

Smart Trash Bin

ENGR 1200 - Engineering Design II

By: Team Invictus - Luka Aitken, Toma Aitken, Tazrian Zabin, Almat Bolatbekov

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Problem Definition

- An Ordinary House Bin.
- Why are they inefficient?
- Available Solutions?



ZLJ Smart Light Touch Stainless Steel
Trash Can (Color: Stainless Steel Size:
Large)

\$559.99



Objectives & Functions & Constraints

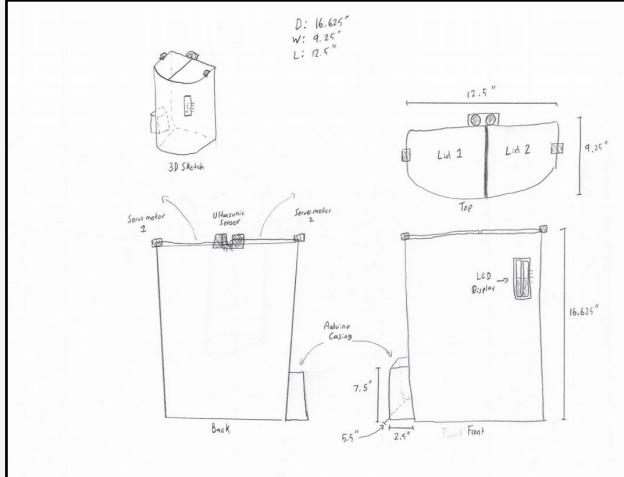
- IoT technology
- Inexpensive
- Touchless accessibility
- Alert mechanism
- Easy maintenance
- Light-weight
- 10L capacity



Alternative Designs

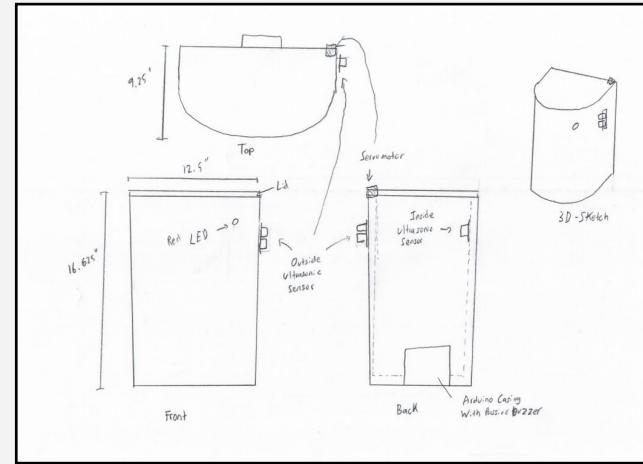
Solution 1:

- User will hold one of their hands on sensor on lid.
- Detects if the bin is full.
 - Uses LCD display.



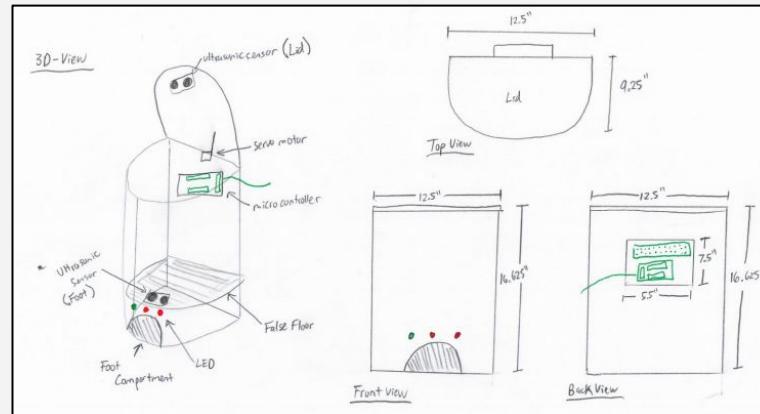
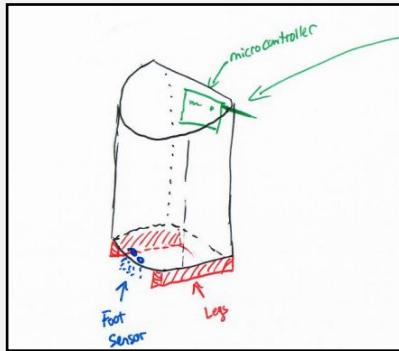
Solution 2:

- User will hold one of their hands on sensor on side of the bin.
- Detects if the bin is full.
 - Displays with one LED.



