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3R Focused Web Application

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Abstract
The primary focus of the 3R-Focused Web application liesin waste management and reduction. Over the course of years, waste management and reduction has become a neglected point. Reduce, Reuse and Recycle is one of the prominent approach to completely manage and reduce a waste item. This approach has been inculcated into 3R- Focused Web application. It is typically a user-preferenceweb application comprising of 3 modules: Donate, Recycle and Rent. The main objective of the system will remain to reduce, reuse, and recycle the items which are simply thrown away by people without any second thought. There are numerous different types of items whichcan be either used for donation, or if they are not in a condition to be donated to a person or a group of people, then they can be turned in for recycling so that, that particular waste item will not end up in waste and it can be recycled for a good purpose, lastly the rent module willgive a helping hand in reusing items. Users can rent out items which are in a good condition, which they have not used for a long period of time or are not going use in future, other users can borrow those items which will benefit them in many ways. In general, this web application aims at all the categories of waste items and also present users with a common platform for easy reduction of waste items and effortless access.

Keywords: 3R strategy, donation, recycling,reusing, sustainability, minimalism

Introduction

Managing and reducing waste has been a debatabletopic over the course of years and in recent years it has become a neglected point. One of the predominant benefits of waste management and reduction is its ability to decrease the environmentalimpact of human activities. Improper disposal and recycling of waste leads to waste items ending up inplaces like landfills, illegal dumpsites, natural habitats, streets and public places, water bodies etc.This web application targets the set of people who are passionate and keen about completely reducing a waste item. It aims at all the categories of waste items by providing three techniques to make use ofthe objects the user holds, a donation section, a recycling section, and a borrow/rent section.

II. Literature Review & Existing Systems

Following are the existing systems which included the approach of 3R strategy but comprised of drawbacks:

A. GoGreen: GoGreen [1] is a mobile application that helps the community to keep the environment clean . It provides a scanning option that presents the user with concise information about the product

material and about where to throw the waste as well as users will receive creative "do it yourself" ideas and eco-friendly suggestions for the scanned product. The main drawback of GoGreen is that it doesn't provide communication or a link between the users, as they cannot share their ideas.

B. Ea'arah Application Ea'arah [2] is a free platform that enables users to offer services, and items whether for free or not to other people. The user must specify the living area to view the products available in his area and can also use the filter to directly identify the product . Users have been provided with searching option for customized things as well as determining their need, and contact the seller or product owner. The app's location spanis limited only to Eastern province which could be a drawback for the app and it is only supporting the concept of Borrowing.

C. RecycleCoach : RecycleCoach [3] is a mobile application that teaches the users how to recycle and sort recyclable items. The app starts with a survey to test and improvise the knowledge of the user regarding recycling. Additionally it offers a search tool for users to search if an item can be recycled or not, and if yes, how to recycle it. The app also includes a calendar for scheduling recycling days and setting reminders. The app is not providing creative recycling solutions and the products cannot be scanned, whidoes not provide a main drawback for the app.

D. RecycleNation: Recycle Nation[4] is a website and a mobile application that provides users with nearby recycling centers and present them with tips and ideas for recycling various items. The main drawback of this system is that it is completely focused on only one aspect of the 3R strategy i.e recycle and it may not put much emphasis on wastereduction or reuse techniques.

This paper has proposed an application system integrating all the three Eco friendly options (Recycling, Donations and Borrowing) and also an efficient attempt to eradicate the drawbacks of the existing systems.

III. Methodology

The proposed system aims to develop a common and accessible platform where different types of users can easily reduce a waste item with the help of three modules: donation, recycling and a borrow/rent section.

The system architecture explains the entire workflow of the system:

Firstly, the admin will login the system. The admin will be able to view all the listed donation centers and recycling centers. Further, if there are any requests from any donation or recycling centersthe admin will have the choice to approve it or not.The admin can then delete those centers too.

A user will have to first login into the systemor register if he/she is not a registered user. Proceeding, the user will be able to view three options: DONATE, RECYCLE, RENT/BORROW.As per user's preference he/she can click on of those options. If the user clicks on donate option, he/she will have to enter its locality address which will provide it with the nearest donation center. Further, the user can donate its items by clicking a photograph or choosing a photograph and proceed for donation by requestingto the donation center for donation.

If the user clicks on recycling option, it will provided with two options: a recycling ideas dashboard and find a recycling center. On the recycling ideas dashboard, the user will be able to post its innovative recycling ideas, save it, search a particular recycling idea. The second option will work similarly to the donation module.

In the third option, the user can post its items photographs and its details for rent, the other user can

request to that particular user for renting that item. The second user can then select the time period (for rent), payment option, and proceed for renting the item.

From the perspective of donation centers and recycling centers, they will have to register themselves first and send a request for entering into the system. The admin can then approve/disapprove that request. The donation centers will be given a dashboard where they can post their requirements, and proofs of receival of donation from the user. User will able to view the requirements and can apply to that particular requirement. The donation centers can further view the requests of the users who are interested to donate. The recycling centers will be given a dashboard where they can post their reused or modified items. The recycling centers will also be able to view the requests from the users who are interested to recycle.

