A

Project Stage-I Report

On

"Tracking, Reusing & Reducing Plastic Waste"

In partial fulfillment of requirements for the degree of

Bachelor of Technology

In

Computer Engineering

Submitted By

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Under the Guidance of

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CERTIFICATE

This is to certify that the Project Stage-I entitled "**Tracking, Reusing and Reducing Plastic Waste"** has been carried out by team:

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under the guidance of **Prof. P. A. Agrawal** in partial fulfillment of the requirement for the degree of Bachelor of Technology (Semester-VI) in Computer Engineering of Dr. Babasaheb Ambedkar Technological University, Lonere during the academic year 2022-23.

Date:

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R. C. PATEL
INSTITUTE OF TECHNOLOGY
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Department of Computer Engineering

Institute Vision

To achieve excellence in engineering education with strong ethical values.

Institute Mission

To impart high quality Technical Education through:

- Innovative and Interactive learning process and high quality, internationally recognized instructional programs.
- Fostering a scientific temper among students by the means of a liaison with the Academia, Industries and Government.
- Preparing students from diverse backgrounds to have aptitude for research and spirit of Professionalism.
- Inculcating in students a respect for fellow human beings and responsibility towards the society.

Department Vision

To provide prominent computer engineering education with socio-moral values.

Department Mission

To groom students to become professionally and ethically sound computer engineers to meet the growing needs of industry and society.

Index

Figure Index

Chapter –1

Introduction

Plastic products have become an integral part of our daily life as a result of which the polymer is produced at a massive scale worldwide. On an average, production of plastic globally crosses 150 million tonnes per year. Its broad range of application is in packaging films, wrapping materials, shopping and garbage bags, fluid containers, clothing, toys, household and industrial products, and building materials.

It is estimated that approximately 70% of plastic packaging products are converted into plastic waste in a short span. Approximately 9.4 million TPA plastic waste is generated in the country, which amounts to 26,000 TPD2. Of this, about 60% is recycled, most of it by the informal sector. While the recycling rate in India is considerably higher than the global average of 20%, there is still over 9,400 tonnes of plastic waste which is either landfilled or ends up polluting streams or groundwater resources. While some kinds of plastic do not decompose at all, others could take up to 450 years to break down.

approach to health record management, enabling health care professionals to access and exchange complete patient data seamlessly[1].

In this project, we will focus on developing a comprehensive EHR system that leverages advanced technologies such as blockchain and cloud computing to address the challenges associated with

fragmented health records. By integrating these technologies, our EHR system will offer a secure, efficient, and user-friendly platform for health care providers to access and share complete patient medical histories[3].

1.1. Background

Plastics are amazing and since its inception. plastic enabled countless advances in aux industry and way of life created to be light, durable, chemically reactant. Indi-reactive to outside influences and easy to manufacture, plastic is a prefer winding marital for Paintless articles that are used. not only by ordinary users in their daily affairs but also in aeronautics, construction industry. Packaging etc.

But there is a threat with 'throw away "places" (disparable plastics, single use products. kick off items etc.) Asper Minuty India generates 16000 ton/day. Environment, of which only 9000 ton/day is being collected and the remaining palluites the sail, clogs drains, polluter water and kills the animals with its indigestive nature.

The project aims to develop a mobile application through which people can come together to indulge into activity that focuses an collecting disparable plastics which air coffee cups, soft drink bottles, foiletry containers i.e. shampoo, thrower gelete, camier bags which will contribute towards reducing and recycling plastic waste to an extent... A small toward effort eco-friendly environment. Due to the drastic need of reducing plastic in India, socializing and gathering together to help India become a cleaner place is the role need at current hour[3].

1.2. Motivation

While plastics are ubiquitous in daily life-
reducing plastic pollution requires actions and efforts from the citizens as well as the government. since 58°% of the population in metropolitan Cities are engaged in fobs and other activities, very less attention has been given to their type by the residents. issues 6 engage youth into activities and encouraging them to set an example. Therefore, an idea to J ideal youth for upcoming youth is the 8 key perceptions behind. this project.

We are setting up a platform where people can come together, explore places and give their contribution in reducing pistic waste. As people will come together more and more awareness will be spread as well as people can meet new individuals having same mindset. Increasing social communication, spreading more awareness regarding efficient management of plastic waste and taking small efforts to make India cleaner is the care motivation behind developing the app[4].

1.3. Problem Statement

Applying the Circular economy principles properly can dramatically reshape the economics of plastics in global economy while helping, the environment. Recycling plastics has a great potential because here u a material that can be recycled many times while retaining Ille ramie and functional properties. It means that we need. to increase the collection of plastic waste and India recycling capacities. Innovation is the key and it needs to stimulate more methods. of increasing recycling and the recyclability. of plastic-containing products that further improve product design. There is great potential for economic gain but for this to happen we need multiple players across businesses and research. communities to come together, to reconceive key material flows and manufacturing processes.

All this need? to be supported by proper policies and my sufficient investment. There is a requirement of reshaping the economics of plastic which could help the environment and also the global economy. Plastic is the only material that can be recycled multiple number Himes and still hold an economic role in gr market. Also recycling plastic can reduce environmental stress then reducing pollution.

This methodology shows great potential in economic rise. We need caution that highlight the bulk waste generators of plastic waste and propose Qшtions and section providers in nearby areas[1].

1.4. Objectives

The objectives of implementing an Electronic Health Record (EHR) system are as follows:

1. Design and develop an EHR system that utilizes blockchain and cloud computing technologies to enhance data security, privacy, and accessibility in healthcare settings.
2. Evaluate the performance and scalability of the proposed EHR system in handling large volumes of patient data and user requests, ensuring efficient and reliable system operation.
3. Assess the impact of the blockchain and cloud based EHR system on healthcare providers' efficiency and productivity in managing patient records and delivering care, aiming to streamline workflows and improve overall healthcare service quality.
4. Analyse the cost-effectiveness of implementing the blockchain and cloud based EHR system compared to traditional systems, considering factors such as infrastructure, maintenance, and operational expenses, to determine the economic feasibility and potential long-term savings.
5. Explore the potential benefits and challenges of integrating blockchain and cloud computing technologies into existing healthcare systems, including interoperability, data standardization, and regulatory compliance, and provide recommendations for successful implementation and adoption.

By addressing these objectives, we will provide a comprehensive understanding of the project's purpose, significance, and potential impact in the field of electronic health record systems.

