



Solar Powered, AI-Enabled Waste-Sorting Trashbin

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ARUSH NATH: A CONCIOUS TECHNOLOGIST

An introduction to the innovator of SAWT: Solar AI Waste-Sorting Trashbin

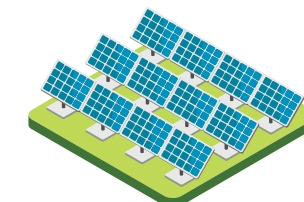
EDUCATION

I'm a 10th Grade Student at Pathways School Gurgaon. I served as the President during MYP5, and Vice Technology Captain in PYP5.



AREAS OF INTEREST

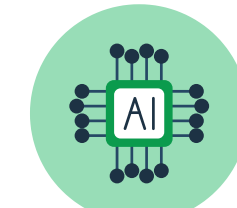
My areas of interest include



Solar
energy



Electric
vehicles



Artificial
Intelligence

STEM-FOCUSED EDUCATION



Brown University
Solar Energy &
Engineering Pre-
College Program



LaunchX Innovation
Program at
University of
Michigan



InspiritAI Scholars
Program



Cornell University
Intro to Engineering
Program Alum

HOBBIES

In my free time, I love to play the piano, debate at national levels, hit the gym, build 3D models and robots as well.

IDENTIFYING THE PROBLEM

India ranks fourth on the mismanaged waste Index, with 98.55% of generated waste being mismanaged.

LANDFILLS in INDIA

50% of India's waste ends up in landfills - approximately 12 million tonnes. These landfills are a huge issue for the ecology due to **methane emissions**, and the nearby local people who catch **disease** and cannot afford treatment.



1/4 of Entire
Landfill



CREATION of SAWT

To automate this process through AI and Solar Energy, and created **SAWT** - the **Solar AI Waste-sorting Trashbin**. SAWT uses Vision AI and Solar Energy to automatically sort waste into its respective category, without human computation.



LEARNINGS from BROWN

At Brown, I saw how students in a hurry threw trash into any bin **regardless of category**. I later found out that this mis-sorting of waste is a contributing cause to the **increasing size of landfills** across the globe.

SAWT & TARGETED SDGS

SAWT solves three key sustainable development goals, focused on sustainable and clean energy.



#7 Affordable and Clean Energy

Harnessing the power of the sun, SAWT functions completely using a Solar Panel & Battery eliminating the need of electricity from the grid would otherwise come from fossil fuels.



#11 Sustainable Cities & Communities

By minimizing the waste mismanaged, and hence the carbon footprint of the community a clean future for the city is ensured - creating a sustainable production & consumption cycle.



#13 Climate Action

Landfills are one of the largest sources of methane in the environment, an extremely harmful greenhouse gas which makes it difficult to achieve climate goals.



BUILDING THE SOLUTION

A feature-packed solution to automate the waste-sorting process.



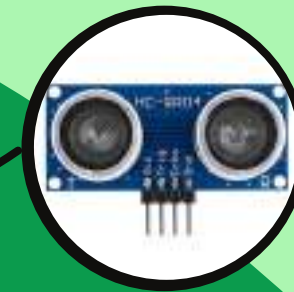
(back) 150Ah
Battery for
continuous power



150W Solar Panel for
sustainable power



Deposit trash
from either side



Disposal Detection
Ultrasonic Sensor



Industry standard
waste collection
system



WPC Weather
Resistant and
Eco-friendly
construction



SAWT'S PRODUCT TIMELINE

A technically complex process involving tedious research and numerous iterations.

STAGE 1

The first step was creating circuit diagrams and 3D Models that would later act as a reference point when creating the product. Blender and Wokwi were used for the same.



STAGE 3

The third step was assembling the entire project. This included the wiring of electrical components and the construction of the WPC chassis for the product.



STAGE 5

Finally, came fine-tuning such as optimizing the PIR light and sorting belt color for the best classification accuracy. This was accompanied by cosmetic touch-ups to the product.



STAGE 2

The second stage was sourcing materials and components for the fabrication. This was done through both online and physical local marketplaces.



STAGE 4

Amongst the final stages was programming SAWT. Ultralytics and Python was utilised to train the YOLOv8 model to classify waste and rotate the motor.



CURRENT STAGE

The project is now a completely functional commercial-level prototype. The patent application for this project has been filed and is currently awaiting approval.



SAWT AND ROLE OF COLLABORATION

SAWT involves students from all fields and socio-economic backgrounds.