Final Design

- User will insert one foot.
 - Lid will open once the user's foot is detected.
 - Timer before lid closes once foot is removed.
- Detects if the bin is empty, almost full and completely full.
 - Displays and Shows the user with LEDs.



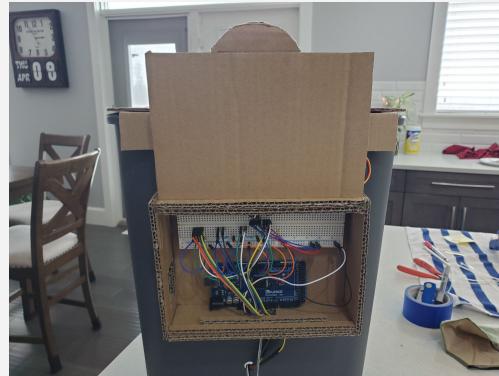
Reasons Why We Picked the Final Design

- More reliable and easier to use.
 - Shows user if its empty, almost full, or completely full.
- No hands required.
 - Don't have to bend down.
- Cost Effective.
 - Uses affordable materials.
 - Easy to Manufacture.



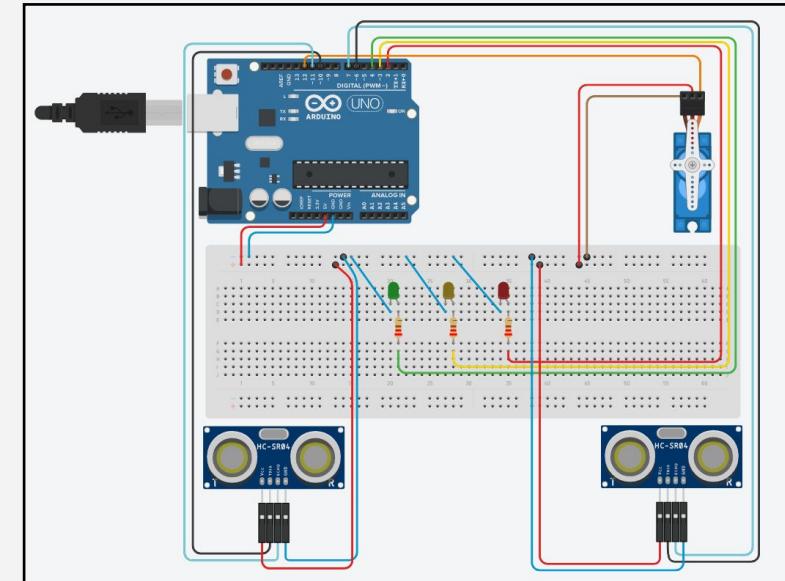
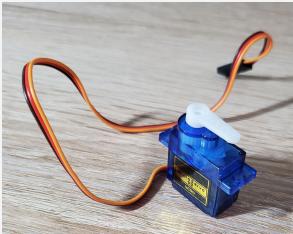
Features

- Lightweight, Compact, and Portable.
- No Sharp Edges.
- Back Compartment .
- No Human Effort to Open.
- Foot Sensor that detects user's foot.
- Lid Sensor that detects level of waste.



Components

- 1 Arduino MEGA 2560
- 1 Breadboard
- Wires
- LEDs & 220 ohm Resistors
 - Red, Yellow, Green.
- 2 Ultrasonic Sensors
 - One for Foot, Other to detect level of waste.
- 1 Servo Motor
 - To open Lid.
- 1 Trash Bin



