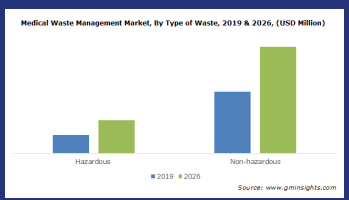
SortIT

An ***autonomous*** **solution** to medical waste

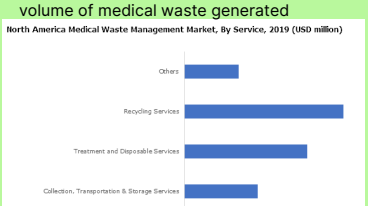
Problem

- **Improper Waste Disposal** in Hospitals and Medical Facilities.
- The waste ends up in landfills damaging the environment.
- Untreated medical waste is particularly harmful if left unattended as it can be resold or reused.
- The US alone generates **2 million tons** of medical waste every year.
- **Only 58% of facilities** from 24 countries are adequately equipped to safely dispose of hazardous waste.
- Unsafe injections are responsible for **1.7mil HepB** infections, and **33,800 HIV** infections yearly.
- Usually, manual labor is employed in unsafe working conditions to manage this waste.



Insights

- **#1** priority of a hospital is to **save patients**
- Everything else is secondary - efficiency, waste management, environmental safety.
- Training human personnel to sort waste is costly, prone to error, and increases risk of injury.
- The medical waste management market is growing every year due to the increasing volume of medical waste generated



Alternatives

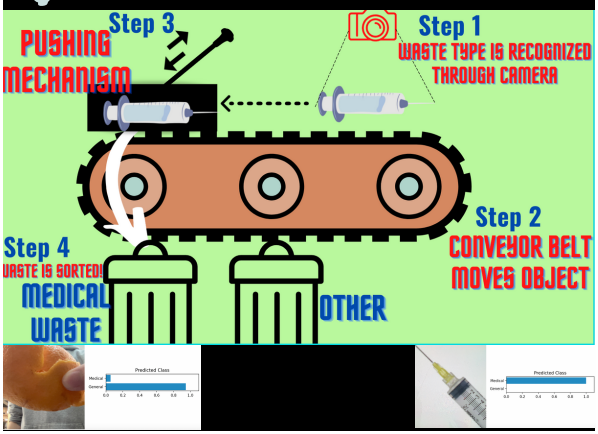
Manual Labor

- Prone to make errors.
- Slow & inefficient.
- Unsafe working conditions.
- Ill-equipped to deal with medical waste.

Trashbot

- Slow for everyday use.
- Only sorts one item at a time.
- Not designed for medical waste, cannot be customized according to users need.
- Expensive!

Our Solution



Experiment

Experiment 1: Over a span of 1 week, team members went around campus and collected information on waste disposed of at common locations such as the library & Exhibition Hall, and created a database noting the different types of wastes and the bins they were deposited in. Statistics that highlighted the contamination and mix-up were then presented.

Experiment 2: Viewers were asked to sort commonly discarded items in real-time such as soda bottles and wrappers after which the correct classification was revealed. ***All the viewers failed to classify items correctly.***

Cost Structure

- $50.00 - Wood
- $30.00 - Motor
- $25.00 - Arduino Nano
- $19.35 - 2 x 1.6 Gallon Trash Cans
- $18.00 - Camera
- $11.00 - DC Convertor
- $1.50 - Springs
- $0.50 - String

- ***Total: $155.35***
- ***Market Price: $225.00***

Our Solution Explained

The solution is an autonomous sorter that uses computer vision to compartmentalize waste. This would employ pytorch and the timm package to create a biomedical waste classification model. This would be paired with a conveyor belt and a pusher, which would help mechanically isolate the waste based on certain categories. This system would then be paired with computer technology using hardware such as Arduino.

UVP & Adopters

SortIT is the **only** product that currently ***sorts medical waste*** using its *custom sorting algorithm*. Coming in at a ***TENTH*** of the cost of the competitors, with ***NO*** additional service charges, it kills two birds with one stone by also *eliminating waste management companies* that charge exorbitant amounts for the same job. Examples of adopters are listed below.

- Hospitals: ICUs, General ward, Labs, and other areas.
- Clinics & Practices*
- Public areas.

Team Members: Kumail Mohamed, Aditya Kabu, Adrian Ng, Matthew Zhou, Suchir Sur, Geoffrey Gress

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7152398/ www.gminsights.com https://www.dosomething.org/us/facts/11-facts-about-recycling#:~:text=After%20you%20learn%20something%2C%20Do,to%20bottom%20twice%20a%20day. https://www.cdc.gov/vhf/ebola/clinicians/non-us-healthcare-settings/safe-injection.html