

CODS-T211

ABSTRACT

PROBLEM STATEMENT

The large water body pollution caused by Marine Dumping

SOLUTION ABSTRACT

Marine Dumping is the deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures, as well as the deliberate disposal of these vessels or platforms themselves in large water bodies. The main causes of Marine Dumping are land runoffs (waste that is dumped in rivers or lakes that is carried forward to the oceans), oil leaks (leaking of oil from tankers or oil platforms), ocean mining (by-products are dumped), illegal dumping (in developing countries, it is easier and more convenient to dump the waste in the oceans) and lack of expertise of countries in regulating dumping allows industries to get away with dumping.

To decrease land runoffs, various machines can be used to scoop up the waste before it joins the ocean. It could be a remote-controlled boat/ robot that can analyse the area and scoop up the rubbish. To check illegal dumping, we could use satellite footage and analyse it in real time to know who are the repeated offenders. To deal with oil spills, a boat can be deployed with chemical dispersants or also have the ability to scoop off the top layer of oil. The lack of expertise in the field of marine dumping has led to a lot of deadly environmental issues. Replacing these officials with AI can help increase the efficiency and will also reduce the human errors. Our idea is to create a bot which will have the ability behave like a boat. It will be able to photograph its surroundings and analyse the garbage contents. It will also have access to satellite images of the same region. After analysis of the problem, it will work on finding the best solution. It will be equipped with basic mechanisms which will allow it to clear garbage such as plastic, etc through scoops or nets and bring it ashore. For waste floating on the water surface, they can be cornered into a net and scooped up. For waste not picked up by that, we can use a mechanism similar to the one used to clear water hyacinths. We would use solar energy to power our bot.

STEPS:

1. The bot scans the surroundings with its camera.
2. If there is pollution detected, it checks the type of pollution else checks the satellite view.
3. There are 5 types of pollutants.
 - i. Plastic wastes
 - ii. Industrial effluents
 - iii. Biological waste
 - iv. Household chemicals
 - v. Agricultural run off
4. For plastic wastes, the bot checks the area of the river covered in waste. If the area is more than 2m^2 , a scooping arm is used to scoop out the waste. If the area is less than 2m^2 , a net with an extendable arm is used.
5. For industrial effluents, the bot checks the sample of the discharge for chemicals. If there are no chemicals present, it is released into the river. If there are large amount of chemicals present, the effluents are treated using a septic tank filter (installed inside the bot) and then discharged into the river.
6. For biological waste, a similar process as that of plastic wastes is followed.
7. For agricultural runoff, the sample is checked for the presence of insecticides and pesticides. If there are none present it is discharged into the river. If insecticides and pesticides are present, it is treated using charcoal filters and reverse osmosis (RO) treatments.

DESCRIPTION:

The problem statement chosen here is 'Pollution in large water bodies caused by marine dumping'.

The world is facing many problems and marine dumping is a major crisis in need of immediate attention. So, we have put in our best efforts to come up with innovative ideas to deal with marine dumping.

