BEACONHOUSE NATIONAL UNIVERSITY

SaafPakistan

PRJ-F23/329

PROJECT PROPOSAL REPORT

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SCHOOL OF COMPUTER &IT

September 2023

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Problem Statement

Pakistan, like many other countries, lacks a structured recycling system, with no concept of separate bins for recyclable materials. As a result, individuals and businesses indiscriminately dispose of all types of waste together, contributing to the worsening of environmental pollution and the accumulation of recyclables in landfills. This haphazard waste management approach not only worsens environmental pollution but also hinders the sustainable utilization of valuable recyclable resources.

Existing System

In Lahore, Pakistan, the prevailing waste management system heavily relies on informal and inconsistent practices. Residents and businesses typically dispose of their waste by dumping it in open areas, streets, or makeshift trash piles near their homes or places of business. These haphazard disposal methods often result in unsightly, unsanitary, and environmentally harmful conditions.

The collected waste is typically gathered by local waste collector or municipal workers who manually sort through it to salvage recyclable materials. Non-recyclable waste is then transported to landfills, which are often poorly managed and insufficiently regulated, leading to pollution and health hazards. Households in Lahore rarely segregate waste, with organic and inorganic materials tossed in together. This means that otherwise recyclable materials, such as paper and plastic, become contaminated with bacteria, reducing their quality and usefulness.

Even if waste was segregated at the basic level with separate bins for organic and inorganic waste, we could significantly reduce the amount of garbage that ends up in landfill sites in Lahore. Due to the absence of a well-structured recycling system, valuable recyclable resources are frequently mixed with non-recyclable waste, exacerbating environmental issues.

An NGO Aabroo Educational Welfare Organization, based in Lahore, has recognized the need for sustainable waste management solutions and has taken a pioneering step in this direction. Since 2007, they have initiated a successful Solid Waste Management Initiative, collecting recyclable waste from households and institutions. This program not only generates funds to support the organization but also promotes environmental awareness with a focus on the 3Rs (Reduce-Reuse-Recycle). Currently serving around 7,000 households and 28,000 donors each month, the initiative covers one-third of Aabroo's monthly expenses, with the goal of achieving full financial sustainability in the near future.

Still, there is a lack of incentives for responsible waste management in Lahore, discouraging individuals and businesses from actively participating in recycling efforts. These challenges highlight the urgent need for a comprehensive and organized waste disposal and recycling solution in Lahore, such as SaafPakistan.

Literature Survey

In our pursuit of cutting-edge insights and innovative approaches to foster positive behaviors and outcomes, we have thoroughly explored a myriad of research papers and articles. Among the compelling concepts that have captivated our attention is gamification, a strategy that seamlessly integrates game elements and techniques into non-gaming contexts. Additionally, the surging interest in tools like carbon footprint calculators, designed to evaluate one's environmental impact, has been a focal point of our research endeavors. Our extensive review of the literature has illuminated the confluence of these two domains and their potential to shape a more sustainable future.

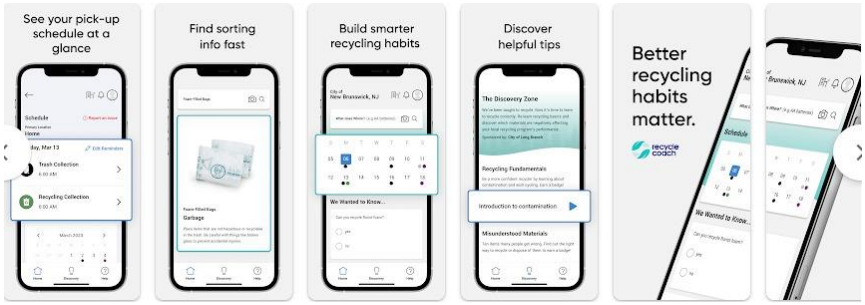
- A study "Gamification for Recycling: A Review of the Literature" by the University of California, Berkeley (2020) found that gamification can also be effective at increasing recycling rates. The study found that a program that rewarded people with points for recycling led to a 15% increase in the recycling rate.[1]
- A study "Financial Incentives and Gamification to Increase Recycling Rates" by the World Bank (2021) found that financial incentives and gamification are most effective at increasing recycling rates in countries with high levels of income and education.[2]
- The article "The state of carbon footprint calculators: An evaluation of calculator design and user interaction feature" by "John Mulrow" is about the state of carbon footprint calculators. It discusses the growing interest in these tools and the variety of calculators available. The authors note that there is no standardization in the way calculators are designed or the data they use. This makes it difficult to compare results from different calculators. The authors also discuss the importance of user engagement and how calculators can be used to educate people about their carbon footprint.[3]
- Gamification is a promising approach to promoting tourist recycling behavior, as shown in the article "Gamification as An Approach to Promote Tourist Recycling Behavior" by Lidia Aguiar-Castillo et al. (2019). It can make recycling more fun and engaging for tourists, and encourage them to recycle more often. Some examples of gamification for tourist recycling include awarding points and badges, using leaderboards, and creating challenges.[4]