1. Objectives: the primary elective of the application is to reduce plastic partition and contribute towards cleanliness by spreading more and more awareness.

   Objective 1 :-

   To inspire youth from corporate as will as Higher education institutions to collectively participate in various cleanliness activities

   Objective 2 :-

   As the secondary objective the application works on promoting recycling of plastic waste to decrease the production of plastic. furth is already suffering from the problem. of excessive use of plastic ey humans, in the situation recycling in the best option.

   Objective 3 :-

   The third or let's say the final objective or aim of the app is to spread awareness to or rather among the local to stop the plastic waste from being land filled and also to stop incineration waste as it's the main reason behind the land being infertile and inappropriate to me[5].

1.5. Scope

1. Designing and developing an android application for efficient and effective management of plastic water ey developing a secure, easy to handle and informative system for providing people opportunity to contribute towards cleanliness The system will be designed to spread awareness about different types of plastic and to make people understand the difference between recyclable and non-recyclable products.

2. Developing user interface for people interested in participating in raulou's cleanliness activities. The user interface will give options Such as group information about different plastics. activities held in nearby region baud on their location. The user in interface will be deigned in a way which will be easy. to use with minimalist UI, and design.

3. The application will have tracking and informative capabilities. Capabilities such at racking how much plastic has been reduced my group and also other benefits for anticipating.

4. conducting through tating and validation to ensure that the android application will meal the highest standards possible. Thi will involve conducting both functional and non- -functional tutition[3].

Chapter – 2

Literature Review

The literature review of Stern, Powell, & Hill in 2014 on environmental education studies, suggested a number of points associated with teaching methods that led to desired outcomes of environment education. Teachers own verbal and nonverbal communication styles acting as role models for developing pupils' environmental literacy are one of the many benefits of direct teaching involving school teacher engagement. Another benefit is that it is experiential which means students can actively participate in firsthand experience which helps in developing their skills and perceptions of self-efficacy. Another type of teaching is game-based which allows students to have active, safe and experiential engagement with real-world environmental problems.
Lisha Tomy and Parvathi et al, describe about waste management that entails various waste bins which manifest significant filling variation. Many problems arise due to the detection of the waste level of the urban solid-waste bins which instigate due to the non-uniform shape and the variety of materials that are included. Major issues related to waste collection are: (i) when the bin will be filled and (ii) empty the bin before it gets overflowed. The foremost concept of the work was to create a smart intelligent garbage alert system for waste management. They also proposed an alert system for waste collection by sending an alert signal to the municipal net server for immediate and swift cleaning of a dustbin with kosher verification according to the level of garbage filling. This process is carried out by the ultrasonic sensor which is interfaced with Node MCU to verify the level of garbage that has been filled in the dustbin and transmits the data to a mobile application operated by the end user or the authority.

The review work of Md. Golam Kibria, Nahid Imtiaz Masuk, Rafat Safayet, Huy Quoc Nguyen & Monjur Mourshed mainly put the spotlight on the identification of plastic waste generation sources and the depth of severity of pollution in land and marine environment. The increasing volume of plastic waste degrades soil fertility as well as contaminates

groundwater, nonetheless it heavily damages the surrounding ecosystems and marine environment. In this work, traditional plastic waste management that has been practised on land and marine environment is reviewed on a large extent, and their shortcomings to cope up with waste to energy conversion and recycling prospects are also illustrated. This work also sheds light on the in-depth analysis of new technologies to manage plastic waste and discussed the most environmental and economically friendly ways to manage plastic waste. Finally, this review work also sorts out the potential challenges and opportunities to manage plastic waste from diverse perspectives, including infrastructure development, introducing new alternatives to plastics, emphasising 3R and 4R waste management programs, strengthening the existing laws and regulations to control plastic pollution, and above all raising social awareness among every group in the society.

The research of Tirthankar Banerjee, Ph.D., Rajeev Kumar Srivastava, Ph.D., Yung-Tse Hung, Ph.D., P.E., DEE emphasizes on the increasing trend of global as well as Indian plastic production and consumption scenario. Moreover, with the concepts of ISWM, plastic waste disposal problems are tried to sort out. However, in Indian situations, there are several constraints such as proper collection, segregation, and transportation of the discarded plastic material. However, increase in public awareness coupled with changes in individual behaviour can be an effective way to reduce the environmental repercussions of waste plastics. Apart from these, in a resource limited world, the recovery of energy and resources should be fundamental principle to sustainable development and in order to achieve its active public participation and proper implementation of regulations are essential.

2.1. Review of Existing System(s)

The problem of plastic waste is a global environmental issue that has been increasing in severity over the past few decades. As a result, there have been numerous efforts to track, reduce and reuse plastic waste. In this review, we will examine some of the existing systems that have been implemented to tackle this issue.

Plastic Waste Management System (PWMS): The PWMS is a system that has been implemented in various countries to track and manage plastic waste. This system involves collecting data on the types of plastics being produced, the amount of waste being generated, and the methods of disposal. The information is then used to develop policies and strategies for reducing plastic waste.

Plastic Bag Bans: Bans on single-use plastic bags have been implemented in many countries to reduce the amount of plastic waste generated. These bans have been successful in reducing the number of plastic bags in circulation, but have also faced some opposition from businesses and consumers who find them inconvenient.

Extended Producer Responsibility (EPR): EPR is a policy approach that holds producers responsible for the entire lifecycle of their products, including their disposal. This approach has been implemented in some countries to incentivize producers to design products that are more easily recycled and to encourage them to take responsibility for the disposal of their products.

Overall, there are various existing systems that have been implemented to track, reduce and reuse plastic waste. While some of these systems have been successful, there are still many challenges

that need to be addressed in order to effectively tackle this global issue.

2.2. Limitations of Existing System(s)

1. Lack of uniformity: There is no uniform system for tracking plastic waste, which makes it difficult to accurately measure the amount of plastic waste generated, recycled, or reused. Different countries, regions, and industries have their own tracking methods, which makes it challenging to compare data.
2. Insufficient data: The available data on plastic waste is often incomplete, inaccurate, or outdated. This makes it difficult to make informed decisions on the best strategies for reducing, reusing, or recycling plastic waste.
3. Limited recycling infrastructure: The current recycling infrastructure is not equipped to handle the increasing amount of plastic waste generated worldwide. As a result, a significant amount of plastic waste ends up in landfills, oceans, or incinerated, which is harmful to the environment.
4. Inadequate waste management policies: Many countries lack effective waste management policies that prioritize the reduction, reuse, and recycling of plastic waste. This leads to poor waste management practices and contributes to the growing problem of plastic pollution.
5. Lack of consumer awareness: Many consumers are unaware of the impact of plastic waste on the environment and the importance of reducing, reusing, and recycling plastic products. Without adequate education and awareness, it is difficult to achieve significant reductions in plastic waste.

