RecycleBuddy

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RecycleBuddy

Waste management needs to be improved at the consumer level.

Our team has created an AR app that scans items to help users determine where they should go.

Why is this important?

- In 2017 Canada produced the most annual waste (globally) - totalling 1.3B metric tonnes
- Average Canadian produces 673 kg of waste per year or 1.8kg a day
- Canadians only recycle 16% of their total waste
- The amount of global waste is increasing annually

Design Criteria

Design criteria are defined goals or parameters that the tool must achieve order to be successful. In order to evaluate the solution chosen, the criteria below must be met:

- **Performance Time:** The amount of time required to perform the task
- **Dimension & Size:** The amount of physical or digital space required.
- **Complexity:** The simplicity of use to attain a result for the end user. To evaluate this, the number of interactions taken will be counted for each solution.
- **Adaptability:** The ability for a solution to be flexible in all situations, environments, or problems.
- **Effectiveness:** The ability to perform the task properly without producing an error.
- **Implementation Cost:** The total cost to implement the solution.

Benchmarking

Technical Benchmarking

Criteria	Group 5 Product	COHDA[2] Recycling Identification Device	Taobao / Alipay App / Scanner[3]	Liverpool Hope University App[4]
				
Performance Time	Initial result: 30 seconds Total run time: 45-60 seconds	“Immediate”	N/A	“…slow to be commercially viable”.
Dimension & Size	Physical model size: 2.5 inches in length, 2 inches in width and 6 inches in height Physical model weight: 250 grams (g) Digital size: 100 megabytes (MB)	Physical product. Fits inside palm of hand. Dimensions N/A.	Taobao 256.4MB Alipay 255.7 MB	App. Size N/A.
Complexity	3-5 decisions and 5-8 interactions	1 decision/ interaction	N/A	N/A
Adaptability	Adaptable worldwide	Adaptable worldwide	Adaptable worldwide	Adaptable Worldwide
Effectiveness	Ideally 90% success rate Realistic 70-80%	N/A	N/A	92% success rate
Implementation Cost	Under 100 CAD	“Low cost”	Added to existing platform. No cost.	Under 175 CAD (100 GBP to CAD)

User Benchmarking

Criteria	Importance	Group 5 Product	COHDA[2] Recycling Identification Device	Taobao / Alipay App / Scanner[3]	Liverpool Hope University App[4]
Performance Time	4	3	3		1
Dimension & Size	3	3	3	2	
Complexity	5	2	3		
Adaptability	3	3	3	3	3
Effectiveness	5				3
Implementation Cost	1	2	2	3	2
Total		42	47	18	30

User benchmarking of market ideas
3 - Best score 1 - Worst score
Total based on score multiplied by weight of criteria

Chosen Solution

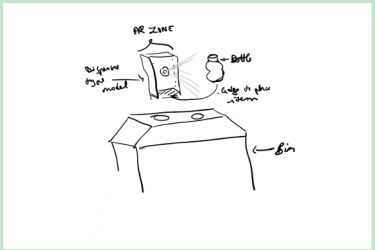
-Numerous concept sketches

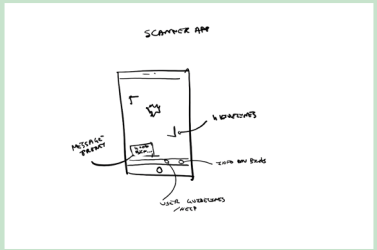
-Performed idea benchmarking

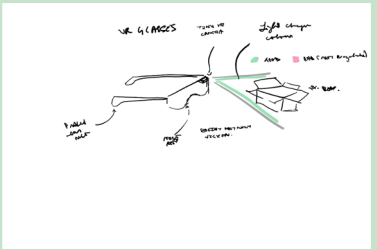
-AR app was the chosen solution

Ideas	Performance Time	Dimension & Size	Complexity	Adaptability	Effectiveness	Implementation Cost	Total
Weight	**4**	**1**	**5**	**4**	**5**	**2**	**-**
AR App	4	4	3	4	4	5	81
Scanner	5	2	5	2	2	1	67
QR Code Questionnaire	2	5	1	4	2	4	52

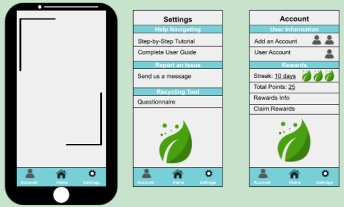
Benchmarking of concept ideas.
5 - Best score 1 - Worst score
Total based on score multiplied by weight of criteria

