CODS-T211
ABSTRACT

PROBLEM STATEMENT
The large water body pollution caused by Marine Dumping
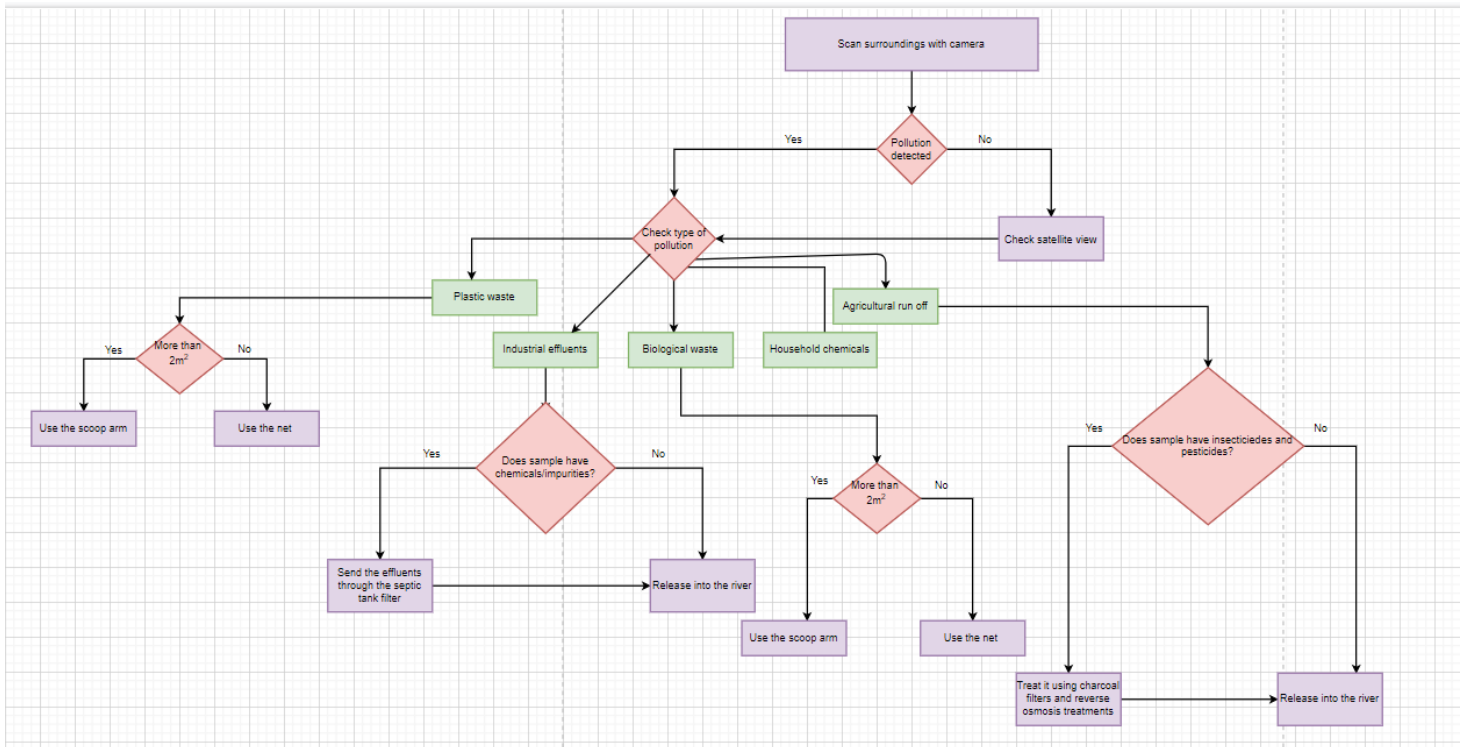
SOLUTION ABSTRACT