Chapter – 3
Requirement Analysis

3.1. Method used for Requirement analysis.

Requirement analysis is an essential process in any project, including those related to tracking, reducing, and reusing plastic waste. Here are the steps to prepare a method for requirement analysis for this project:

1. Identify stakeholders: The first step is to identify the stakeholders who will be impacted by the project. This may include government agencies, NGOs, plastic manufacturers, recyclers, waste management companies, and the general public.

2. Gather requirements: Once the stakeholders are identified, gather the requirements from each of them. This can be done through surveys, interviews, focus groups, and other methods. The requirements may include tracking the amount of plastic waste generated, reducing the amount of plastic waste, and finding ways to reuse

3. Categorize requirements: After gathering the requirements, categorize them into functional and non-functional requirements. Functional requirements are related to what the system should do, such as tracking plastic waste, while non- functional requirements are related to how the system should perform, such as being user-friendly[2].

3.2. Data Requirement

1. Quantity of Plastic Waste: Accurate data on the quantity of plastic waste generated in the project area should be collected regularly. This will help in identifying areas with high plastic waste generation rates and prioritize efforts to reduce and reuse plastic waste.
2. Types of Plastic Waste: The project team should collect data on the types of plastic waste generated in the project area. This will help in identifying which types of plastics are commonly used and the ones that are most difficult to recycle.
3. Recycling and Disposal Facilities: Data on the recycling and disposal facilities available in the project area should be collected. This will help in identifying gaps in the existing waste management infrastructure and prioritize efforts to improve recycling and disposal options.
4. Waste Collection and Transportation: Data on the waste collection and transportation system should be collected. This will help in identifying areas where the waste collection and transportation system is inefficient and prioritize efforts to improve it.
5. Stakeholders: Data on stakeholders involved in the plastic waste management system should be collected. This includes producers, consumers, waste collectors, recyclers, and government agencies. This will help in identifying the roles and responsibilities of each stakeholder and prioritize efforts to engage and collaborate with them[4].

3.3. Functional Requirements

Functional Requirements for Tracking, Reducing, and Reusing Plastic Waste Project:

1. Tracking System: The project should have a tracking system to monitor the movement of plastic waste throughout the entire process. The tracking system should be able to identify the source of the plastic waste, the quantity, the type of plastic, and the destination.
2. Reduction Goals: The project should set specific goals for reducing plastic waste. The goals should be measurable and achievable, and should be set for both short-term and long-term periods. The reduction goals should be based on the current plastic waste production, recycling capacity, and reuse opportunities.
3. Recycling Infrastructure: The project should have an adequate recycling infrastructure in place to handle the plastic waste generated. This should include a sufficient number of recycling facilities, equipment, and trained personnel to handle the recycling process.
4. Reuse Opportunities: The project should identify opportunities for reusing plastic waste. This could include working with local businesses to identify ways to reuse plastic waste, such as in building materials, furniture, or other products.
5. Public Awareness: The project should include a public awareness campaign to educate people about the importance of reducing plastic waste. This could include information about the negative impact of plastic waste on the environment, the benefits of recycling, and how to properly dispose of plastic waste[5].

3.4. System Specification

1. System Overview:

   The system should be able to track plastic waste from its point of origin to its final destination, including all intermediate stages in between.

   The system should be able to reduce plastic waste by identifying areas where waste can be minimized, and implementing strategies to reduce waste.

2. System Architecture:

   The system should be cloud-based, accessible from anywhere with an internet connection.

   The system should have a central database that stores all relevant data and allows for easy retrieval and analysis of information.

3. User Interface:

   The system should have a user-friendly interface that allows users to easily input and access data.

   The interface should have different levels of access, with varying levels of permissions and privileges for different types of users.

   The interface should have analytics and visualization tools that allow users to interpret and make sense of the data.

4. Tracking and Monitoring:

   The system should be able to track the movement of plastic waste from its origin to its final destination, including all intermediate stages in between.

   The system should be able to monitor the amount and type of plastic waste generated at different stages of the process[2].

Chapter – 4

Planning And Scheduling

4.1 Project Planning

4.1.1 Planning

Project planning is one of the most important aspect which mostly occurs while assigning project tack to other group members. So complete the different tacks of the project, each needs to be aligned with specific and mental work In our project we are four members each air- ned with individual tack such as

a) collecting data on plastic type, waste

b) collecting data on which type of plastic waste is generated on large scale

c) Developing the android application

Also together all members have involved in checking system code Time to time within some amount of time. According to all the aspects as mentioned, project. planning has done been done in a weekly manner. Step by step all the members have commuted in coding and project implementation.

4.2 Project Scheduling (Cost & Effort)

4.2.1 COCOMO Model

COCOMO (Constructive Cost Model) is a regression model based on LOC, i.e., number of Lines of Code. It is a procedural cost estimate model for software projects and is often used as a process of reliably predicting the various parameters associated with making a project such as size, effort, cost, time, and quality. It was proposed by Barry Boehm in 1981 and is based on the study of 63 projects, which makes it one of the best documented models. The key parameters which define the quality of any software products, which are also an outcome of the COCOMO are primarily Effort & Schedule:

- **Effort:** Amount of labour that will be required to complete a task. It is measured in person-months units.
- **Schedule:** Simply means the amount of time required for the completion of the job, which is, of course, proportional to the effort put in. It is measured in the units of time such as weeks, and months.

Different models of COCOMO have been proposed to predict the cost estimation at different levels, based on the amount of accuracy and correctness required. All of these models can be applied to a variety of projects, whose characteristics determine the value of the constant to be used in subsequent calculations. These characteristics pertaining to different system types are mentioned below. Boehm's definition of organic, semidetached, and embedded systems:

1. **Organic –** A software project is said to be an organic type if the team size required is adequately small, the problem is well

understood and has been solved in the past and also the team members have a nominal experience regarding the problem.

