R^3

(Reduce, Reuse, Recycle)

Prototype Pitch

Patapsco Middle School - 6th Grade
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Problem Definition

➢ A lot of recyclable items are being thrown into the trash and being sent to landfills everyday, this creates toxic chemicals that heat up the earth and contributes to global warming.

➢ Another issue with recyclable items in landfills is that they don't biodegrade quickly. In fact, it takes an average plastic water bottle 500 years to completely biodegrade.

➢ **Bottomline is inability to efficiently segregate Recyclable items from trash causes environmental pollution and opportunity lost in saving energy**
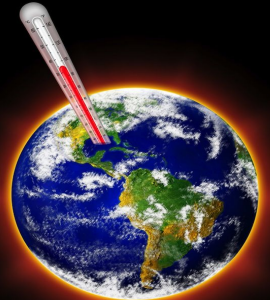
Client and Expectations

Our client is Gemma Evans, we originally send an email to Allan Kittleman, then he forwarded the email to her because she is the head of recycling coordination. She was very kind and responded to us quickly. In her email she gave us a couple of requirements and expectations for our device.

Below is our interpretation of expectations given to us:

➢ Need a tool to identify recyclable items and restrict recyclable items to be intermixed with the trash
➢ Efficient Proximity sensing of recyclable items
➢ Needs to be weatherproof and avoid damage from trash inside the container
➢ Needs to have display panel for friendly usability and buzzer prompting
➢ Recyclables should be fed individually to container
➢ Scope is limited for home usage - Needs further improvements for commercial usage

Current Solutions and their Weaknesses

MESA
Mathematics
Engineering
Science
Achievement
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Below are key findings based on our market research on existing solutions

➢ There is no distinct product in market that can identify all types of recyclable items

➢ None of the devices in the market, surprisingly is user friendly - don't have display, prompting and notification capabilities.

➢ No device that can identify recyclable items that settled in trash bin, free flow to trash bin(W/O lid) and thrown into trash bin(with lid).

➢ Bottomline is there is no efficient device that can restrict recyclable items from intermixing with trash.

Choices Made for Prototype

MESA
Mathematics
Engineering
Science
Achievement

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We considered the following solution choices for protype and selected option 1

- ➢ **Option 1:** A device to identify trash and recyclable items throwing into the trash bin with lid
- ➢ **Option 2:** A device to identify recyclable items throwing into (free flow) the trash bin without lid
- ➢ **Option 3:** A device to identify recyclable items from the settled items of the trash **bin**

Given defined timeline we considered the following capabilities for this iteration but it has foundational framework that can be extendable for future releases.

- ➢ Identification of few selected recyclable items - metal detection scope only
- ➢ Individual loading of the items in trash bin
- ➢ LCD display for prompts along with buzzer
- ➢ Lid auto open/close based on identification of items
- ➢ Residential usage only
- ➢ Temperature sensor

Prototype Demonstration
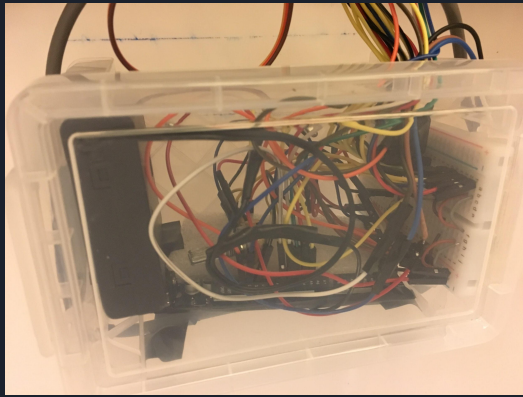
Advantages of Prototype

The device has foundational framework with focused capabilities but has potential to be fully extendable to meet broader diversified needs

<u>Key Advantages</u>

➢ Minimizes intermixing of recyclable with trash in turn helps
 ○ Reduction of chemical toxic gases generation from Landfills
 ○ Increased Opportunity in recycling and energy saving
 ○ Real time clock (RTC) with day, date, time
 ○ Not expensive product

