

REHOME: CONNECTING DONORS WITH CHARITIES

1. INTRODUCTION

1.1 BACKGROUND

In today's fast-paced world, it's surprising to know that millions of reusable household items are tossed aside each year. This not only makes waste management tougher but also adds to the environmental challenges we face. A report from the UK Department for Environment, Food & Rural Affairs (DEFRA, 2022) reveals that about 14 million tons of household waste ends up in landfills annually, with a significant chunk being items that could easily be reused or transformed into something new.

At the same time, charities and non-profit organisations are doing their best to gather essential items for those in need. While many generous donors want to help, they often feel unsure about the best ways to donate. This gap between what we waste and what communities actually need highlights the need for a creative solution to help redistribute resources more effectively. That's where ReHome comes in.



INTRODUCTION TO REHOME

VISION

To connect donors and charities seamlessly, we aim to turn reusable household items into meaningful support for those in need, reducing waste and amplifying generosity.

MISSION

ReHome's mission is to empower donors with personalized charity connections using data and machine learning to match their values and interests.

ReHome is a data-driven prototype platform designed to revolutionise the way donors connect with charities, reducing household waste and supporting community organisations. By combining the power of data science, machine learning, and user-

friendly design, ReHome aims to address the pressing societal challenges while contributing to the United Nations' Sustainable Development Goals (SDGs).

2. PROBLEM STATEMENT

2.1 KEY ISSUES

2.1.1 EXCESSIVE HOUSEHOLD WASTE

Every year, countless reusable items like furniture, electronics, clothing, and kitchenware end up in the trash. By establishing a better system to help connect these items with those in need, we can reduce waste and avoid filling our landfills even more. This not only protects our environment, but also ensures that valuable resources benefit our communities.

2.1.2 CHARITY RESOURCE SHORTAGES

Charities rely on the generosity of donations to keep their vital operations running smoothly. Yet, they often find themselves in a bit of a pickle when it comes to accessing the essential items they need. While some organisations might receive a surplus of certain goods, they still face shortages of others, which can create inefficiencies and prevent them from helping those in need as effectively as they would like.

2.1.3 INEFFICIENT DONATION PROCESS

Potential donors often encounter some challenges, such as:

- **Lack of Awareness:** A lot of people might not realize how or where to donate items in a way that truly makes a difference.
- **Uncertainty:** Sometimes, donors feel unsure about whether their items will be accepted or if they're truly needed, which can make them hesitate.
- **No Tracking Mechanism:** Donors might not have a clear way to see the positive impact of their contributions, which can discourage them from continuing to donate regularly.

2.1.4 LACK OF MATCHING MECHANISMS

Right now, we don't have a seamless system that links generous donors with charities based on their immediate needs, location, and donation preferences. This can lead to some missed opportunities, as many donations might go unused or end up with charities that don't need them the most.

3. PROPOSED SOLUTION: THE REHOME PLATFORM

ReHome is a wonderful digital platform that makes it easy for generous donors and caring charities to connect. With smart machine learning algorithms, handy geolocation services, and a user-friendly interface, ReHome helps ensure that donations find their way to those who need them most, all in a smooth and efficient manner.

SOLUTIONS

PROJECT OBJECTIVES



01 Create a Donor-Charity Connect Platform

02 Build a Recommendation System to Match Potential Donors to Charities

3.1 CORE FEATURES

- **Intelligent Matching System** – This wonderful feature uses machine learning to suggest charities that truly resonate with the donor's contributions. By examining the types of items available, the system carefully identifies the best recipients based on their immediate needs and preferences. This way, we can ensure that donations are used in the most effective way possible, bringing joy to both donors and recipients.
- **Geolocation-Based Search** – Donors can now enjoy an engaging experience by utilizing an interactive map or a location-based search function to discover nearby organisations that need specific items. This not only makes finding the right charity easier but also helps to reduce transportation costs and carbon footprints by ensuring donations are efficiently delivered within our local communities.

- **User-Friendly Interface** – The platform is thoughtfully designed for everyone, whether you're tech-savvy or prefer a simpler approach. With a clean and intuitive layout, it allows donors and charities to effortlessly register, browse, and interact - no specialized training required.
- **Real-Time Donation Tracking** – Donors will love being able to track their contributions at every step, from the moment they decide to donate until their items are received and put to good use. This feature fosters trust in the donation process, encouraging ongoing engagement and delight.
- **Sustainability Insights** – The platform proudly provides insightful, data-driven information on how donations contribute to reducing waste and achieving sustainability goals. Users can explore analytics such as the number of items saved from landfills and the estimated decrease in carbon emissions, showcasing the impactful difference they are making in the world.