2. **Semi-detached –** A software project is said to be a Semidetached type if the vital characteristics such as team size, experience, and knowledge of the various programming environment lie in between that of organic and Embedded. The projects classified as Semi-Detached are comparatively less familiar and difficult to develop compared to the organic ones and require more experience and better guidance and creativity.

   E.g., Compilers or different Embedded Systems can be considered of Semi-Detached types.

3. **Embedded –** A software project requiring the highest level of complexity, creativity, and experience requirement fall under this category. Such software requires a larger team size than the other two models and also the developers need to be sufficiently experienced and creative to develop such complex models.

   1. Basic COCOMO Model

   2. Intermediate COCOMO Model

   3. Detailed COCOMO Model

4.2.2. Gantt Chart:

		Name	Duration	Start	Finish	Predecessors
1		**Literature review**	5 days	**20/3/23 8:00 AM**	**24/3/23 5:00 PM**	
2		Review Of Existing System	4 days	20/3/23 8:00 AM	23/3/23 5:00 PM	
3		Limitation Of Existing Syste	1 day	24/3/23 8:00 AM	24/3/23 5:00 PM	2
4		**Requirement Analysis**	2 days	**27/3/23 8:00 AM**	**28/3/23 5:00 PM**	
5		Method Analysis	2 days	27/3/23 8:00 AM	28/3/23 5:00 PM	
6		Data Requirement	1 day	27/3/23 8:00 AM	27/3/23 5:00 PM	
7		Functional Requirement	1 day	28/3/23 8:00 AM	28/3/23 5:00 PM	6
8		System Specification	1 day	27/3/23 8:00 AM	27/3/23 5:00 PM	
9		**Planning and Scheduling**	7 days	**3/4/23 8:00 AM**	**11/4/23 5:00 PM**	
10		Project Planning	2 days	3/4/23 8:00 AM	4/4/23 5:00 PM	
11		Project Scheduling	3 days	5/4/23 8:00 AM	7/4/23 5:00 PM	10
12		Risk Assessment	2 days	10/4/23 8:00 AM	11/4/23 5:00 PM	11
13		**Design Details**	4 days?	**7/4/23 8:00 AM**	**12/4/23 5:00 PM**	
14		Data Flow Diagram	4 days?	7/4/23 8:00 AM	12/4/23 5:00 PM	2SS
15		**System Modeling**	3 days?	**17/4/23 8:00 AM**	**19/4/23 5:00 PM**	
16		UML Diagrams	3 days?	17/4/23 8:00 AM	19/4/23 5:00 PM	14
17		**Implemantation Plannin**	11 days?	**24/4/23 8:00 AM**	**8/5/23 5:00 PM**	
18		Hardware Specification	5 days?	24/4/23 8:00 AM	28/4/23 5:00 PM	
19		Programming Language An	6 days?	1/5/23 8:00 AM	8/5/23 5:00 PM	18

Fig 4.1: Gantt Chart

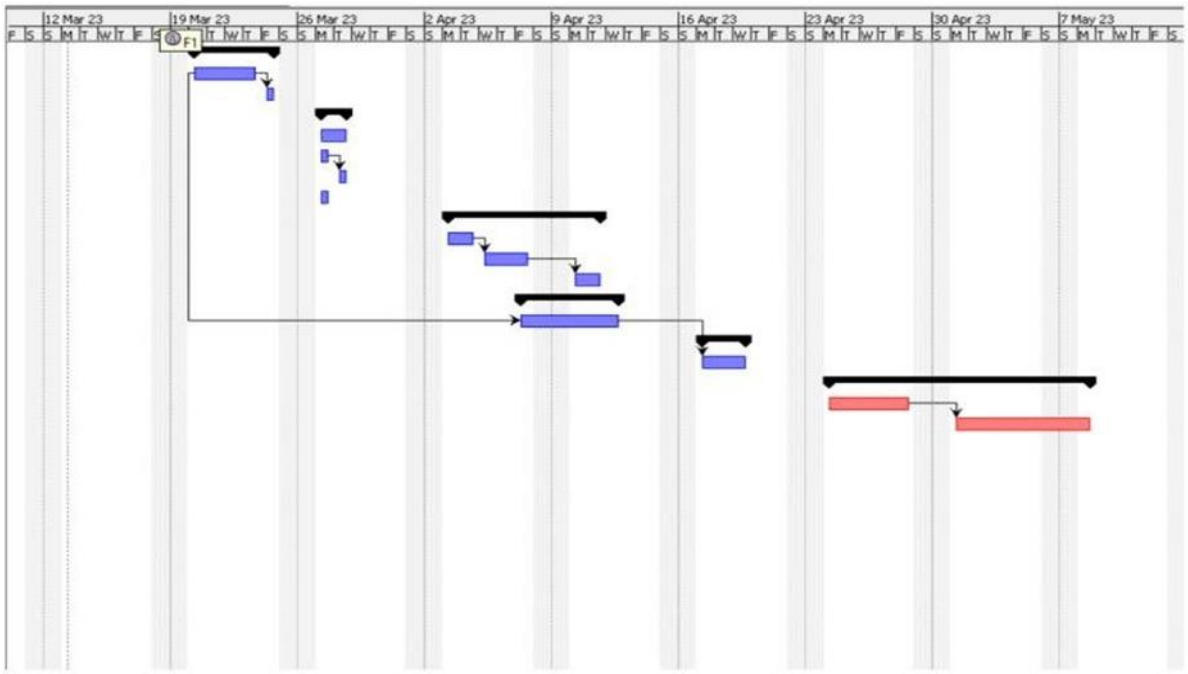

Fig 4.2: Gantt chart - Graph

4.3 Risk Assessment

Assessing the risk associated with tracking, reusing, and reducing plastic waste involves considering various factors and potential hazards throughout the lifecycle of plastic materials. Here's a risk assessment framework to evaluate these aspects:

1. **Data security and privacy risks**: Assess the risk of sensitive information exposure when collecting and storing data related to plastic waste tracking. Ensure proper encryption and security measures are in place.
2. **Interoperability risks**: Evaluate compliance with relevant regulations and standards for data collection, such as General Data Protection Regulation (GDPR) or local data protection laws.
3. **Usability and user adoption risks:** Assess the reliability and resilience of the tracking system to minimize the risk of data loss or system failure.
4. **Stakeholder Engagement**: Identify and mitigate any potential risks associated with involving various stakeholders, such as governments, waste management companies, or consumers.
5. **Reusing Plastic Waste:**

a. Contamination: Evaluate the risk of using contaminated plastic waste in recycling or upcycling processes. Implement quality control measures to ensure the safety and suitability of reused materials.

b. Chemical Hazards: Identify potential health and environmental risks associated with the reuse of certain types of plastics, such as those containing hazardous additives or chemicals.

c. Durability and Performance: Assess the quality and durability of reused plastic materials to avoid potential hazards arising from reduced product performance or failure[3].

Chapter – 5

System Requirement Specification

5.1 Design Details

Tracking Plastic Waste:

RFID (Radio-Frequency Identification) Tags: Incorporate RFID tags into plastic products or packaging to enable tracking throughout their lifecycle. These tags can be scanned at various points, such as during manufacturing, distribution, and waste management, to monitor the movement of plastic items and identify potential waste leakage points.

QR Codes: Integrate QR codes on plastic products or packaging, which can be scanned by consumers or recycling facilities to obtain information about the product's material composition, recycling instructions, and responsible disposal methods.

Design for Reusability: Create plastic products that are durable and designed for multiple uses. Consider factors such as material selection, structural integrity, and ease of cleaning to ensure that the products can withstand repeated use without compromising safety or functionality.

Refillable Systems: Develop refillable systems for plastic packaging, such as shampoo or detergent bottles, where consumers can refill their containers with bulk products. This reduces the need for single-use plastic packaging and encourages a shift towards reusable alternatives[4].

5.2. Data Flow Diagram

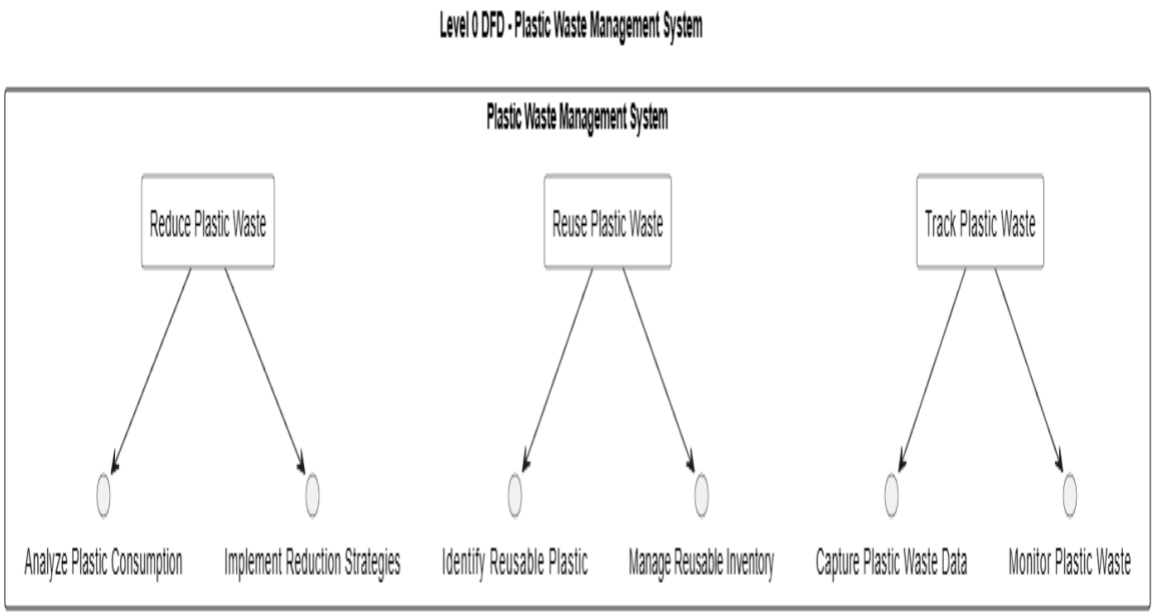

Fig. 5.1 Level 0 DFD Diagram

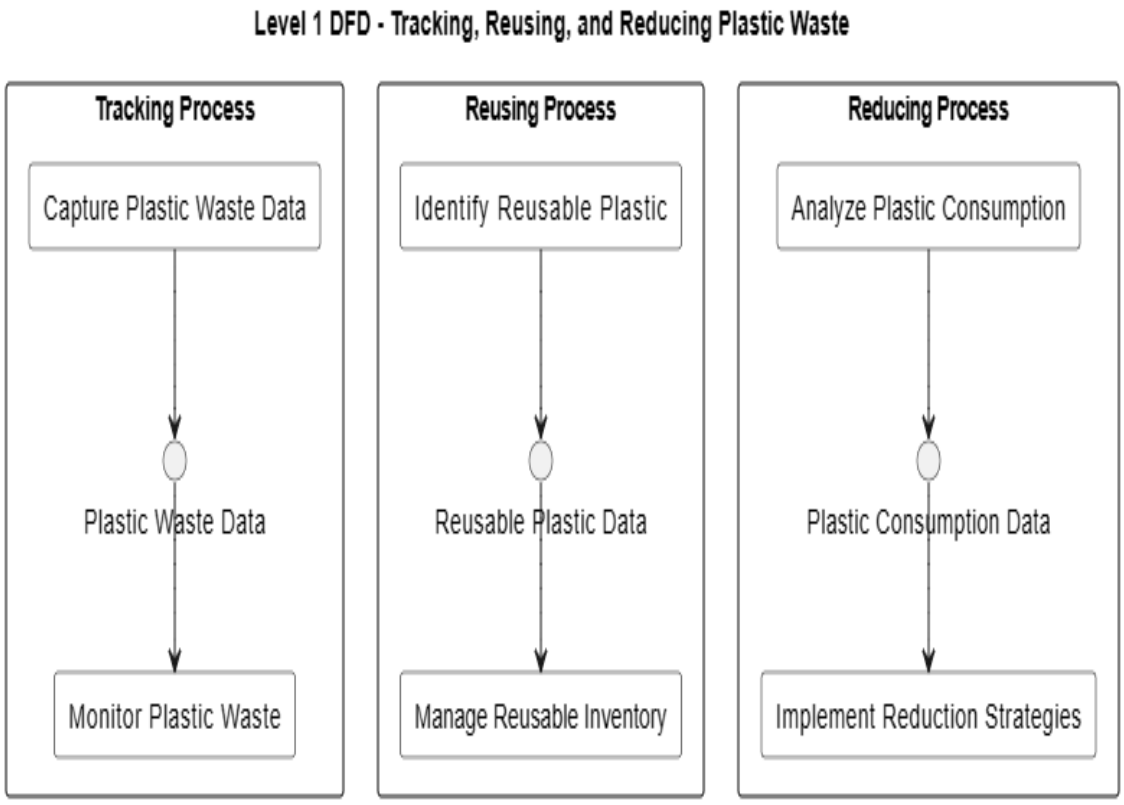

Fig. 5.2 Level 1 DFD Diagram

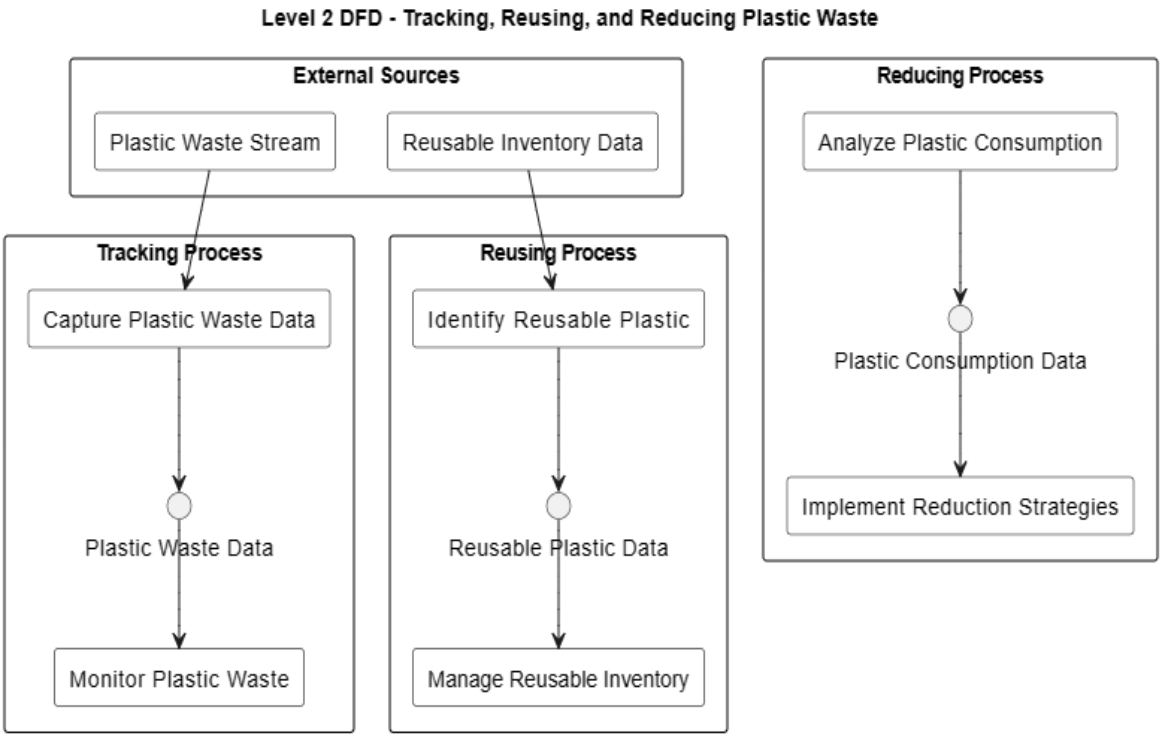

Fig. 5.3 Level 2 DFD Diagram

Chapter – 6

