Computer Coding Challenge #3

Problem: Plastic pollution and other, human-made trash is detrimental to the health of our oceans and waterways.
Challenge: Address this issue by harnessing the power of cloud computing, machine learning/artificial intelligence, and image recognition/processing. Create a program that identifies human-made pollution – trash – as seen in a video segment taken from a stationary underwater camera.

Video transect: Computer Coding Challenge #3 video from Coral Morphologic's Coral City Camera (rubble zone view) at PortMiami, Florida. Videos courtesy of Coral Morphologic.
https://vimeo.com/535577674/0fcfd48c91

There is a growing awareness of the detrimental impact of plastic pollution, and many parts of the world are taking substantive action to curb it. Realistically, however, it is unlikely that the entire world population will discontinue the use of plastic in everyday life; in many instances plastic products have made life easier, more comfortable, and safer. In some parts of the world, access to plastic products is a symbol of economic prosperity.

In the effort to remove plastic pollution from the ocean, many are looking to technology to help. And one of the necessary first steps is to be able to identify human-made trash from fish and other biological organisms. This is where you come in.

Photo source: stock.adobe.com

Your challenge is to design a computer program that identifies human-made trash in a video transect taken from a stationary camera. Any time the program detects trash in the video transect, that trash

should be marked. Teams may choose how to highlight the trash, but the MATE Competition suggests overlaying a mark on, or ring around, the pollution at all times it is on the video screen. MATE Competition officials must be able to easily recognize when an object is marked as trash.

Images courtesy of Coral Morphologic. Left: Foil wrapper highlighted with red colored ring. Right: Plastic bottle highlighted with blue mark.

Teams with the top programs will advance to the next round of the Computer Coding Challenge.

Submissions:
Teams undertaking the Computer Coding Challenge will have 4 weeks to create their program and deliver that program, an explanation of how the program/algorithm works, and a video demonstrating your solution working real time, to MATE ROV Competition officials. The program, explanation, and video must be submitted no later than 11:59 PM, Hawaii time, June 14, 2021. The following naming convention should be used for your submissions: School or organization name_company name_ document type_2021, where document type is either the program or explanation. The program and the explanation of the algorithm should be submitted as PDF files. The explanation can include flow charts, tables, and code snippets, etc. The video should be uploaded to YouTube or Vimeo and a link provided to that video.

The program, explanation and video link should be submitted to the 2021 MATE Computer Coding Challenge #3 Submission form.