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.
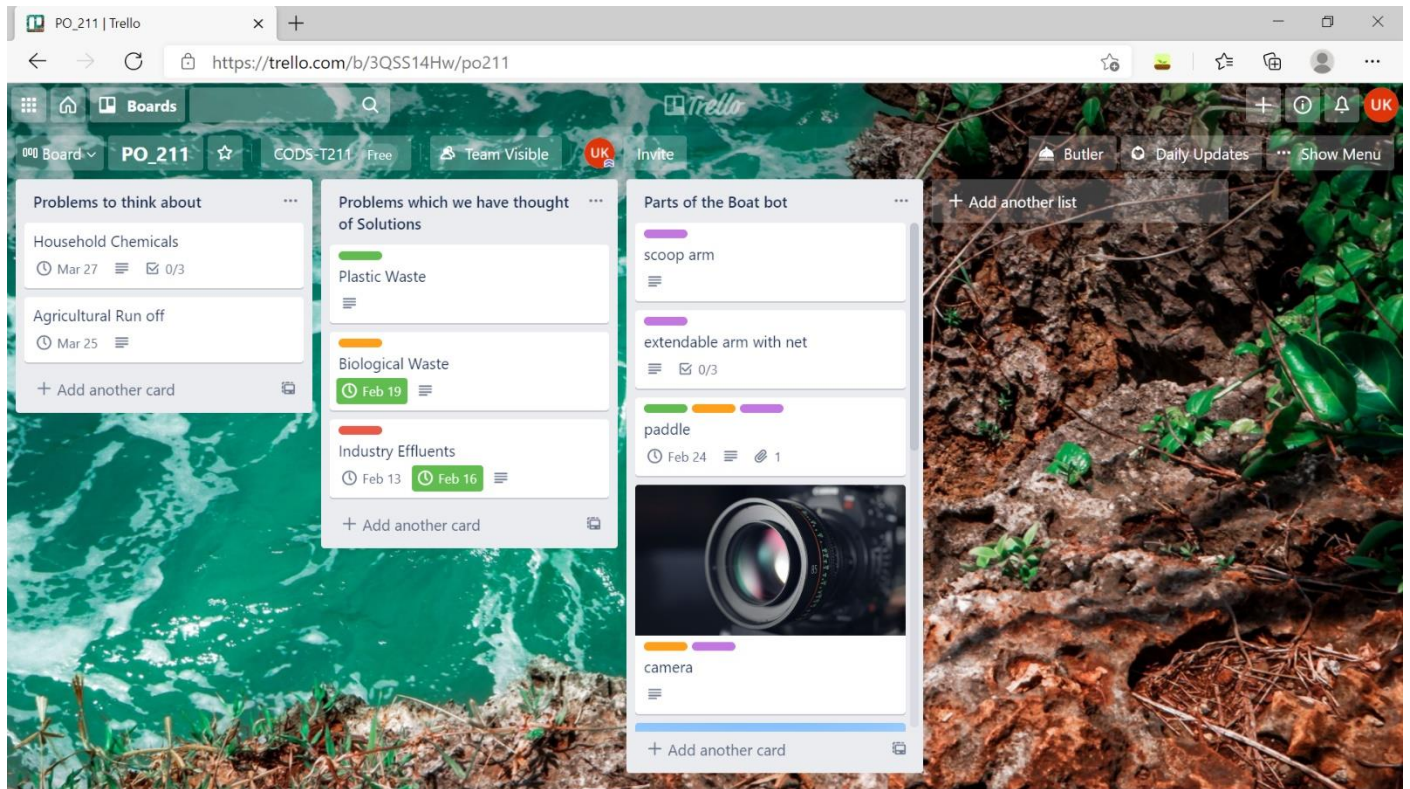
STEPS:

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 pollution.
   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 bed covered in waste. If the area is more than $2m^2$, a scoop 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.

FLOWCHART:

Scan surroundings with camera

Pollution detected
- Yes → Check type of pollution
- No → Check satellite view

Check type of pollution:
- Plastic waste
- Industrial effluents
- Biological waste
- Household chemicals
- Agricultural run off

Plastic waste → More than 2m²
- Yes → Use the scoop arm
- No → Use the net

Industrial effluents → Does sample have chemicals/impurities?
- Yes → Send the effluents through the septic tank filter → Release into the river
- No → Release into the river

Biological waste → More than 2m²
- Yes → Use the scoop arm
- No → Use the net

Agricultural run off → Does sample have insecticiedes and pesticides?
- Yes → Treat it using charcoal filters and reverse osmosis treatments → Release into the river
- No → Release into the river

TRELLO:

[PO_211 | Trello](https://trello.com/b/3QSS14Hw/po211)