System Modeling- Need of System Modeling

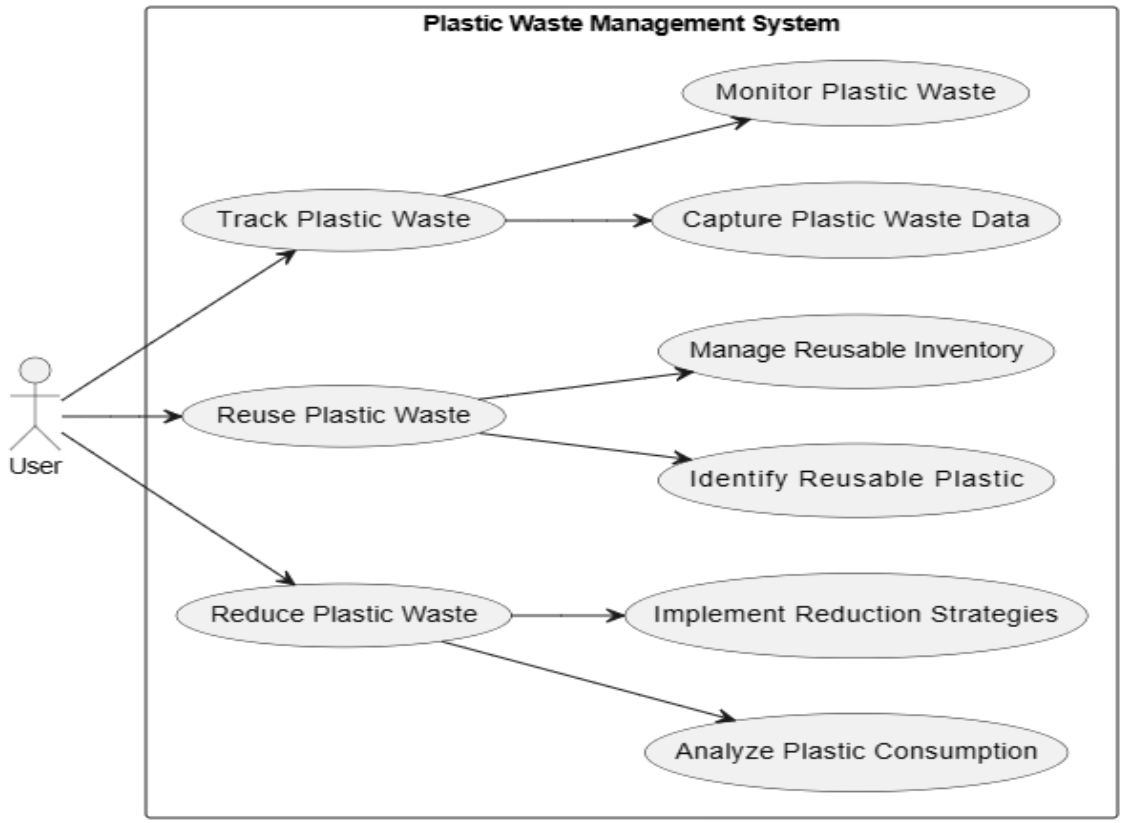

Fig. 6.1 Use Case Diagram

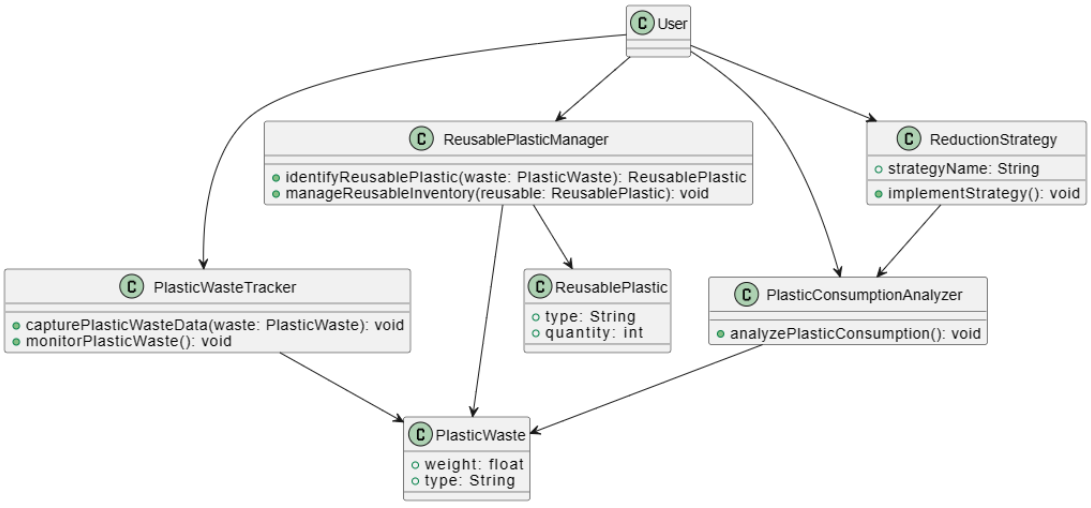

Fig. 6.2 Class Diagram

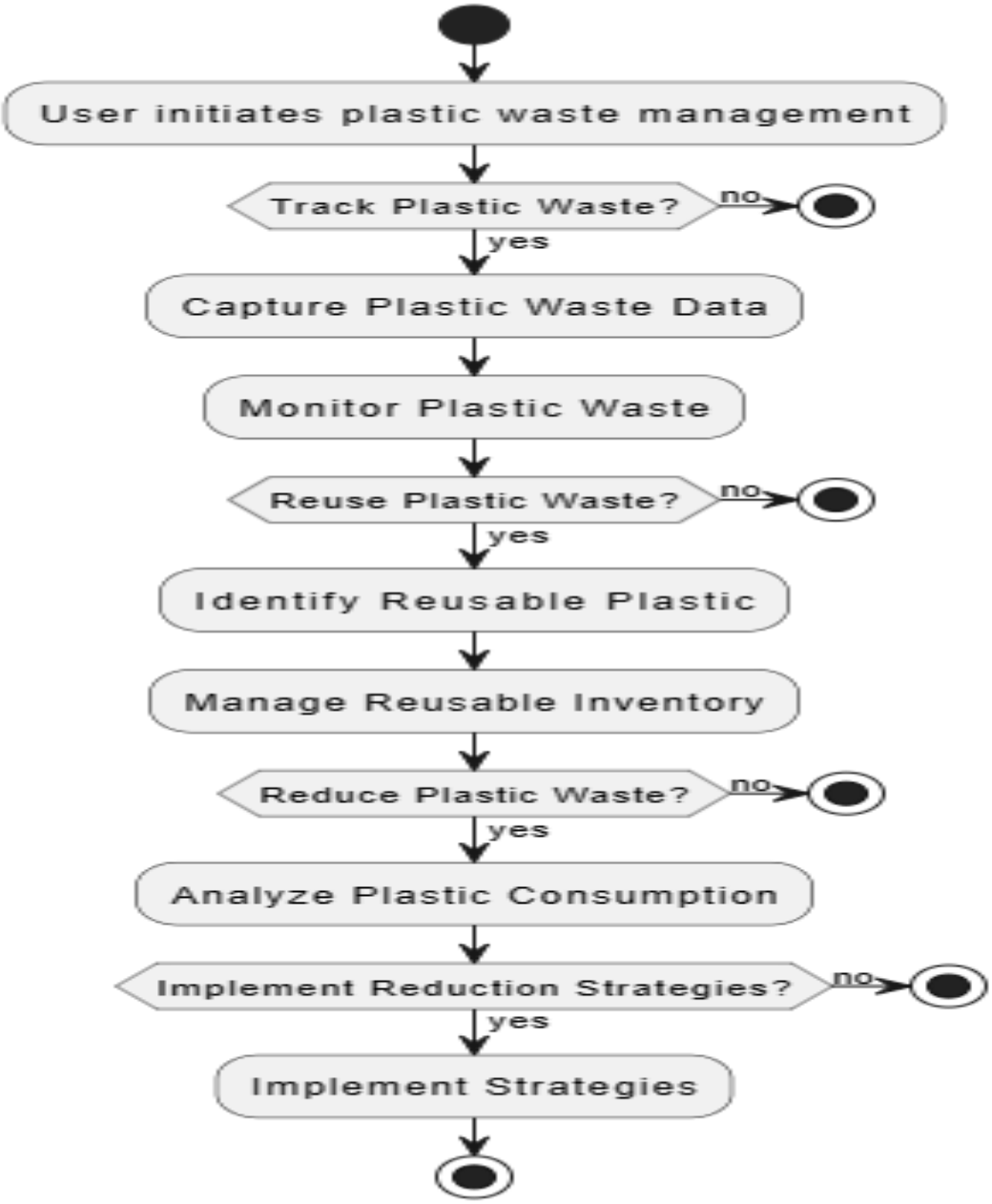

Fig.6.3 Activity Diagram

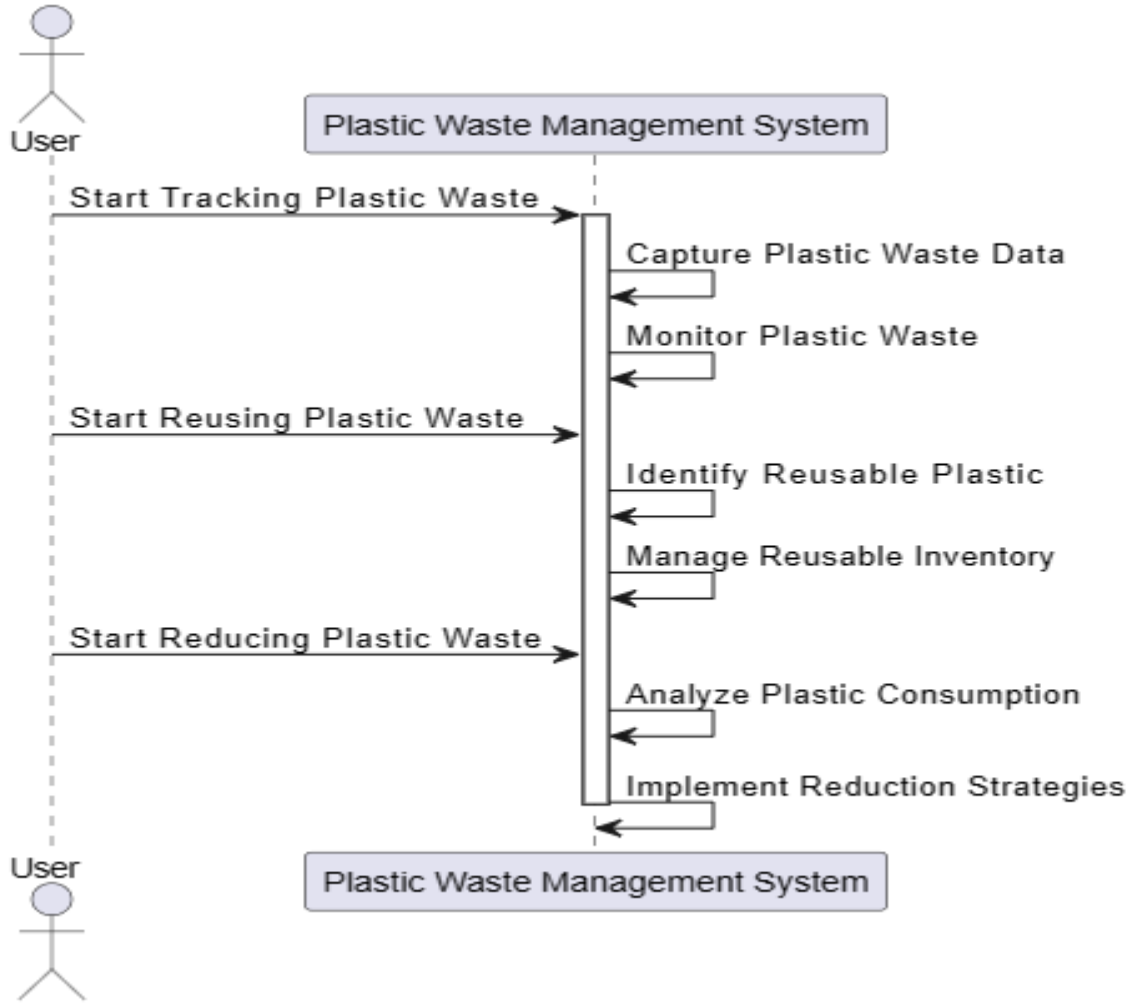

Fig. 6.4. Sequence Diagram

Chapter – 7

Implementation Plan for Project Stage-II

7.1 Hardware Specification

Processor: Intel® Core i5-1030H CPU @ 2.50GHZ Or AMD Ryzen 5

RAM: 8GB

system Type 64-bit OS Physical device (Android device)

7.2 Platform

Windows as your development environment

There are multiple paths for developing an android device app using Windows operating system.

These paths fall into three main types:

Native

Cross-platform

Android game.

Native Android

Native Android development on Windows means that your app is targeting only Android (not iOS or windows devices). We prefer Android Studio, although visual studio can be used too, to develop within the eco-system designed specifically for the Android operating system.

The user interface will be consistent with other native apps on the device and any feature or capabilities of the user's device will be straight forward to access and utilize.

7.3 Programming Language Used

Python: Python is a versatile and widely-used programming language known for its simplicity and readability. It offers a rich ecosystem of libraries and frameworks for data processing, analysis, and web development, making it a popular choice for environmental projects.

