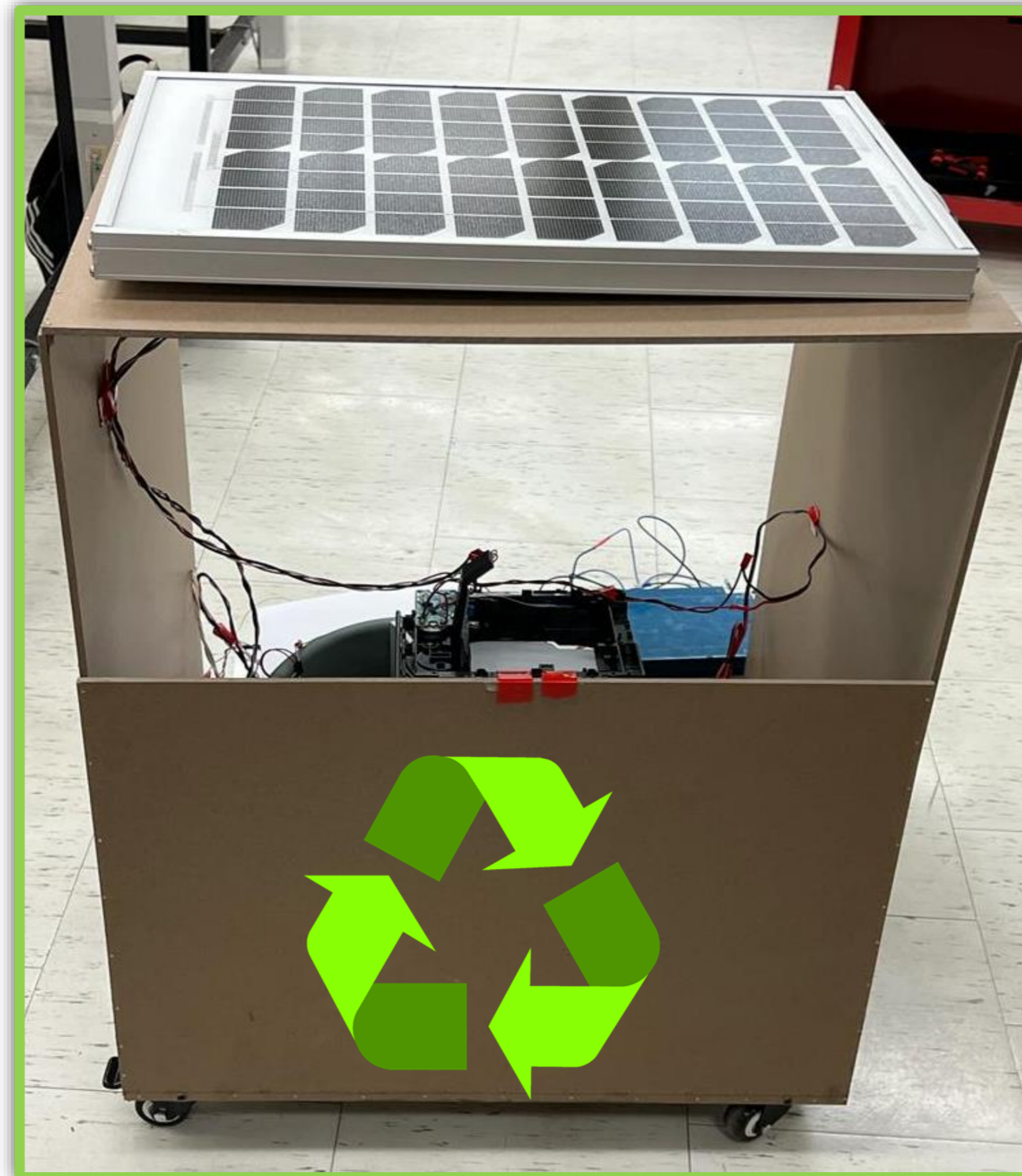


Solar Powered Smart Bin

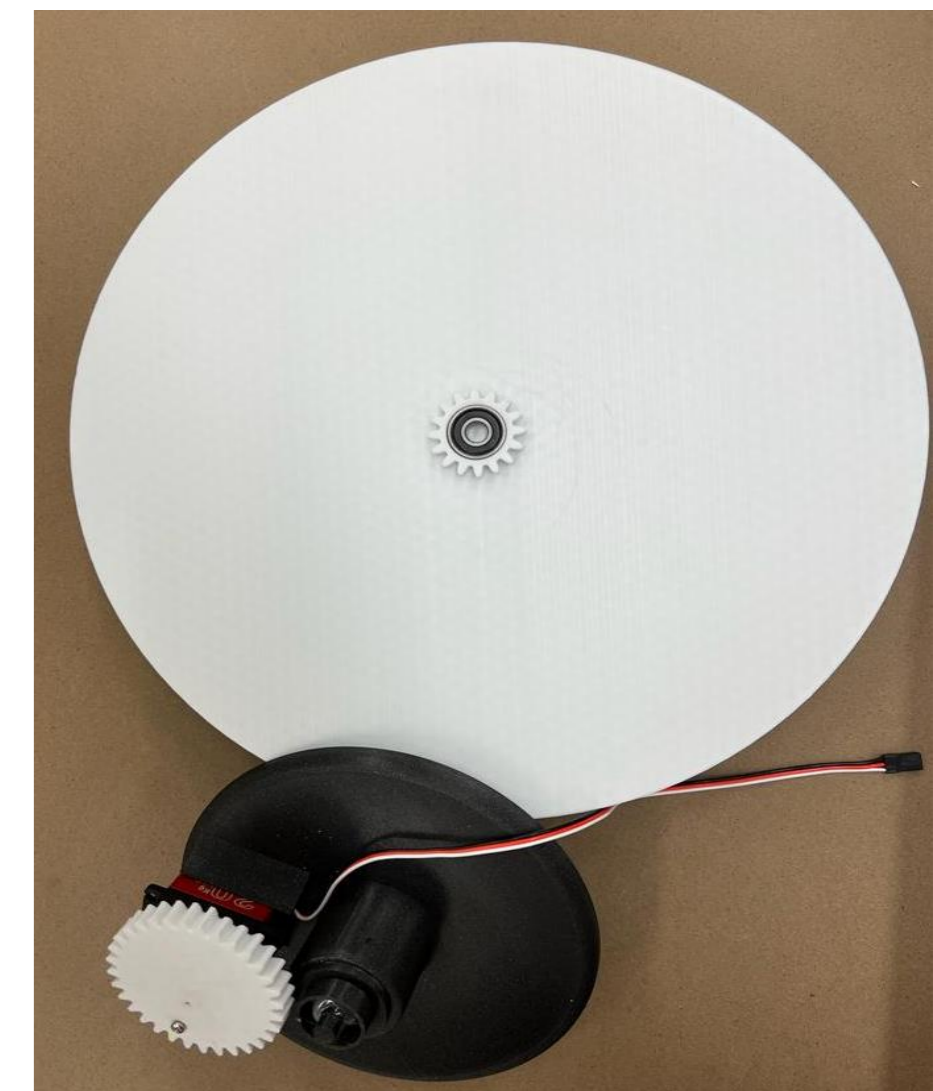
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Model testing results

ACCURACY
91.72%

	COMPOST	METAL	RECYCLE	UNCERTAIN
COMPOST	97.4%	0%	1.3%	1.3%
METAL	1.2%	88.1%	8.3%	2.4%
RECYCLE	3.8%	3.1%	90.8%	2.3%
F1 SCORE	0.95	0.91	0.92	



Problem:

- Contaminated waste is still prevalent in waste sorting facilities.
- This is despite efforts to increase public awareness about recycling, reusing and sorting of waste.
- Probable cause: People lack the knowledge or will to properly sort their waste.
- Proposed solution: To minimize contaminated waste, proper waste management must be carried out at the source.

System Specification:

- **Raspberry Pi:**
 - Act as the main processing unit.
 - Interface with camera and peripherals.
- **Image Processing:**
 - Identify and categorize wastes into the appropriate compartment (Compost, Recycling, or Metal and Others).
 - 84% classification accuracy.
- **Servo Motor:**
 - Rotate the bin to the correct compartment before disposing waste.
 - Sort one object at a time.
 - 20 kg weight capacity.
- **Solar Panel:**
 - Gather solar energy and store it in the onboard 12V battery.
 - Power components through switching regulators.
- **Wireless reporting system:**
 - Send a text notifying users when a compartment is full and requires maintenance.

Objectives:

- Use or repurpose recycled materials and keep the overall budget < \$350.
- Power the entire system via solar panels.
- Communicate the status of the bin to an external device wirelessly.

Sorting Device:

- 3D printed gears, shafts, and plate to allow the 180 degrees servo to rotate 360 degrees.
- Categorize and monitor each compartment using IR sensors.

Safety:

- **Fuse:** Overcurrent Protection for electrical equipment
- **Voltage Regulator:** Maintains an optimal fixed output voltage
- **Charge Controller:** Keeps the battery from overcharging.

Acknowledgments:

- Douglas Wagner
- Gary Anderson, universal recycling symbol, retrieved from Recycling.com on April 28

