K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Socially Related project 2022-23

Underwater Object Detection Based On Improved CNN

Understanding and analyzing the underwater objects which plays vital role in several applications such as maintenance of oceans sub-aquatic system and underwater environment. As the Complex nature of underwater environment possess biggest challenge towards object detection and recognition of underwater images. Detecting and analyzing underwater noise is crucial for companies working in the marine industry. The conventional systems serving this objective utilize traditional handcrafting algorithms and process methodologies that are extremely inefficient. This brings out the necessity for computer vision-based systems that are machine controlled and can be machine learning-based models.

To overcome this deep learning method is employed for improving object detection with more accurate positioning, faster speed, and more accurate classification. Object detection can also be used to count and track different objects. It is quite different from recognition, where image recognition assigns a label to an image, but on the other hand, object detection draws a bounding box and then labels the object. Object discovery is a way to find the meaningful parts of a class in digital images and recordings. In this paper our objective is to find out the various items from the image. For finding an item, we use Object localization. Object identification, can be done using different methods. First is the calculation using CNN. In this, we need to choose the intrigued areas from the picture and need to arrange them utilizing Convolutional Neural Network. The second method is calculations based on regressions. YOLO technique belongs to this class. YOLO is an abbreviation for the term ‘You Only Look Once’. This is an algorithm that detects and recognizes various objects in a picture (in real-time). Object detection in YOLO is done as a regression problem and provides the class probabilities of the detected images. YOLO algorithm employs convolutional neural networks (CNN) to detect objects in real-time. As the name suggests,

the algorithm requires only a single forward propagation through a neural network to detect objects. This means that prediction in the entire image is done in a single algorithm run. The CNN is used to predict various class probabilities and bounding boxes simultaneously.

Predicting the underwater objects well in marine make safe the environment can help the government projects to make a clean marine. object detection is highly useful in automation to make the environment good and rate of wastage will be recycled the respective non-biodegradable objects and also useful for government to prevent the global warming to plan their clean city or organization activities so that they could recycle more object waste in the underground water objects such as paper, plastic bag , bottles. This includes detecting and classifying different types of underwater man-made objects that may be present in the underwater environment. CNN-based approaches for underwater object detection and classification typically involve using pre-trained models or developing custom models trained on annotated underwater image datasets. These models are then used to perform object detection and classification tasks on new underwater images or video frames. The use of CNNs for underwater object detection and classification has several advantages over traditional computer vision techniques, including their ability to automatically learn features from raw input data, their robustness to noise and variability in underwater imaging conditions, and their ability to handle complex and diverse object classes.

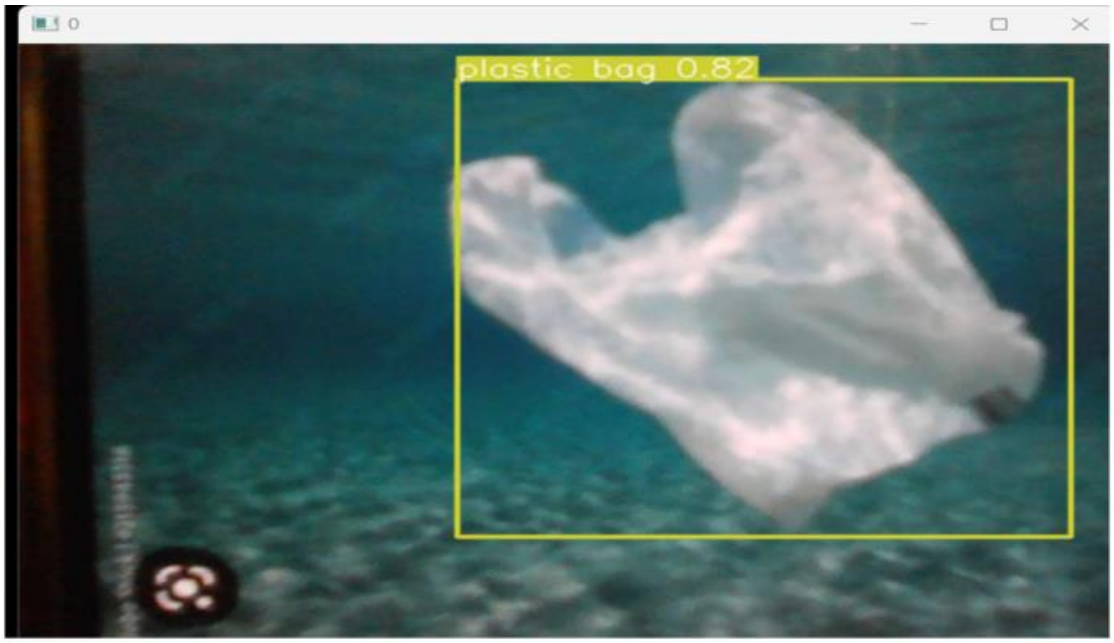

Fig 8.1 Detecting plastic bag

Fig 8.3 Detecting cloth

Fig 8.4 Detecting plastic bag and classifying it into non-biodegradable

Future Work:

1. Expanding the dataset to include more diverse types of underwater objects and improving the model's performance on smaller or more challenging objects.

2. This model could be integrated into underwater robotics or autonomous vehicles for real-time monitoring and detection of marine debris.

3. Develop an algorithms that can work in difficult underwater condition in low light and night.

4. Introduce an application software which concentrate more on Non-biodegradable.

5. Focus on collecting and curating datasets of underwater images and videos to support research in this area.