



Project Litter Bot Deployable Prototype

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PROBLEM STATEMENT

We worked to design an autonomous scouring bot as a remedy to mitigate the man-made litter pollution and reduce its impacts on the environment.



Figure 1: Litter intoxicating farmland's waterways.[1]



Figure 2: Philippines' 'Dead Whale' art shows aquatic life cycle danger from plastic pollution.[2]

BACKGROUND

Litter and trash are found everywhere around the world. Most of the trash ends up in the ocean through river ways or blown by wind onto streets, farmland, beaches, etc. What does this mean for us? It means the disruption of food sources from the ocean, eventual increases in global warming from untreated waste, and a declination in human health from hazardous pollution that stunts plant growth and slowly pollutes its way into our very own food and water systems.

Reference [1]: <https://depositphotos.com/87312604/stock-photo-environment-problem-landfill-farmland-polluted.html>

Reference [2]: <https://www.ecowatch.com/dead-whale-plastic-pollution-2408402292.html>

SUMMARY OF WORK

Throughout the 9 month course, our team worked remotely to complete features that included: A camera that can identify trash from 5ft-12ft away, two variations of a four-wheel drive system with camera controlled PWM, GPS perimeter/geofencing, and three variations of a robotic gripper arm. The robot boots up and uses machine vision to scan for bottles in its field of view from its database, then adjusts its driving direction and motion until the litter (i.e. a bottle) is a few inches away from the front sensor and slowly extends the arm to dispose of it properly onboard!



Figure 3: Litter Bot Full Capacity.



Figure 4: Prototype Front View.



Figure 5: Gripper Arm.

IMPACT ON THE COMMUNITY

- Help reduce litter in community parks and streets.
- Keep farmlands cleaner for healthier plant growth.
- Reduce microplastic decay intoxicating the marine life.
- The Litter bot can be placed in open areas for occasional cleaning maintenance for the city, farmers, and rangers.