In light of these research findings, it becomes evident that targeted strategies, such as gamification and financial incentives, hold the power to significantly enhance recycling rates. Furthermore, standardizing the design and features of carbon footprint calculators remains crucial. This not only facilitates precise environmental impact assessment but also functions as an educational instrument, guiding individuals toward more responsible and sustainable behaviors. Collectively, these approaches offer a promising pathway toward a more sustainable and environmentally-conscious future.

Additional Research

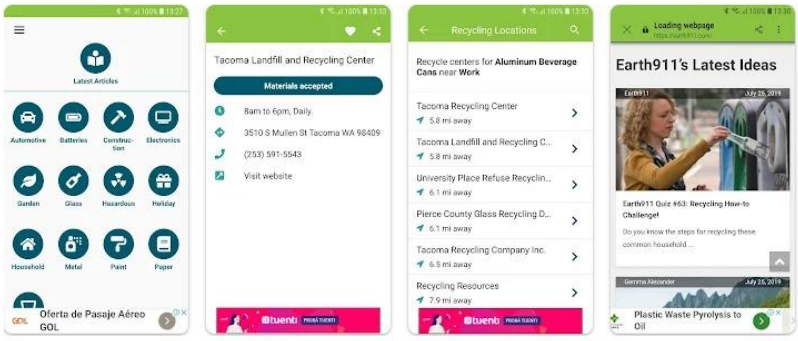
1. Recycle Coach Mobile App [5]

Recycle Coach is a mobile app and website that helps users recycle and compost correctly. It provides information on what materials can be recycled or composted in their area, as well as tips on reducing waste. Recycle Coach also has a feature that allows users to set reminders for their recycling and composting pickup days.



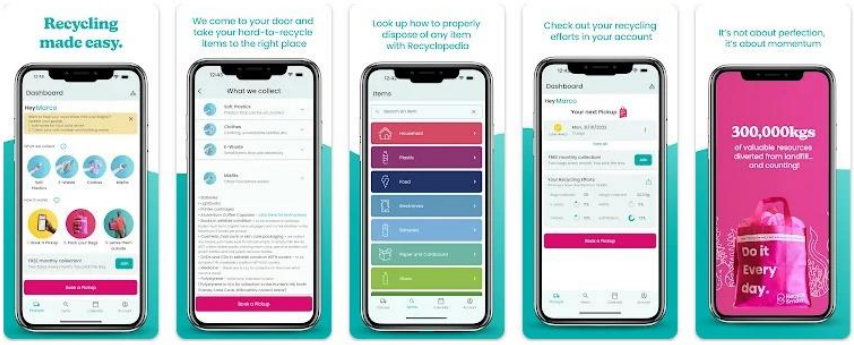
2. iRecycle Mobile App [6]

iRecycle is another mobile app that helps users recycle and compost correctly. It provides similar information to Recycle Coach, but it also has a few additional features, such as a barcode scanner that can be used to identify recyclable materials. iRecycle also has a rewards program that gives users points for recycling and composting, which can be redeemed for prizes.



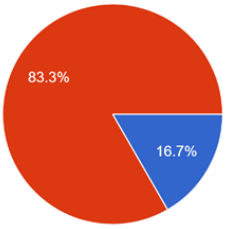
3. Recycle Smart Mobile App [7]

Recycle Smart is a mobile app that provides information on what materials can be recycled, as well as tips on reducing waste. Recycle Smart also has a feature that allows users to find the nearest recycling drop-off location.

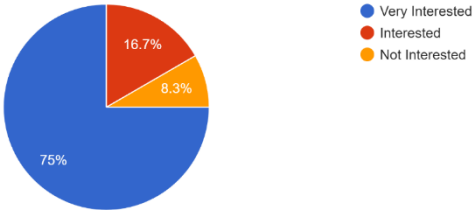


Survey

1. We surveyed 12 people on their recycling practices and preferences and their responses were as followed
   - 83% of the people do not recycle because there are no means for recycling.