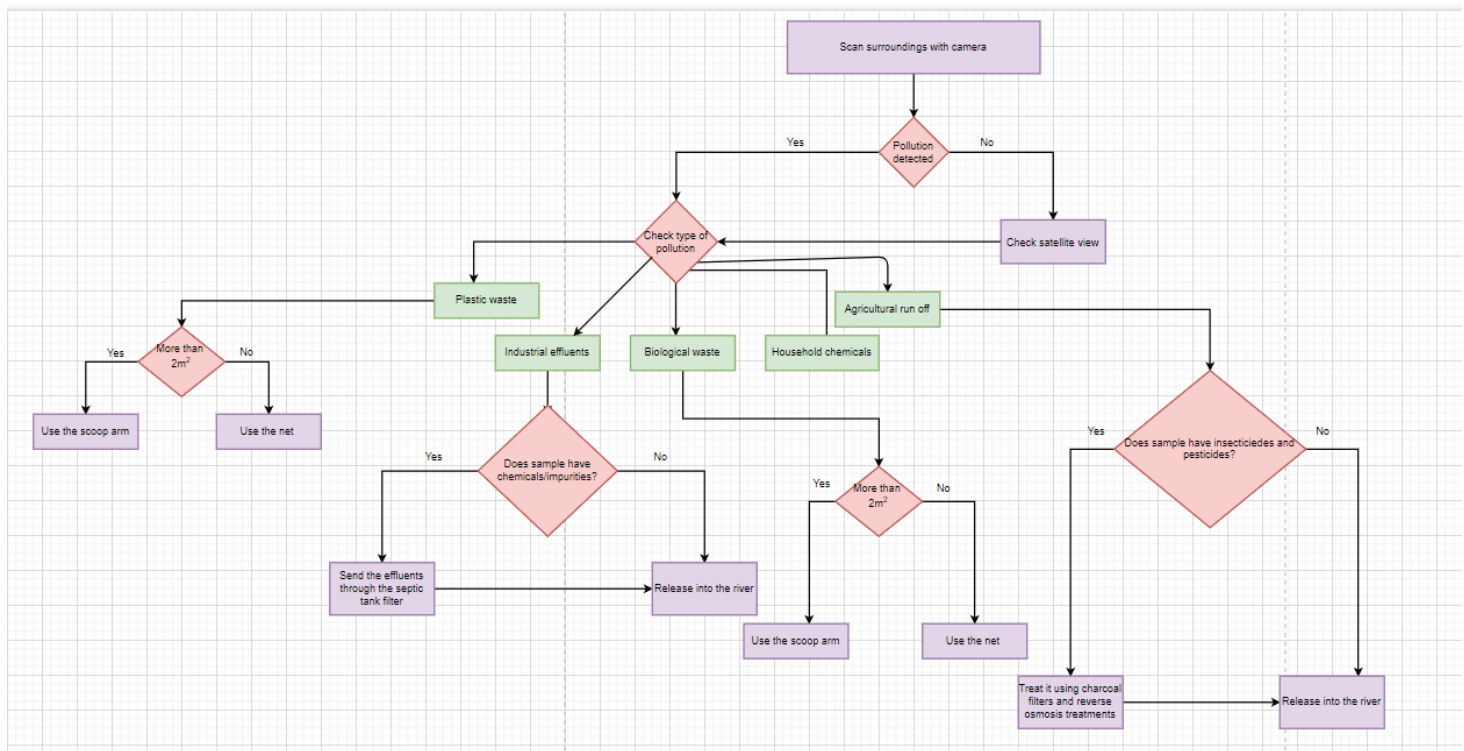
The major causes of marine dumping in water bodies are:

1. **Plastic wastes:** Plastic is a widely used material and is used for a variety of reasons. When these plastics, especially single use plastics, are disposed into the rivers the aquatic life is greatly affected and this indirectly affects our environment and us. Plastic waste floats on water and can be easily detected on the surface. This gives us a leeway to remove the plastic using a scooping arm and a net. The bot takes a photograph of the area with the waste. If the waste covers more than 2m^2 , a scooping arm is used and if it is less than 2m^2 , a net with an extendable arm is used.
2. **Industrial effluents:** Industries are the backbone of our country. But the releasing of untreated water into the rivers by these industries is a major threat to the environment. The bot checks for the presence of chemicals in a given sample of water and if there is any present, it checks for the amount of impurities.
3. **Household chemicals:** The chemicals from a vast number of households are disposed into rivers. This could either be prevented at home or the samples could be analysed similar to industrial effluents and agricultural runoff. The water should run through a series of aerobic and anaerobic reactors. This should remove all the harmful chemicals and maybe even make the water safe to drink.
4. **Agricultural runoff:** Food must be grown at an exponential rate to keep up with the growing population. This cannot be achieved naturally and thus, farmer turn to pesticides, insecticides and other harmful chemicals. The bot checks for the presence of such harmful chemicals in the sample and is treated using charcoal filters or reverse osmosis. If the bot cannot analyse the sample, it is sent to a real lab. Industrial effluents can be tackled even if the source is uncooperative. The source can be identified through satellite tracing and by analysing the water samples for chemicals. The sample can be passed through a septic tank filter after which the samples can be reanalysed. If the toxic chemicals are still present, we would have to filter the water using a more powerful, external filtration plant.

CONCLUSION:

The treatment of water in the fresh water bodies before it reaches the marine waters helps us combat ocean pollution. Human activity near all these fresh water bodies is very high and thus removing the waste generated here would greatly decrease the pollution at the end point.

FLOWCHART:



TRELLO:

