1. Learn about background knowledge about the effects of plastics in the ocean. This to justify the existence of your solution to a problem that is building of plastics and what are the effects of it and how does your solution help with this problem of quantifying plastics in the ocean being such a high footprint activity . this is to be done by end of week 5 of semester 1.

* 1. look at other solutions similar to yours that have used image processing and computer vision to tackle the problem with plastic build up in the ocean and decrease the foot print required to quantify them.
  2. Look at the types of plastics that are causing problems in the ocean. For example plastic bags, bottles and fishing nets .

2. Develop skill in learning to use appropriate software for example opencv 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 and computer vision. (Examples of libraries numpy, scipy, scikit-image, opencv-python. Etc.) this should be done by the week 15 of semester 1.

* 1. learning to use python for the start. this should be done between week 4 to 9 of semester 1
  2. learn about the libraries used by python for image processing such as numpy, scipy . this is to reduce the effects of things such as blur and light reflection in the images taken by your programme.
  3. learn algorithm that can used on the board of your choosing to detect the objects of interested (plastics) in the picture that is taken by the system. (for example YOLO algorithm and OPENCV neural network platform that can be used to make use of such algorithms).

3. Choose an programming board and other accessories that is capable of image processing (plus computer vision implementation). and is light and lower power usage /low footprint and can be mounted on a drone. This should be done by end of the 11th week of semester 1 so implementation can start quickly.

3.1 do research to be done on boards that are both low foot and are capable of image processing and implementation of computer vision and then choose the best one while being in budget for the coursework .

3.2 choose the type of camera that is compatible with the board of choice and also has high enough resolution that can take high quality pictures to allow the algorithm to identify the objects within the image.

3.3 determine what are the most important aspects about camera and how can these effects the algorithms performance ( such as resolution and field of view).

4. determining the best position in the air for the camera to take the highest quality images that can be used to detect the harmful plastics in the ocean. This to make sure that the algorithm detecting the required

4.1 to do this manual calculation is needed to be done on the hypothetical height of the camera and see effect it has on the amount of space per meter in each pixel of the image that is taken by the camera.

Implementation of algorithm that is trained to detect harmful plastics on the surface of the ocean . this must be done with chosen algorithm (for example YOLO ) being trained to detect the objects that are required in the project (harmful plastics). This should be done by week 4 of semester 2

5.1 first choose the best algorithm base on the research and learning that was done on the algorithms

5.2 train the algorithm to detect objects like plastic nets, bouys and dark plastic bottles.

5.3 implement this trained algorithm into the board and make sure it works with the camera on the board.

6. Implementation of programme that is capable of both taking images from the board’s camera and being able to process the image so that quality reducing effects such as blur and light reflection are cleaned out the image. Should be done by week 6 of semester 2.

6.1 write programme that takes picture and then use homomorphic filters to reduce the light being reflected in the image. ( this is because reflection from ocean can cause major problems for the algorithm detecting objects).

6.2 use a blurring technique for the images to make sure that the sharp edges of image that have lost their detail become smooth so that your object detection algorithm doesn’t run into issues.

7Implement your whole system together while also testing its capabilities regularly to make sure system works properly for the final viva review of the system . this is the final step in any project this needs to be done to make sure that system works for the final day of the project . this should be ready by first week of easter.

7.1 regular testing starting from first week of semester 2 to make sure the implementation of the system works properly. this is to make sure that near the end of the project nothing goes wrong with the hardware or software.

7.2 keep record of the tests done to provide evidence of the programme working prior to Viva just in case the system stopped working on the day of viva.

7.3 implement version control in case of system stop working you can go back to prior version and restart your progress there if for some reason something goes wrong with your programme for example .

Incmelental stepps

Break downl3 the objectives into steps. O3