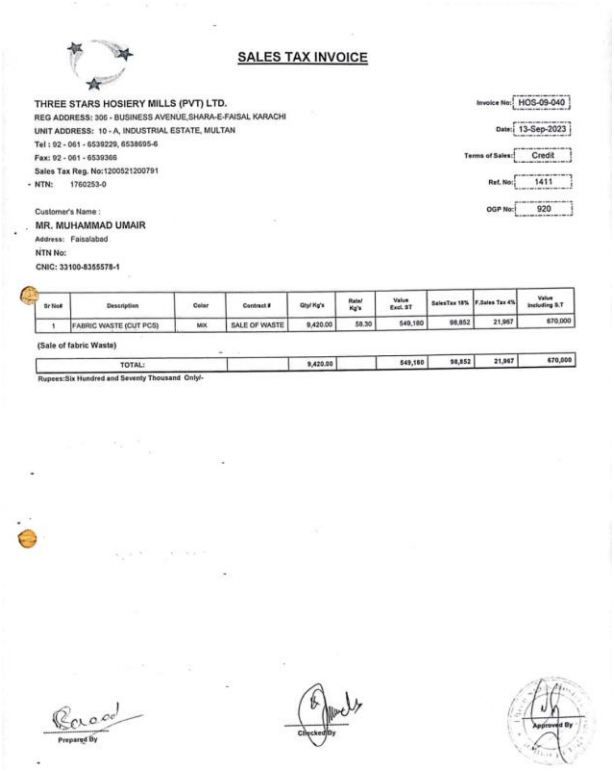


   - 75% percent of the people said that they would start recycling if it were made convenient by an app



2. Additionally, we also came in contact with two organizations. We reached out to these organizations to gather information on their recycling habits and to get information on what they recycle, how much they recycle and how much they sell it for. We were then provided with some invoices to help understand the financials

    - Three Star Hosiery Mills



SALES TAX INVOICE

THREE STARS HOSIERY MILLS (PVT) LTD.
REG ADDRESS: 306 - BUSINESS AVENUE,SHARA-E-FAISAL KARACHI
UNIT ADDRESS: 10 - A, INDUSTRIAL ESTATE, MULTAN
Tel : 92 - 061 - 6539229, 6538695-6
Fax: 92 - 061 - 6539366
Sales Tax Reg. No:1200521200791
NTN: 1760253-0

Invoice No: HOS-09-040
Date: 13-Sep-2023
Terms of Sales: Credit
Ref. No: 1411
OGP No: 920

Customer's Name :
MR. MUHAMMAD UMAIR
Address: Faisalabad
NTN No:
CNIC: 33100-8355578-1

Sr No#	Description	Color	Contract #	Qty/ Kg's	Rate/ Kg's	Value Excl. ST	SalesTax 18%	F.Sales Tax 4%	Value Including S.T
1	FABRIC WASTE (CUT PCS)	MIX	SALE OF WASTE	9,420.00	58.30	549,180	98,852	21,967	670,000
(Sale of fabric Waste)									
TOTAL:				9,420.00		549,180	98,852	21,967	670,000

Rupees:Six Hundred and Seventy Thousand Only/-

Prepared By
Checked By
Approved By

    - Active Apparels

In conclusion, information from both these organizations helped us understand the potential of the recycling business in the garments industry and in short helped us build our business model.

3. Furthermore, we contacted 2 recycling experts (Scrap Collection Centre's) to get up to date rates for different recycling materials
    - Cheema Metal Scraps: Contact – 03414025140 (Ameer Hamza Cheema Owner)
    - Warraich Scrap Dealers: Contact – 03554770998 (Asad Warraich Owner)

Proposed Solution

Overview:

SaafPakistan is a comprehensive mobile application designed to revolutionize waste management and recycling practices in Pakistan. It addresses the challenges of unstructured waste disposal and promotes responsible recycling habits among individuals and businesses.

Key Features:

Recycling Pickup Scheduling:

- Users can schedule convenient recyclable pickups.

Gamification:

Leaderboard System:

- A dynamic leaderboard system integrated into the app for individuals and businesses, fostering a sense of competition.
- Users earn points and rankings based on their recycling activity.
- Real-time updates on leaderboard standings to keep participants engaged
- Add friends: Users can search for and send friend requests to other app users. Once the request is accepted, they become friends within the app.
- View Friends Ranking: In the Leaderboard section, users can see a separate tab for "Friends Leaderboard". This tab displays the rankings for their friends based on their recycling activity.

Rewards and Compensation:

- Users receive compensation for the recyclable waste they contribute, motivating continued participation.
- Transparent compensation tracking within the app, ensuring users are aware of their earnings.