4. TECHNOLOGY USED

4.1 MACHINE LEARNING AND DATA SCIENCE

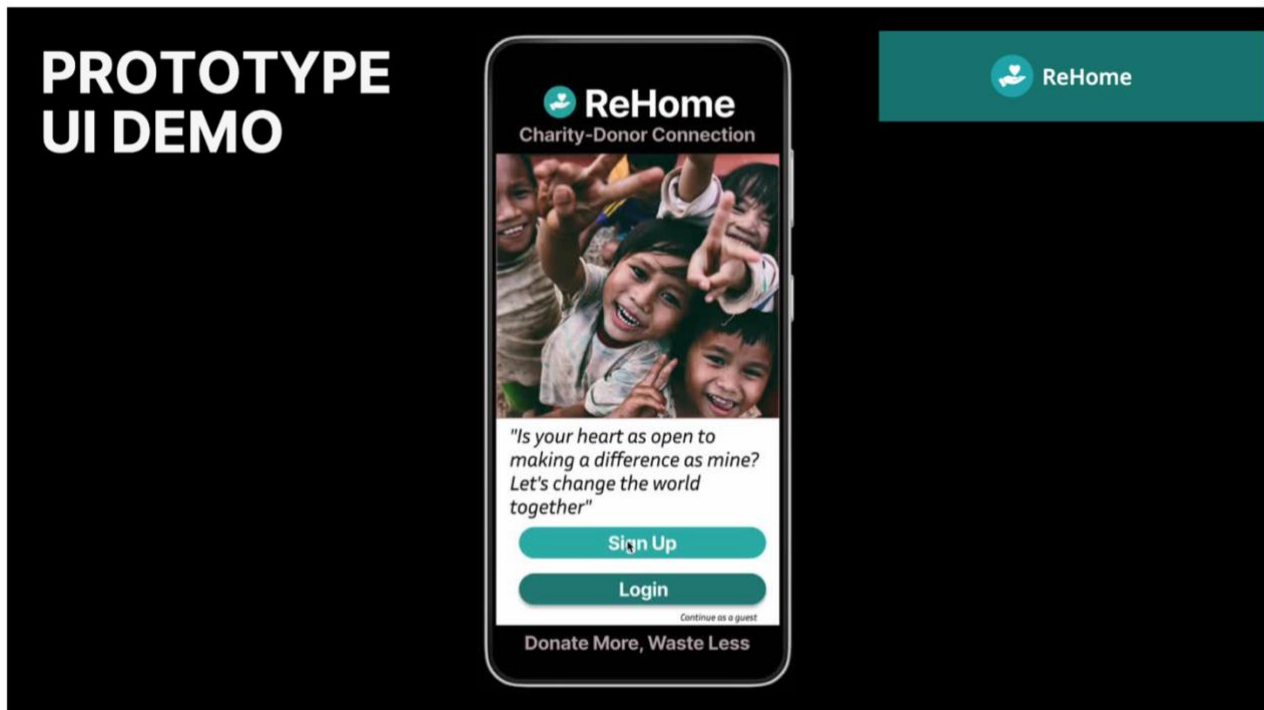
ReHome uses cutting-edge machine learning algorithms to make the recommendation and matching process even better!

- **Haversine Formula** – This handy mathematical tool helps us figure out the shortest distance between two places by looking at their latitude and longitude. This way, we can easily find the nearest charities that are perfect for your donations.
- **K-Nearest Neighbors (K-NN)** – With this smart algorithm, we ensure that charities are connected to donors based on closeness, relevance, and their needs. It's all about prioritizing local donations to keep transportation simple and friendly to our environment.
- **Content-Based Filtering** – Our system tailors recommendations by diving into your donation history, the types of items you have, and your personal preferences. This way, we make sure you're matched with charities that truly need the wonderful items you're offering.

4.2 SOFTWARE & DEVELOPMENT TOOLS

- **Python** – A programming language used to develop the platform's algorithms, data processing tools, and backend operations.
- **Pandas & NumPy** – These libraries are used for data organisation and analysis, enabling efficient handling of donor and charity databases.

- **Google API** – Extracts location data from postal codes to provide accurate mapping and search functionalities.
- **Figma** – A design tool that allows the creation of a visually appealing and user-friendly prototype for donors and charities.
- **Matplotlib & Seaborn** – These visualisation tools generate graphs and reports that display donation trends and platform impact metrics.



