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ijmrset@gmail.com



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# A Research on Waste Management: Waste Trade Hub

N.Pandeeswari<sup>1</sup>, S.Akshaya Devi<sup>2</sup>, P.Chonalika Doss<sup>3</sup>, L.Jeevapriya<sup>4</sup>

Associate Professor, Dept. of Information Technology, PSNA College of Engineering and Technology,  
Tamil Nadu, India<sup>1</sup>

Student, Dept. of Information Technology, PSNA College of Engineering and Technology, Tamil Nadu, India<sup>2,3,4</sup>

**ABSTRACT:** Effective waste management is crucial for environmental sustainability and public health. This paper explores various strategies and innovations in waste management, including reduction, reuse, recycling, and disposal methods. Additionally, it discusses the role of circular economy principles in promoting resource efficiency and minimising waste generation. By implementing comprehensive waste management practices, societies can mitigate environmental pollution, conserve natural resources, and create a cleaner, healthier future for all. By addressing the limitations of existing waste management practices and digital platforms, the E-Commerce Website for Waste distribution aspires to redefine the waste management landscape. This project not only seeks to optimise current processes but also introduces a sustainable and user-friendly solution that aligns with the principles of a circular economy. The process begins from the client who is in the need of paper, plastic, manure and other waste. Our website has two logins, one for the client and the other for the depositor. The Depositor who collect the waste from public and sell it through our website and he/she will update the stocks regularly. The client who are in need of the waste can search their nearby depositor and can buy through our website. The primary objective of the platform is to provide a comprehensive, efficient, and environmentally conscious solution for waste generators, collectors, and distribution centres. The E-Commerce site for Waste Distribution envisions a future where technology empowers individuals and organisations to actively contribute to the circular economy and its potential to redefine waste management practices for a more sustainable and eco-conscious future.

## I. INTRODUCTION

### A. PROBLEM STATEMENT

The project aims to utilise waste. With an increasing emphasis on environmental consciousness, there is a critical need for a technological intervention that seamlessly connects waste generators, collectors, and distribution centres. One of the key issues is the absence of a seamless and user-friendly digital interface that integrates all stakeholders in the waste management ecosystem. Traditional waste collection processes lack real-time tracking, leading to suboptimal routing for collection vehicles and delays in distribution. User experiences are compromised due to cumbersome interfaces, hindering widespread adoption and participation.

### B. PURPOSE

The purpose of the E-commerce site is to provide a clean and disease free environment which promotes 3 R's [Reduce, Reuse, Recycle]. This also provide a better user experience than all other traditional way of collection of waste. This site values all type of waste like plastic, biodegradable, manure, paper and etc., according to the weight of it. An e-commerce site for waste management can serve several purposes, including:

- Convenience: Customers can conveniently order waste management products and services online from the comfort of their homes or offices.
- Accessibility: It provides access to a wide range of waste management solutions, including recycling bins, composting kits, hazardous waste disposal services, etc., to both residential and commercial customers.
- Education and Awareness: The website can be a platform to educate customers about proper waste management practices, recycling techniques, and the importance of reducing, reusing, and recycling waste.



- Customization: Customers can tailor their waste management solutions according to their specific needs and requirements, such as selecting the appropriate size and type of waste bins or scheduling pickup services.
- Efficiency: Through online ordering and scheduling systems, the e-commerce site can streamline the process of waste collection, disposal, and recycling, making it more efficient for both customers and waste management companies.
- Environmental Impact: By promoting eco-friendly products and services, the website can contribute to reducing the environmental impact of waste generation and disposal, ultimately leading to a cleaner and healthier environment.
- Cost-effectiveness: Customers can compare prices and services offered by different waste management companies, enabling them to make informed decisions and potentially save costs.
- Feedback and Support: The e-commerce platform can facilitate communication between customers and waste management providers, allowing for feedback, inquiries, and support, which can help improve service quality and customer satisfaction.

