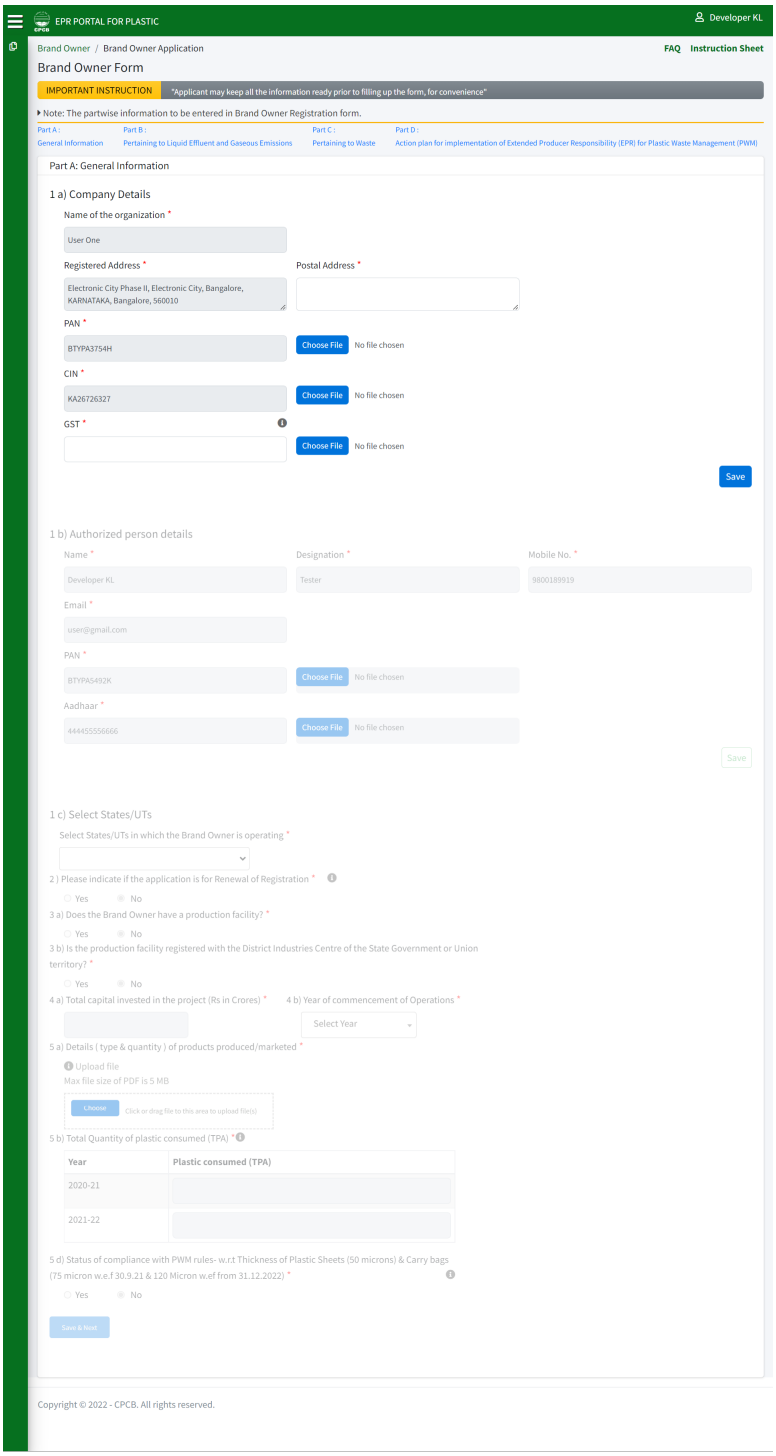

Figure A.13: Brand Owner Dashboard