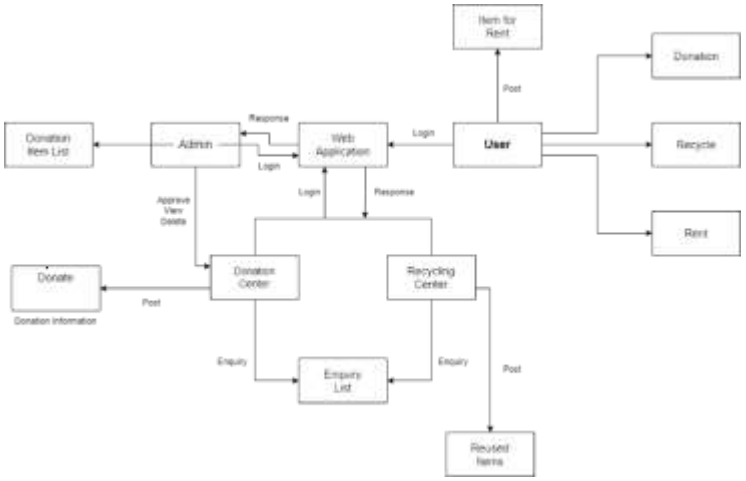

Fig. 1: System Architecture

The choice of tools used to implement 3R- Focused Web application has been selected according to what will give the user the best experience.

Java programming language:

Java is well-suited for building web applications due to its platform independence, robustness, scalability which provides features like multithreading and distributed computing support through frameworks, a broad and vast ecosystem of frameworks and libraries that enhances and supports web development and lastly security features like robust security manager and upholds support for encryption and authentication protocols.

HTML, CSS, JS:

The three core languages which are used for the development of frontend of the web application: HTML, CSS, Javascript . HTML which defines outer structure of a web page, CSS which is used for designing of the web page and Javascript which defines the logic for the web page or which makes the webpages dynamic as well as interactive.

MYSQL database (phpMyAdmin):

A free software tool which is meant to control the administration of mysql over the web. It supports and is comprised of administrative operations like creating a database, executing queries and adding user accounts.

IV. Implementation

3R-Focused web application is developed in java programming language and uses mysql (phpMyAdmin) database. The main prominent users of the web application are admin, donation center(authorities), recycling center (authorities) , and an usual user.

It contains various interfaces and dashboards listed and described below:

1. **Login dashboard :**
   a) Admin login
   b) Donation center login
   c) Recycling center login
   d) User login
2. **Approve/ Disapprove interface:**

This interface allows the admin to approve only authenticated donation centers enter into the system ensuring safety of the users. This interface allows the admin to approve only authenticated recycling centers enter into the system ensuring safety of the users.

3. **View interface:**

This dashboard will display entire lists of approved and disapproved donation centerslist. This dashboard will display entire listsof approved and disapproved donation centers list.

4. **Donation center dashboard.**

A donation center dashboard will allow donation centers to post their requirements and proofs of receival of donation from the user.

5. Recycling center dashboard. A recycling dashboard will allow recycling centers to post reused and modified items for the satisfactionof the user who put up their items for recycling.
6. **Donate interface:**

This interface has been designed for the users which will enable them to connect with various donation centers to donate their items and provide them with nearest donation centers list by calculating the appropriate longitude and latitude of both the user and the respective donation center and then the users can proceed to donate their respective items by entering the details and then uploading a photograph of the same. An enquiry message will be sent to the donation center when a particular user attempts to donate an item.

7. **Recycle interface:**

This interface has been designed for the users which will enable them to connect with various recycling centers to recycle their items and also provide them with nearest recycling centers list by calculating the appropriate longitude and latitude of both the user and the respective recycling center and then the users can proceed to recycle their respective items by entering the details and then uploading a photograph of the same. An enquiry message will be sent to the recycling center when a particular user attempts to recycle an item.

It also provides users with the option to post theirinnovative ideas to recycle items , other users canview these ideas . Additionally save a particular idea if it holds favourable position for the other user.

8. **Borrow/Rent interface:**

A Borrow/Rent interface has been inculcated intothe system for those items which are currently notbeing used by the user or will not be used in the future.

For such items , users can simply rent (lend) themout by posting details and a photograph of that item.

Other users can view and take them on rent and also proceed with the payment for the respective item.

Applications –

1. **NGO's:**

This application will provide the NGO's a means for communicating their needs(food, clothes, financial help, educational support etc.) with various users and getting them fulfilled.

2. **Recycling centers:**

Revenue will be generated for recycling centers(industries) as there will be a growing supply of waste materials generated due to increasing rate of population.

3. **Hotel industry:**

The reduction of waste at source is a key goal of the hotel. All waste items will be reused and recycled before considering disposal.

4. **Manufacturing industry:**

Excess of produce of certain products which may not be put out for selling to common people due to certain reasons can be thrown away. Instead ofthrowing away, they can be reused and recycled.

CONCLUSION

This web application represents a system that provides creative eco-friendly solutions and encourages living a sustainable life. The goal of this application is to protect the environment and to help the people live a minimalistic lifestyle that is suitable for the environment with the support of technology. 3R web application aims toserve society and promote property value via recycling/reuse, borrowing/lending and donating.

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