Detection of plastics bags on marine surfaces using low power image detection system.

Significant amount of plastic in ocean (80%) are originally from land . this includes plastic bags food containers and water bottles as the most common things found . the quantifying of plastic bags on ocean can allow us to understand the causes of gathering of plastic bags in the certain part of ocean and their source. One of the most common ways that plastic is sampled in the ocean is basically is using manta trawls or nets (1) . however this is not very cost effective way of sampling as it takes a lot of human labour , it is why a better cost effective solution have to be used to tackle this problem. A good way of doing this is providing a low power image detection system that can be mounted on top of a drone that can fly over the ocean and quantify the number of plastic bags over a certain area of marine surface. However due to lighting from the sun and reflection of the light on the water surface, it would be very hard to detect plastic bags with light colour which means it is good idea to have the system try to detect plastic bags with darker colour .

Aim : to be able to detect plastic bags with dark colour within using a image processing technique on a moving drone with a cost efficient and lower power usage system.

Objectives:

One of the objectives is to develop a image processing system capable of consistently identifying and quantifying marine plastic near real-time (while flying over the drone). This needs to be done by end of year.

Develop skill in learning to use tenserflow with python and other required software that allow for image processing on a python platform since it is the most accessible platform for image processing and has very good support for image processing . (examples of libraries numpy,scipy,scikit-image, opencv-python. Etc. ) by week 8 of semester 1.

Choosing and programming board that is capable of image processing and is light and lower power usage enough that can be mounted on a drone. Plus designing a 3d case for this board that allows it to integrate its camera and if need be a LED. Into a compact design

The system must have a algorithm that can basically tell the difference between what is a plastic bag and what is not . this system must be implemented on a board that contains a camera and memory space . to do this probably a image processing system like Yolo-tiny can be used on a board capable of image processing in real time and machine learning . this needs to be done by end of semester one .

The system must create a database of labblled objects during a video shoot that contains at which seconds they were detected and with . this should be last of the programming section of this project should be done in by semester 2.

The system must have a algorithm that can basically tell the difference between what is a plastic bag and what is not .

And lastly the this image processing system probably should keep record of the number of plastic bag it has seen in area within a data base and run the system on low power usage that is capable of running on a small battery for hours while been mounted on the drone .

System needs to be capable of taking accurate video samples at every frame so that board on the system can easily analyse the objects found on the water surface(to see if is plastic bag or not. )

Title

Description

Aim

objectives