Corporate Onboarding:

- Companies can register to participate in the recycling program, extending the gamification element to businesses.
- Registered companies have access to the same leaderboard feature for friendly competition within the corporate sector.

- Businesses can showcase their environmental efforts and commitment to sustainability through the app.

Advertisement as a Green Company:

- Businesses that actively participate are highlighted as eco-friendly and socially responsible partners.
- Enhanced visibility to environmentally conscious consumers, potentially attracting more customers.

Dashboard Summary:

- Users will see a motivating summary on their dashboard, encouraging them to earn more points and recycle more.
- The summary includes information such as the total amount they will earn, the total number of waste items recycled, and the total carbon emissions reduced, providing users with a clear picture of their positive impact on the environment.

Deliverables

- Mobile App
- Web App

Technologies

- React
- React Native
- Spring Boot Java
- MySQL
- Netlify
- GitHub
- Postman

Business Model [8] [9]

Our business model is simple: We buy at competitive rates from consumers and businesses and sell at premium rates to recycling centers, creating a sustainable and profitable recycling ecosystem.

Aspect	Details
1. Overview	
Objective	Create a sustainable waste recycling business
Daily Waste	1,967 Tons of recyclable waste
Target Categories	Plastic, Cardboard, Paper, Metals, Textile, Glass, Rubber
2. Revenue Generation	
Gross Profit (Per KG)	Consumers: 24 PKR, Businesses: 31.5 PKR
Revenue Projections	Consumer: 50 Tons/Month = 1.2 million PKR Business: 100 Tons/Month = 3.15 million PKR
3. Operating Costs	
Estimated Costs	35-40% of gross profit (Labor, Equipment, Transportation, Overhead)
4. Net Profit	For 150 Tons/Month: Gross-Operating Costs = 2.61 million PKR
5. Marketing and Sales	
Marketing Strategies	Online advertising, Partnerships, community outreach

Project Methodology

FYP I

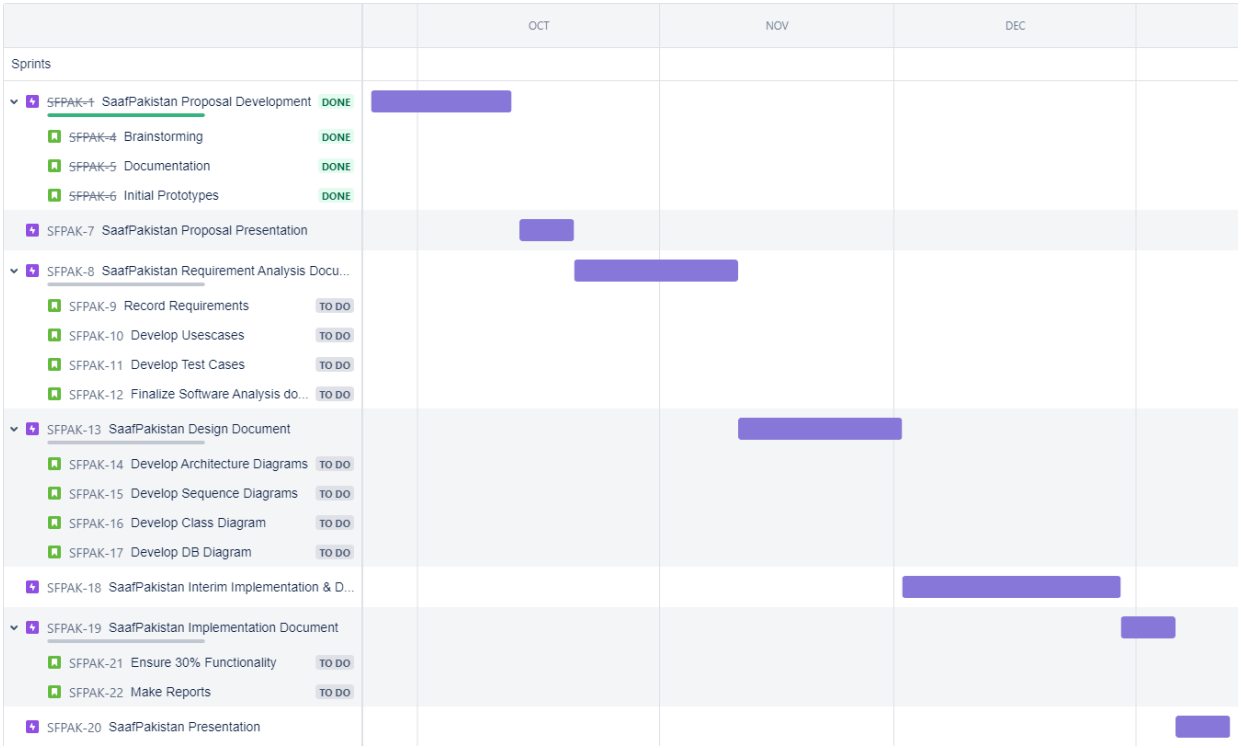
1. **SaafPakistan Proposal:** Develop a proposal for the project and seek faculty approval.
2. **SaafPakistan Presentation:** Summarize the project proposal for presentation to the faculty panel.
3. **SaafPakistan Requirement Analysis:** Conduct research and data gathering to create a detailed analysis document.
4. **SaafPakistan Design Document:** Use software engineering practices to design the system.
5. **SaafPakistan Implementation Document:** Document the implementation of the project, including screen shots and reports.
6. **Work on SaafPakistan User Interface Design**
7. **SaafPakistan Presentation:** Present the analysis, design, and implementation documents to the faculty panel.