<u>Key Strengths</u>

➢ Supports metal detection to avoid intermixing with trash and provides recycle opportunity
➢ The device is very user friendly - displays a LCD message and buzzer to prompt user to recycle the item
➢ If the item is recyclable, the lid does not automatically open
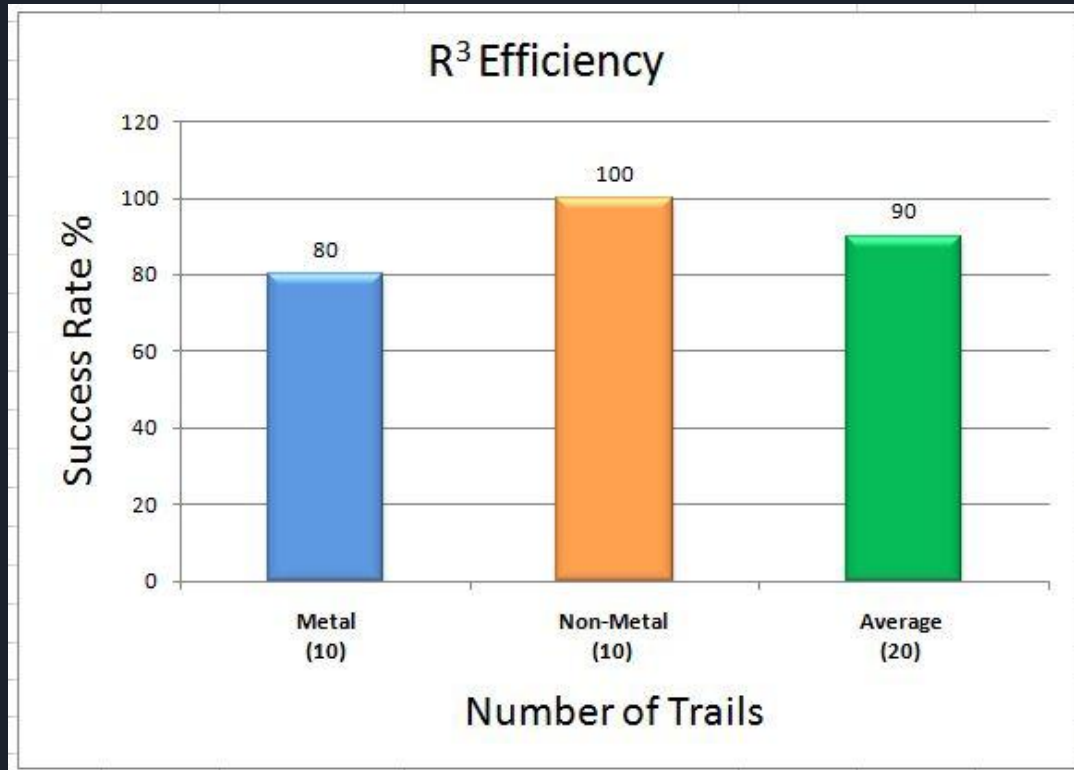➢ Displays the temperature inside the trash can on LCD

Additional Advantages/Facts by R^3

Below are the additional advantages by R^3:

➢ One plastic bottle can save enough energy to power a 60 watts light bulb for 6 hours

➢ It takes about 25 recycled bottles to make a fleece jacket

➢ One coke can can run a television for 2 hours

R³ Efficiency

Next Steps for Design that helps User

Enabling below capabilities are been considered for future enhancements for multi iteration releases for full blown product

- ➢ Plastic, cardboard, paper and glass sensor are must have capabilities
- ➢ Notification to user's phone with recyclable data is nice to have future
- ➢ Extend product capabilities from residential to commercial usage.
- ➢ Monthly reports to user telling them how much they have recycled
- ➢ Temperature sensor can be used to detect temperature over 80 degrees Fahrenheit to notify user with a message on LCD to empty trash from the bin