5. USER EXPERIENCE & PLATFORM FEATURES

5.1 DONOR FEATURES

- **Simple Registration** – A quick and intuitive sign-up process allows donors to set up accounts within minutes, making it easier for them to start contributing immediately.
- **Smart Search & Recommendations** – The platform suggests the best charity matches based on donor preferences, previous contributions, and location.
- **Donation Impact Tracker** – Donors can see how their contributions are being used through notifications, reports, and success stories shared by charities.
- **Donation History Log** – Users can track past donations, providing them with insights into their contribution patterns and encouraging continuous engagement.

5.2 CHARITY FEATURES

- **Customisable Wish List** – Charities can list the specific items they need, ensuring they receive relevant and useful donations instead of mismatched contributions.
- **Efficient Communication System** – Integrated messaging features allow charities and donors to coordinate donation drop-offs or pick-ups easily.
- **Performance Metrics** – Charities can access detailed reports on donation volumes, helping them manage inventory and optimize distribution strategies.
- **Inventory Management System** – A built-in feature helps charities organize and track received donations, ensuring resources are allocated efficiently and do not go to waste.

6. POTENTIAL IMPACT

6.1 CONTRIBUTIONS TO SUSTAINABILITY & SOCIAL GOOD

ReHome aligns with the United Nations' Sustainable Development Goals (SDGs) by addressing environmental and social issues:

- **Goal 11: Sustainable Cities and Communities** – Helps reduce landfill waste by redistributing reusable household items.
- **Goal 12: Responsible Consumption and Production** – Promotes the circular economy by extending the life of consumer goods through donation.
- **Goal 13: Climate Action** – Minimizes environmental impact by reducing waste and optimizing donation logistics.

6.2 EXPECTED BENEFITS

- **Environmental** – Prevents unnecessary waste and reduces carbon emissions through efficient logistics and local donation distribution.
- **Social** – Enhances community support networks by ensuring charities have access to necessary resources.
- **Economic** – Saves costs for both donors (by reducing waste disposal fees) and charities (by securing resources without financial strain).
- **Scalability** – The platform can be expanded to different regions, providing a global solution for donation management.

7. CHALLENGES & MITIGATION STRATEGIES

7.1 POTENTIAL CHALLENGES

- **User Adoption** – Encouraging widespread use of the platform among donors and charities.
- **Logistics Management** – Ensuring smooth coordination of donation pick-ups and deliveries.
- **Data Privacy & Security** – Protecting user information from cyber threats.

7.2 MITIGATION STRATEGIES

- **Educational Campaigns** – Raising awareness through digital marketing and outreach initiatives.
- **Logistics Partnerships** – Collaborating with delivery companies to streamline donation transportation.
- **Cybersecurity Measures** – Implementing encryption and authentication protocols to secure user data.

8. CONCLUSION

ReHome aims to transform the donation process by harnessing technology to create meaningful connections between donors and charities, ensuring that valuable, reusable items reach those who need them most. By integrating intelligent matching algorithms, geolocation services, and real-time tracking, ReHome streamlines the act of giving, making it a simple yet powerful way to reduce waste while maximizing social impact. Through this innovative platform, individuals are empowered to donate with confidence, knowing their contributions are directly benefiting communities in need. Simultaneously, charities gain access to essential resources in a timely and efficient manner, eliminating gaps in supply and ensuring that support reaches the right hands. This efficiency promotes not just responsible consumption but also strengthens the fabric of communities by fostering a culture of generosity, environmental responsibility, and social engagement.

Beyond its functional benefits, ReHome embodies a vision for a more sustainable and compassionate world. By preventing unnecessary waste and extending the life cycle of household items, it actively contributes to a circular economy, reducing landfill waste and minimising environmental impact. However, its impact extends beyond waste

reduction, it inspires conscious giving, cultivates stronger community ties, and encourages businesses and individuals alike to embrace a more sustainable and socially responsible way of life.

CONCLUSION



KEY BENEFITS OF REHOME

- 01 Optimized Resource Allocation
- 02 Enhanced Waste Reduction
- 03 Extends the lifecycle of household items and supports sustainability

RECOMMENDATIONS:

- Develop the Complete ReHome Platform Application
- Deploy Recommendation System: Implement and launch.
- Add Features: Update based on feedback and needs.

We invite donors, charities, and strategic partners to join us in realising this vision. Whether through donations, collaboration, or advocacy, supporting ReHome is a step toward a future where waste is minimised, resources are shared equitably, and every act of giving creates a ripple effect of positive change. Together, we can transform everyday donations into a movement that changes lives and builds a better tomorrow.

- **Code Repository:**

https://github.com/MichaelOforgu/ReHome_Charity_Donor_ML_Recommendation_Model