### C. OBJECTIVE

To establish an e-commerce platform that revolutionises the waste management industry by providing an accessible, comprehensive, and sustainable solution for individuals and businesses to procure eco-friendly waste management products and services conveniently online. Our goal is to promote environmental stewardship, raise awareness about responsible waste management practices, and empower customers to make informed decisions that contribute to a cleaner, greener future. The primary objectives of this e-commerce platform are multifaceted:

- Efficient Waste Management: Streamlining the process of waste collection, distribution, and processing through an accessible and user-centric digital interface.
- Promoting Recycling: Encouraging responsible waste disposal by facilitating the seamless integration of recycling practices within the waste management cycle.
- User Convenience: Providing a user-friendly experience that empowers individuals and businesses to easily list, schedule, and track waste services.
- Environmental Impact: Contributing to a sustainable and eco-friendly environment by harnessing technology to optimise waste management practices.

## II. LITERATURE REVIEW

E-commerce platforms have revolutionised various industries, including waste management. This literature review aims to provide an overview of the existing literature related to e-commerce sites specifically tailored for waste management purposes. The review covers topics such as the significance of e-commerce in waste management, challenges and opportunities, technological advancements, business models, sustainability aspects, and user experiences.

1. Significance of E-commerce in Waste Management:
  - E-commerce platforms play a crucial role in streamlining waste management processes by providing convenient channels for waste disposal, recycling, and reuse.
  - They offer an efficient means of connecting waste producers with waste collectors, recyclers, and other stakeholders in the waste management supply chain.
2. Challenges and Opportunities:
  - Challenges such as user trust, regulatory compliance, logistical complexities, and technological barriers exist in the development and implementation of e-commerce platforms for waste .
  - The opportunity provides a value for all kinds of waste ,and also a earning opportunity to all the people who provide the waste by separating it.
3. User Experiences:
  - User experience design plays a critical role in the success of e-commerce platforms for waste management.



- Factors such as usability, accessibility, convenience, trust, and transparency influence user adoption and engagement with these platforms.

Even providing waste such as plastics and new paper in all area biodegradable waste(such as vegetable waste ,dry leaf ,fruit waste) should also be treated as most important .Our site main aim is to provide a value(in the form of money) to all kind of waste (such as biodegradable,non biodegradable , paper , plastics even separating the waste juice packet) , promote the 3 R's (Reduce ,Reuse ,Recycle), and to provide a clean and disease free environment for our future generation

### III. EXISTING SYSTEM

In the existing system, each task is carried out manually and processing is a very tedious job.The organisation is not able to achieve its need in time and the results too may not be accurate .Due to all the manual maintenance, there are number a number of difficulties and drawback that exists in this system.

Drawback of the existing system :

- Limited number of garbage collection processes are done manually in very few places. Maintenance and collection is so difficult .
- Manual collection of garbage is a mixture of both biodegradable and non biodegradable waste together so the separation is more difficult and there is no possibility to separate it .

### IV. PROPOSED SYSTEM

The proposed system consists of an actor consisting of two phases: a depositors phase and the collectors phase . An employee will allocate to collect the garbage and they will collect from the people and note their name and the weight of garbage they are given separately and it will be marked on the depositor card as well as the employee card. A formal set up will be done in a each area that the employee store all the collected garbage and will be updating the stocks in our site regularly .In the collector phase the collector can book there stock through our website and can get the location details of the area they are going to and can collect their stock .The amount for the people will deposited in the account through gpay according to the weight for the provided waste.

Benefits of the proposed system:

- It provides value in the form of amount to all the common people which may also be considered as a second income of their family.
- Through this action of collecting the waste separately and distributing it we promote the 3 R's (reduce , reuse and recycle) and also provide a disease free ,pollution free and a clean environment for our future generations.

### V. SYSTEM METHODOLOGY

#### A. REQUIREMENT PHASE

This requirement phase involves talking to the potential users in our website our customer is in need of the waste of recycle and to degrade the organic manures or the biodegradable waste .The required phase is to remind the weight and waste currently available and to give the value in the form of money for the waste to the public.