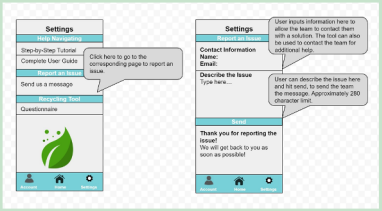


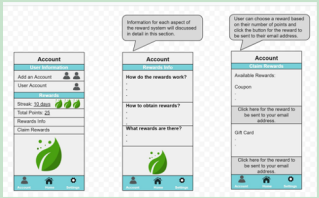




Prototype I







- User interface
  - Scanner on home screen
  - Settings and account tab
- Account
  - Account information
  - User reward information
- Settings
  - User tutorial
  - Bug report option
  - Back-up questionnaire

Prototype II

Target Name	Type	Rating	Status	Date Modified
StarbucksGlass	Single Image	★★★★☆	Active	Mar 11, 2021 10:59
CokeGlassBottle	Single Image	★★★☆☆	Active	Mar 11, 2021 10:57
GlassBottle	Single Image	☆☆☆☆☆	Active	Mar 11, 2021 10:55
SpriteBottle	Single Image	★★★☆☆	Active	Mar 11, 2021 10:51
CokeBottle	Single Image	★★★☆☆	Active	Mar 11, 2021 10:50
FantaCan	Single Image	★★★☆☆	Active	Mar 11, 2021 10:46
PepsiCan	Single Image	★★★☆☆	Active	Mar 11, 2021 10:42
CanDryCan	Single Image	★★★★☆	Active	Mar 11, 2021 10:41
SpriteCan	Single Image	★★★★★	Active	Mar 11, 2021 10:40
CokeCan	Single Image	★★★★★	Active	Mar 11, 2021 10:39
DasaniBottle	Single Image	★★★★☆	Active	Mar 11, 2021 10:36
RealCanWater	Single Image	★★★☆☆	Active	Mar 11, 2021 10:34
FijiBottle	Single Image	★★☆☆☆	Active	Mar 11, 2021 10:33
NestleBottle	Single Image	★★☆☆☆	Active	Mar 11, 2021 10:30

Vuforia Image Library

-Database containing images that the scanner uses to identify the user object

-Images of only recyclable materials

Rating

-More image detail = higher rating

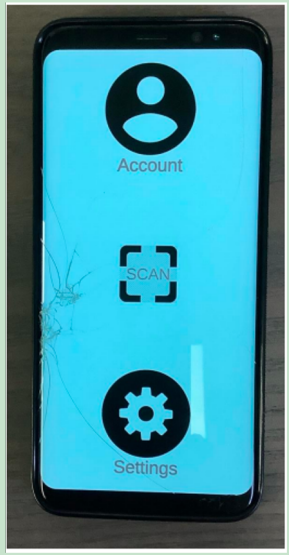
Prototype II

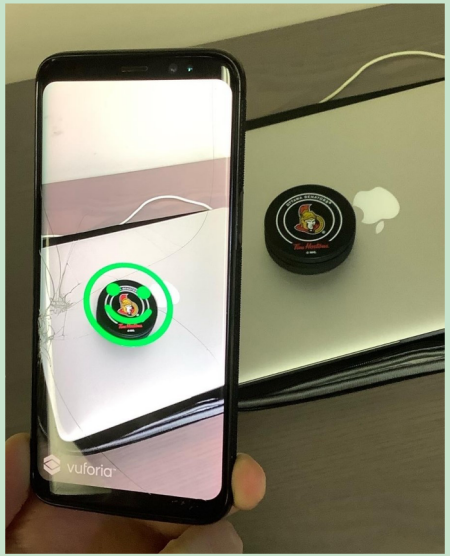
Development of scanner app

-Creation of home screen
-Recognizes items (shows green smiley face)

Testing

-Performance time: 15-20 seconds
-Complexity: 3 actions
-Efficiency: 100%

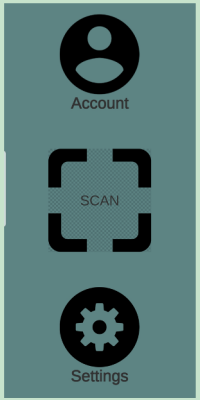


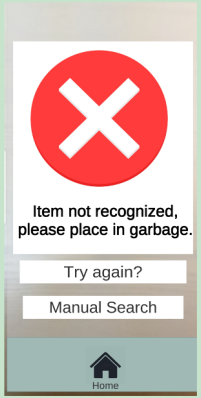


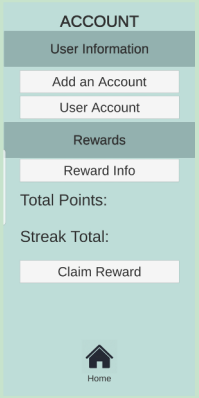
Prototype III

Modifications & Enhancements

- Expanded Vuforia database
- Added several more UI screens (ie settings, account)
- Finalized scanning result pop-ups







