CityCollection

Disrupting Recycling with **Data**

Who are We?

We are a **seed stage startup** in Sri Lanka providing a technological platform that enables trash collection authorities in emerging markets, public or privately funded, to efficiently **attribute**, **collect**, and **direct** recyclables.
Our platform uses an i**ncentivizing recycling model** to gather and understand users disposal related data.
The data will be used to educate the users to **reduce, reuse and recycle,** and also be leveraged via a dashboard to help collectors optimize sorting costs, routes, and drive awareness campaigns.

Current stage of innovation:
- Working POC, building the platform for scalability
- Striking **partnership deal with largest waste management company in Sri Lanka**

Future plans:
- Fully functional **scalable platform**
- Trial the solution in small districts for PET and E-waste
- Strike **CSR deals with major retailers**

Our Team

Gamika Seneviratne

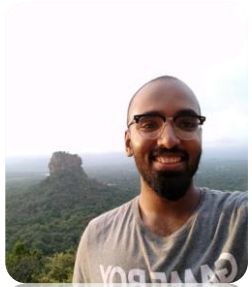
Assistant Director at Acuity Knowledge partners, 5 years experience in financial analysis. Data scientist and image recognition programmer. MEng in Electrical and Electronic Engineering from Imperial College London

Keshani Jayasinghe

Bsc. Software Engineering undergraduate with experience in UX/UI and graphic design enthusiast
Avid volunteer

Ajmal Majeed

Final Year - BSc. Software Engineering,
Former Trainee Associate Software Engineer at Populo,

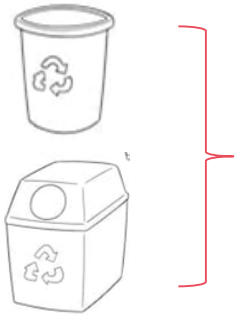


Avinath Gunasekara

Final Year - BSc. Software Engineering, Former Trainee Associate Software Engineer at Zone24x7, and Co-Founder & Community Lead at Colombo Flutter Community

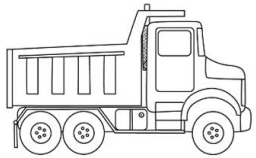
Highly **diverse** team, from **various nationalities**, **genders**, and **religions**

The Business Model



1. Users segregate recyclables...

2. into bags having **QR** codes linked to user's ID



3. …collector collects the recyclables…

4. …collector sorts and validates trash

CityBin

5. ...recycler pays us for trash items

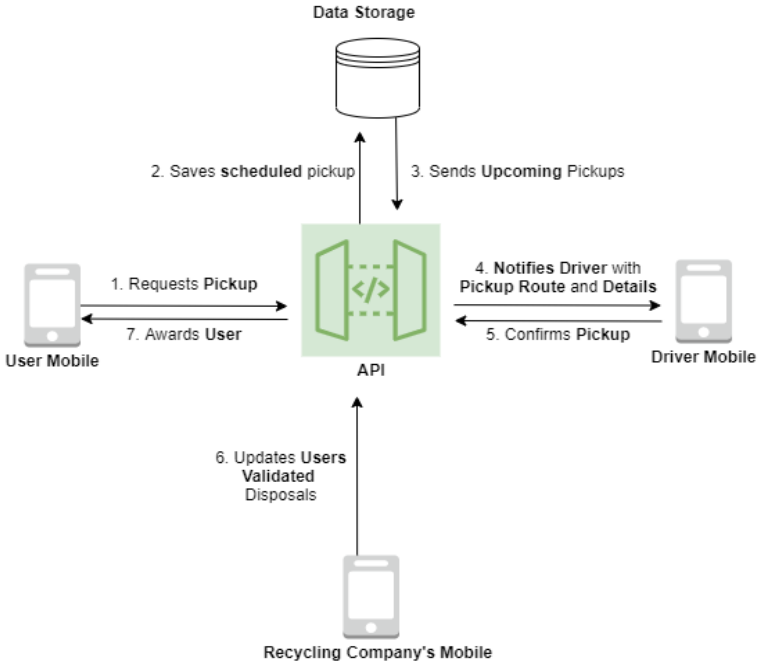
6. ...user earns a percentage of the earnings in the form of **CityPoints.**

- QR codes **enables** us to **track** the users disposals (trash bags) from their **home** to **waste management facility** (collector).
- Validation by the collector can be done at the **user's premise** (e.g. laptops) or at the **collector's facility** (e.g. many PET bottles) via an existing network of manual sorters
- **Data** at **user level** is collected (e.g. **disposal patterns**, favorite brands) and at **district level** (types of items most disposed, proximity to water canals, etc) will be combined to drive targeted collection and education processes
- Additionally, **image data** is collected (for additional incentive; at user's discretion), which allows us to **gauge cleanliness and reusability conditions.** This is *not core to our **City**Collection business yet*, however, it is **essential for Phase II** and for other purposes including **image recognition for industrial sorting** (slides 6, 10).