JavaScript: JavaScript is a programming language commonly used for web development. It can be utilized for creating interactive and dynamic user interfaces, as well as handling data on the client-side. JavaScript can also be used with popular frameworks like Node.js for server-side development.

SQL: Structured Query Language (SQL) is a programming language used for managing and querying relational databases. If the project involves storing and retrieving data related to plastic waste tracking, a database system such as MySQL, PostgreSQL, or SQLite could be employed, with SQL used to interact with the database.7.4 Software / Hardware Development

Java: Java is a robust, general-purpose programming language that can be used for building scalable applications. It has a wide range of libraries and frameworks available, making it suitable for developing complex systems. Java is often favoured for enterprise-level projects with large codebases.

7.4 Software/Hardware Development

Requirement Gathering:

Understand the specific needs and objectives of plastic waste management system.

System Design:

Identifying the necessary modules functionalities and data requirements.

Database Design:

Considering entities such as waste generates, collection points, recycling facilities, and any additional metadata required for analysis.

User Interface Design:

Creating on intuitive user interface to interact with the system.

Development:

Implement the software system based on design.

Waste Tracking:

Developing mechanisms to track the movement of plastic waste from the point of generation to the point of reuse.

Reporting & Analytics:

Implement reporting features to generates insights and metrics related to waste management.

Integration:

To integrates the software system with other existing systems or files.

Testing and Deployment:

To conduct comprehensive testing and deploy the software .

Conclusion

Throughout the project, our primary objective was to address the growing concern of plastic waste and its detrimental impact on the environment. We focused on three key strategies: tracking plastic waste, promoting plastic reuse, and implementing measures to reduce plastic consumption.

The implementation of the tracking system provided valuable insights for waste management strategies, while the promotion of plastic reuse and reduction measures helped shift societal behaviour towards more sustainable practices.It is important to note that while significant progress has been made, addressing the plastic waste crisis requires continuous efforts from individuals, communities, industries, and governments. Sustainable waste management practices, coupled with ongoing awareness campaigns and policy changes, will be crucial in creating a plastic-free future.

The insights gained from this project can serve as a foundation for further research and initiatives, driving innovation in waste management and inspiring others to take action against plastic pollution[1].

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