#### B. DESIGN PHASE

In this design phase we used to design the elements that explain how our site works .As a design we develop the use case diagram ,sequence diagram and system architecture diagram which makes the easy understanding of our site. The client who takes the service which we provide through the registration and the server who provides the required service to the user .They both are benefited through the features available.This phase is design for easy understanding of the world that occur in our application.



### *C. DEVELOPMENT PHASE*

The development phase of the site for waste management is coded using java..The site should be developed for both windows and mac .The site should be used as a database to store service provider information and user review/ ratings. The site uses location services to provide relevant search results based on the user's current location .The site should be optimised for fast performance and low data usage.

Marketing: Here are some marketing strategies that could help promote the app like

Social media advertising: Create advertisements on social media platforms like Youtube, Instagram, Twitter to target users who are likely to use the platform.

Influencer Marketing: Partner with influencers in the DIY space to promote the site to their followers.

Local business partnerships: Reach out to the local plastic collectors and others related to our business to partner with them and promote the website for waste management.

SEO: Optimising the website and app store listing for relevant keywords to improve its search engine ranking.

### *D. REVIEW PHASE*

Apart from the above phases review is comparatively important ,the feedback collected from the user intimate us that isn't fulfilled and we work on to satisfy it.And also in future it will be helpful to upgrade the platform amenities in our site .As a user we need to concentrate on tracking the person as well as the language and also some credit points for promoting the website

## **VI. FEASIBILITY ANALYSIS**

### *A. ECONOMIC FEASIBILITY*

Economically, this project is completely feasible because it requires no extra financial investment.Users need not to pay any subscription fee for registering in our application .Also the user can find more economically feasible options for booking the stocks and provide the affordable business deal.

### *B. TECHNICAL FEASIBILITY*

This web application is technically feasible for this web application is simple to use and easy understand, it depending on the several factors such us development visual studio , front end using HTML and css , Backend using java and database which is firebase ,map activity which is a google map api.The above factors are economically feasible for the development of the web application.

### *C. BEHAVIOURAL FEASIBILITY*

This web application is behaviourally feasible because even with the additional users the behaviour of this web application will be the same as the previous one.

## **VII. RESULT**

In our final experimental phase, we trained an ensemble model combining CNN-LSTM on a dataset comprising 49,972 samples, followed by testing on 25,413 headlines and articles. The training process utilized a 2 GB Dell PowerEdge T 430 graphical processing unit, running on a machine equipped with 2x Intel Xeon 8 Cores clocked at 2.4GHz and 32 GB DDR4 Random Access Memory (RAM). Training involved pre-trained word embeddings and classification on the 'Fake News Challenge Dataset', taking approximately 3 hours for completion of epochs. In contrast, feature reduction techniques required 1.8 hours for computation. Comparisons were made among the outputs of the non-reduced feature set, PCA, and chi-square integrated into a CNN-LSTM architecture. Analysis suggests that PCA is more effective in significantly enhancing accuracy through severe dimensionality reduction. Our presented model outperforms others, achieving an accuracy rate of 97.8%. Furthermore, the average precision, recall, and F1-score for all classes are 97.4%, 98.2%, and 97.8% respectively, as detailed in Table 5, highlighting the statistical significance of our proposed model in distinguishing between fake and legitimate news.



#### D. *BERT*

BERT, short for Bidirectional Encoder Representations from Transformers, has been utilized in the FNC1 task, employing the fine-tuning method where all parameters are adjusted together, and a basic classification layer is appended to the pre-trained model. In this process, BERT predicts all masked positions independently, disregarding potential dependencies between them during training. This oversight leads to a reduction in the learning of certain dependencies simultaneously, resulting in inconsistency between pre-training and fine-tuning. Despite achieving 91.3% accuracy on the FNC-1 task, BERT's F1-score falls significantly short when compared to both our model and the F1-scores of agree, disagree, and unrelated classes, as indicated in Table 7 for the CNN-LSTM model with k-fold cross-validation utilizing PCA.