Video Demo

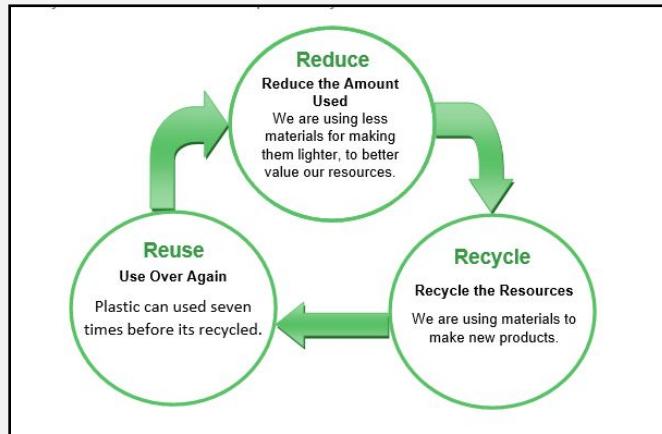
Video Link:

- [https://www.youtube.com/watch
?v=lnfs-MGOr1Y](https://www.youtube.com/watch?v=lnfs-MGOr1Y)

Environmental, Social, Ethical, and Safety Aspects

Environmental:

- Environmental friendly materials.
- Easily Recycle and Reusable.
- Less Materials.
 - Product is lightweight.



Social:

- Easy to:
 - Assemble.
 - Disassemble.
 - Repair.
 - Maintain.
- Helps detects level of waste.



Environmental, Social, Ethical, and Safety Aspects (CON'T)

Ethical:

- Cost Effective
 - Easy to Manufacture.
 - Lower Maintenance Cost.
 - Very Cheap Materials.

Safety:

- No sharp edges.
- No exposed wiring.
- Easy to Carry.
- Structurally Supported.



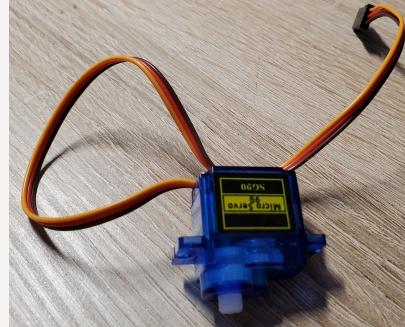
Limitations

- Parts made out of cardboard.
 - Lid & Compartment.
- By using durable materials.
- Not weather resistant.



Future Work

- Use Different Materials.
 - Stronger cardboard, environmental friendly plastic, etc.
- Move Compartment underneath the bin.
- Add Extra Servo Motor.
- Add Passive Buzzer.
- Add Handlebars.



A photograph of a construction worker wearing a white baseball cap and a bright yellow high-visibility jacket with reflective stripes. He is smiling and has his arms crossed. In the background, a large white truck is parked on a dirt surface with trees in the distance.

Conclusion

- Lessons Learned
- What we can do

Thank You For Your Attention!

Any Questions?



Reference

- https://blog.customboxesnow.com/wp-content/uploads/2019/07/double_wall_corrugated_1000x664-624x414.jpg
- <https://www.alumeco.com/media/1017/tyndplade.jpg?width=2000&height=2000&mode=max&upscale=false>
- <https://thoughtfulspot.typepad.com/.a/6a0128760776fb970c015435e95b40970c-800wi>
- https://www.incimages.com/uploaded_files/image/1024x576/getty_152414899_97046097045006_68075.jpg
- <https://www.ecubelabs.com/overflowing-garbage-bins-5-impacts-on-health-and-environment-and-how-to-prevent/>
- https://www.rd.com/wp-content/uploads/2017/09/1-Things-Garbage-Collectors-Want-You-to-Know_158222594-Dmitry-Kalinovskiy-760x506.jpg?resize=640,426
- <https://cdn5.vectorstock.com/i/1000x1000/67/44/icon-no-hand-vector-6166744.jpg>
- <https://hiteches.com/wp-content/uploads/2020/02/cost-effective.png>
- https://images.thdstatic.com/productImages/8858090f-5a9f-4105-8928-b114426dc30c/svn/rubbermaid-indoor-trash-cans-297900egrn-64_1000.jpg
- <https://liftsafegroupofcompanies.files.wordpress.com/2016/04/safety.jpg>
- <https://www.redwoodlogistics.com/wp-content/uploads/2019/10/holding-costs.png>
- <https://pyxis.nymag.com/v1/imgs/7b2/f13/02ed99475196996082428280aba60560ce-simplehuman-rounded-trash-can.rsquare.w600.jpg>
- https://img.huffingtonpost.com/asset/5c642e3f2500003502c88afb.jpeg?cache=QcnyC9W2zQ&ops=1778_1000