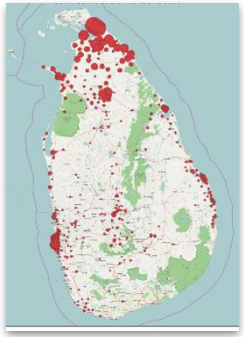
The Platform

1. User requests a pick up
2. The API saves a scheduled pickup in the database
3. The Backend polls the database on a timely basis checking upcoming pickups.
4. Notifies the driver of an upcoming pickup with the pickup route and details.
5. The Driver confirms the pickup.
6. Once the Driver has dropped off the garbage at the recyclers facilities, the recycler validates the users disposal (verify correct amount of garbage to claim points/ensure no cheating)
7. The user is rewarded with **City**Points, a virtual currency for **City**Collection, once the recycler validates the garbage items

*Discretionary **images** taken by the users for additional incentives will help us to understand the **reusability/recyclability** and progress to **Phase II**



What is the Data we Generate?



Locations data...

- Location data will be gathered at the point of collection

...allows us to

- Examine recycling density at user/city/district levels
- Locate areas with low recycling, e.g. next to rivers

Brands data...

- Brand data by types (PET, HDPE, etc)

...allows us to

- Collaborate with willing brands to help strategize better reduction /reuse/recycling techniques

Recyclable type data...

- Types of recyclable items, e.g. plastics, paper, cardboard, metals, etc

...allows us to

- To accurately segregate for the recyclers to consume

Image data...

- Gathered for extra incentive
- Two existing models;

1. mobile capable platform for image classification
2. specific brand identification model (YOLOv3)

...allows us to

- Build a database of garbage item images. Used for gauging cleanliness and reusability.
- Used for **phase II**

Visualizing Data through “The Dashboard”

Collection Routing

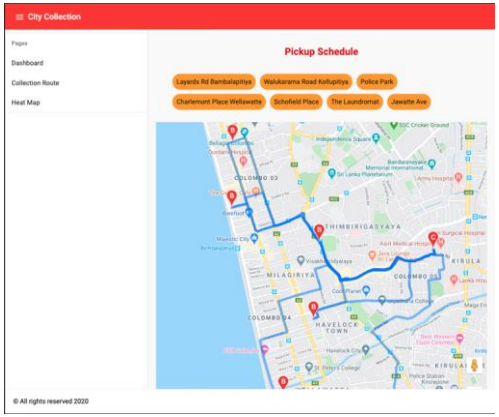
Collection authorities will be able to visually monitor the collections for the day with an optimized route for each pickup.

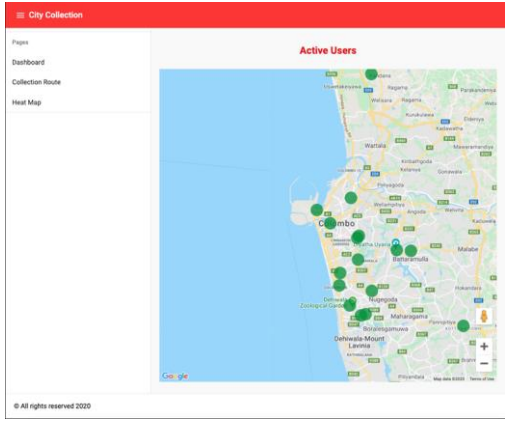
Recycling Heat Map

Monitoring areas in which recycling is taking place in a methodical manner in comparison to areas in which recycling is not taking place with the use of a heatmap, visually deriving the data gathered.

(Future work) Types Of Waste Disposed

Identifying which type of recyclable waste is being disposed by categorizing the disposals of each user and visually representing them on a map.



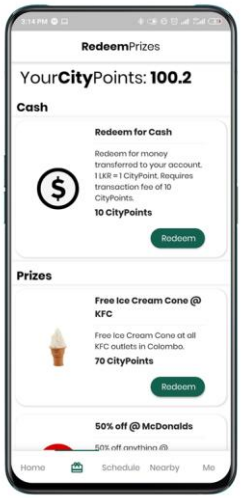


Actual data from 100 participants in a crowdsourced data gathering initiative

How do we Scale?

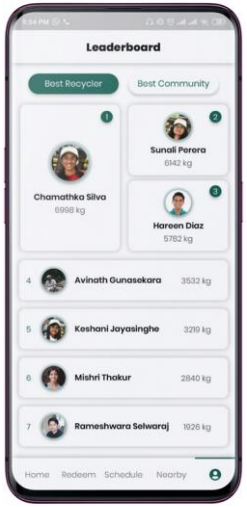
Incentivizing

Users can redeem for prizes and coupons on the modern UI application with the points they earn from using **Citv**Collection



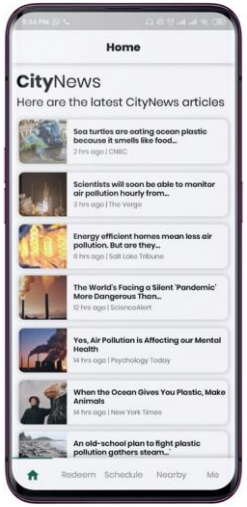
Gamification

Users can compete with others in the community and friends to see who recycles the most.