#### E. *XLNet*

XLNet integrates bidirectional context while also avoiding independent predictions. It introduces a technique called "permutation language modeling," where tokens are predicted in a random order rather than sequentially. Built upon the Transformer XL architecture, XLNet surpasses BERT on 20 tasks, including document ranking, natural language inference, question answering, and sentiment analysis. It demonstrates improvement over BERT on the FNC-1 task, achieving an accuracy of 92.1% and an F1-score of 76.0%

#### F. *RoBERTa*

An open-source language model known as Roberta (Robustly Optimized BERT Approach) was introduced in July 2019. In a study cited [67], the author developed a large-scale language model using transfer learning based on the Roberta-based deep transformer model. This model comprises 12 layers with 768 hidden units, each containing 12 attention heads, totaling 125 million parameters. To conduct transfer learning, they trained the model for fifty epochs and adhered to hyperparameter recommendations from [69], resulting in superior performance compared to both BERT and XLNet models. However, despite achieving an accuracy of 93.71%, which falls short of our model's accuracy, our proposed model, incorporating PCA and only one layer of CNN and LSTM, can achieve higher accuracy. We adjusted only a limited number of parameters, whereas Roberta entails tuning 125 million parameters precisely. Additionally, the computational costs escalate significantly with Roberta's 12 layers of 768 hidden units. Comparing F1-scores reveals that Roberta's performance on individual classes is inferior to our model's. This discrepancy may lead to inadequate performance even in agree and disagree classes, although the F1-scores for discussing and unrelated classes are almost identical

### VIII. CONCLUSION AND FUTURE WORK

Manure Collection and Distribution Website is an innovative solution that addresses environmental concerns, promotes renewable energy production, and benefits both farmers, organic pesticide makers and biogas producers. With the successful implementation of this project, we aim to contribute to a more sustainable and eco-friendly future. In conclusion, the implementation of an e-commerce website for waste management holds significant potential for revolutionising how waste is handled and disposed of in our communities. This digital platform not only streamlines the process of waste collection, recycling, and disposal but also promotes environmental sustainability by encouraging responsible waste management practices.

By leveraging technology and e-commerce capabilities, the waste management industry can enhance efficiency, increase accessibility, and raise awareness about the importance of sustainable waste practices. As we move towards a more interconnected and digital future, embracing e-commerce solutions in waste management stands as a progressive step towards a cleaner, greener, and more sustainable world. Firstly, the e-commerce website facilitates a more efficient and convenient waste disposal experience for users. With the ability to schedule pickups, order recycling bins, and track waste disposal activities, customers can seamlessly engage with waste management services from the comfort of their homes or businesses. This increased accessibility not only enhances customer satisfaction but also encourages wider participation in responsible waste disposal practices.



Moreover, the e-commerce platform offers an opportunity to promote environmental awareness and education. By incorporating informative content, guidelines, and incentives for eco-friendly choices, the website can serve as an educational hub for users. This not only fosters a sense of environmental responsibility among consumers but also contributes to the larger goal of building a sustainable and eco-conscious community.

From a business perspective, the implementation of an e-commerce website holds the potential for cost savings and operational efficiency. Automated processes, such as scheduling and tracking, can optimise resource allocation and reduce manual workloads, leading to increased productivity and decreased operational costs. Furthermore, the platform allows for data-driven decision-making, enabling waste management entities to analyse trends, optimise routes, and enhance overall service delivery.

In conclusion, the adoption of an e-commerce website in waste management is not merely a technological upgrade but a transformative step towards a more sustainable and efficient future. By leveraging the power of digital platforms, we can revolutionise waste management practices, engage communities, and contribute to the global imperative of environmental conservation. As we navigate the challenges of waste management in the 21st century, embracing e-commerce solutions emerges as a key strategy to build greener, more resilient, and environmentally conscious societies.

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