FYP II

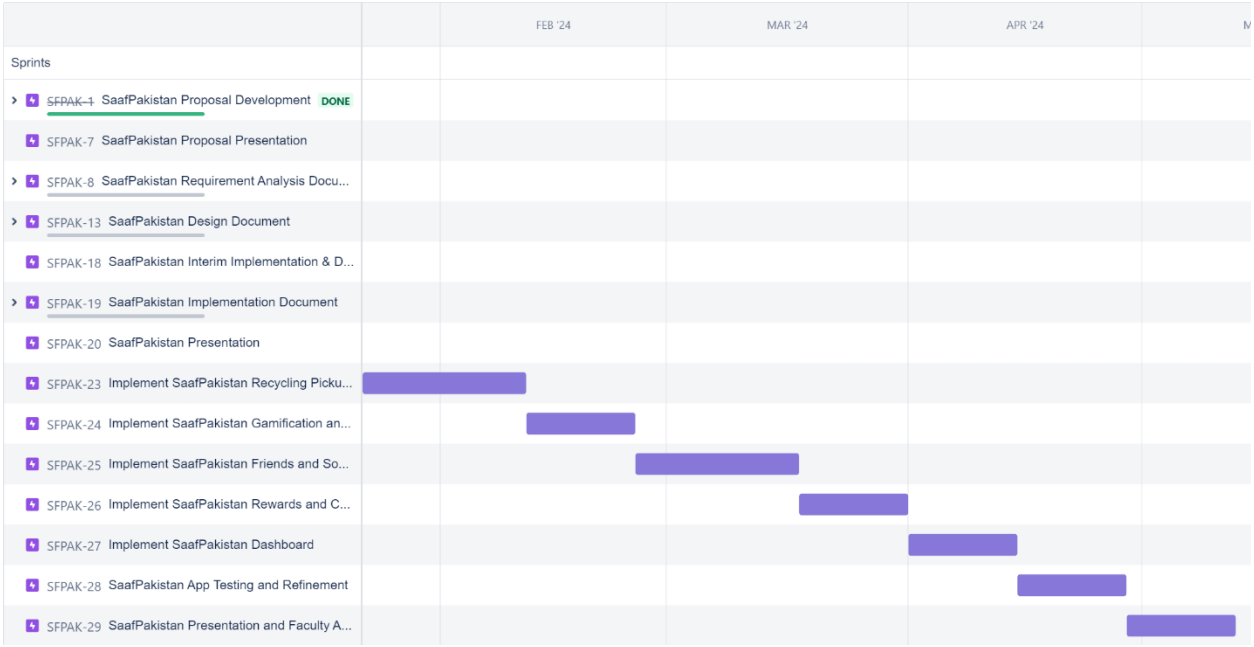
1. **Implement Recycling Pickup Scheduling**
2. **Implement Gamification and Leaderboard System**
3. **Implement Friends and Social Features**
4. **Implement Rewards and Compensation**
5. **Implement Dashboard**
6. **Testing and Refinement**
7. **Presentation and Faculty Approval**

Timelines

FYP- I



FYP- II



Expertise

Ali Sher (Team Lead)

- React (Udemy)
- Spring Boot (Web Engineering)
- MySQL (DataBase Systems)
- GitHub (Business Process Engineering)

Nouman Ali

- UX/UI (HCI)
- MySQL (DataBase Systems)
- GitHub (Business Process Engineering)
- Spring (Web System Development)
- Prototyping (Figma)

Mian Faizan Munawer

- React (Udemy)
- Spring Boot (Web Engineering)
- MySQL (DataBase Systems)
- GitHub (Business Process Engineering)
- Postman (Internship)

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