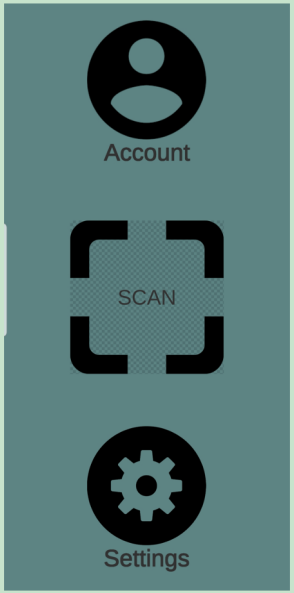
Criteria	Benchmark	Final Product
Size and Dimension (mb)	100mb	31.7mb
Efficiency (%)	90%	75%
Performance time (sec)	30sec to 60sec	Avg. 17sec Various age groups tested
Complexity (# actions)	5-8 actions	Recognizes item: 3 actions Doesn't/user tries again: 4 actions Manual search: 6 actions
Cost ($ CAD)	$100	$0 (cost to create - implementation cost and maintenance not included)

Green - Exceeded goal Yellow - Met goal

Red - Fell below goal

Live Demonstration

We will now have a live demonstration of our final product.



Limitations & Next Steps

Limitations:

-Vuforia image database
-Time constraints

Future Objectives:

-Expand Vuforia database
-Create tutorial
-Improve reward system
-Update aesthetics

Lessons Learned

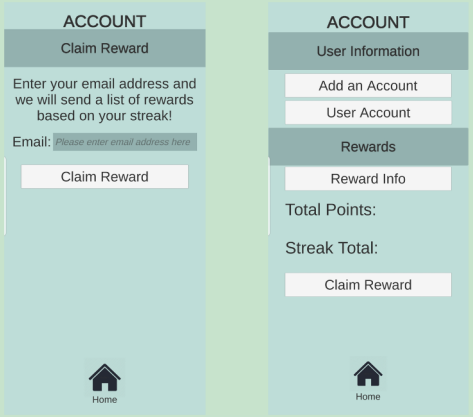
-Must be extremely user friendly

-It must be obvious whether the item is recyclable

-A larger image database is needed to be more efficient/effective

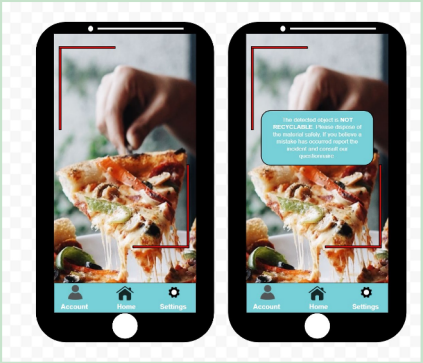
-User must be engaged

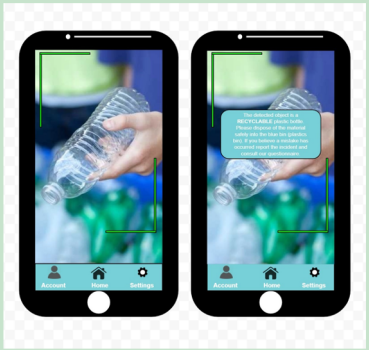
-Simple solution (manual search)



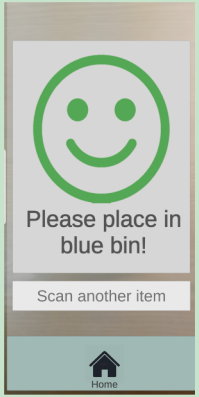
Reward System

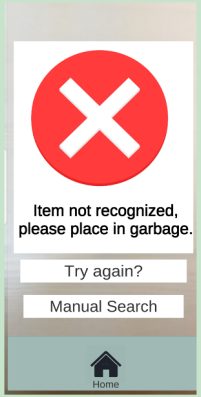
Initial Idea





Final Concept





Conclusion

RecycleBuddy is dedicated to reducing waste at the consumer level. The AR app solves the issue by helping the user place the item in the appropriate place using AR scanning technology.

We would like to sincerely thank you for listening to our presentation! Thank you from the RecycleBuddy team!