Education

Users can see any news regarding recycling, pollution, and related articles.



Location **(Phase II; slide 9)**

Users can find nearby **City**Bins to dispose their garbage

Phase II

Phase I

CityCollection

At home incentivised recycling.

Phase II

CityBin

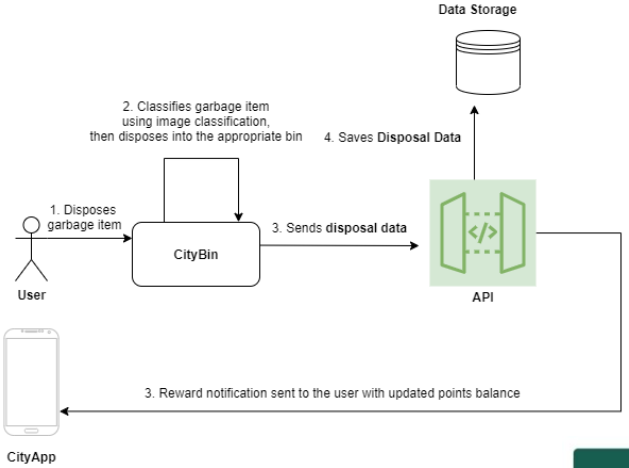
Out of home incentivised recycling.
Recycle **anywhere**.

- **City**Bin is phase II of the platform where we leverage the collected **garbage image data** from **City**Collection to deploy **physical 'ultra' smart garbage bins** that allows users to **dispose** of **garbage** items and get **rewarded** with **points**.

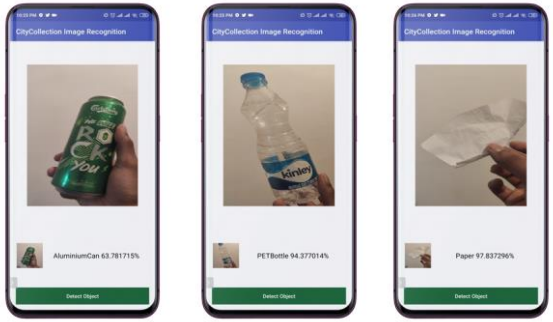
- A **City**Bin is an "**auto-segregating" smart garbage** bin that can be placed anywhere (sidewalks, malls, cafeterias, schools), these **bins reward you** with **points** for using them to **recycle** .

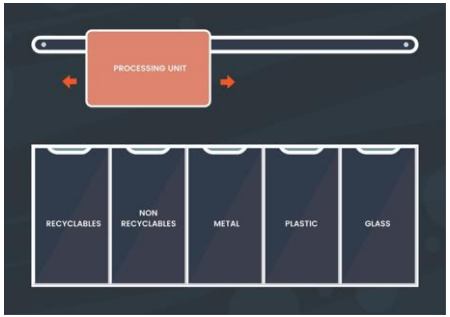
- The **bins will be placed in areas where large crowds gather**, especially near waterways (after analyzing data we gathered from community level user disposal trends)

How does CityBin work?



Current Image Classification for **City**Bin





Inside **City**Bin

Front View of **City**Bin

SolidWorks Render of **City**Bin

*Detailed diagrams of CityBin can be found in the attached report

Challenges we Address

Challenge 1 - Improved Visibility of Plastic Waste Generation and Material Flows

1. Tracking and understanding where plastic waste comes from and goes? ✓

   - **City**Collection allows us to track the disposal of different types of garbage from the user to the waste facility.

2. Better understand waste generation based on its quality (type, cleanliness, etc) and source ✓

   - Segregation by type is inherent and tagged to locations. Further incentivised image data collection identifies brands, **gauges cleanliness/reusability**

3. Predict the consumer attitudes and behaviors to identify potential channels of influence on plastics? ✓

   - Inherently tracks **users' disposal habits, patterns**; used to educate users on RRR

Further detail is available on our comprehensive assessment report

Challenge 2 - Optimization of Circular Supply Chains for Plastics

1. How might we incentivize responsible for plastic use and waste management? ✓

   - **City**Collection rewards users with points that they can use to redeem for coupons and cash on the app.

2. How might we enhance the visibility, connectivity, and efficiency of informal sector waste collectors and aggregators? ✓

   - 'News' tab **drives education** and allows for **community and collector led awareness campaigns**

3. How might we better track and improve value generation across the supply chain? ✓

   - Image, location, time series disposal, brand, and type data is gathered to help us/collector understand source, generation, and evaluate collection strategy and integrate fragmented value chain. We are also exploring building a **marketplace to integrate** collectors and recyclers

Thank You!

We are currently in discussions with a **major** waste management solutions company in Sri Lanka to make **City**Collection, and the eventual **City**Bin a **reality**.

We are working on partnering with them to launch the platform and utilize their vast collection logistics network (largest in Sri Lanka) to **improve waste management** in Sri Lanka, and eventually other **emerging markets** as well.

We like to hear your thoughts!

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