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REVA UNIVERSITY
Bengaluru, India

AI-PLASTIC DETECTOR

Team BLUESCAN

Date: 09-09-2023

Hackathon on
Plastic-Free Rivers
With Artificial Intelligence
Towards Sustainability

SAVE THE RIVERS

#PlasticFreeWithKyndryl #RACEREVAforSDG14

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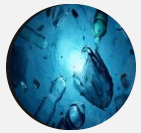
Agenda

1. Team Profiles
2. Motivation for participating
3. Solution Summary
4. Effectiveness of the Model
5. Working of the Model
6. Innovation in the solution
7. Scalability of the Model
8. Business value of the solution
9. Final Remarks

Solution Summary

Our solution will be a scalable and easy-to-deploy system that can be used by local authorities to monitor plastic pollution in their rivers and oceans.

The system will provide accurate and up-to-date information on the location and quantity of plastic waste, which will help local authorities to make informed decisions about how to clean up and prevent plastic pollution.



Our solution will provide a number of benefits, including:

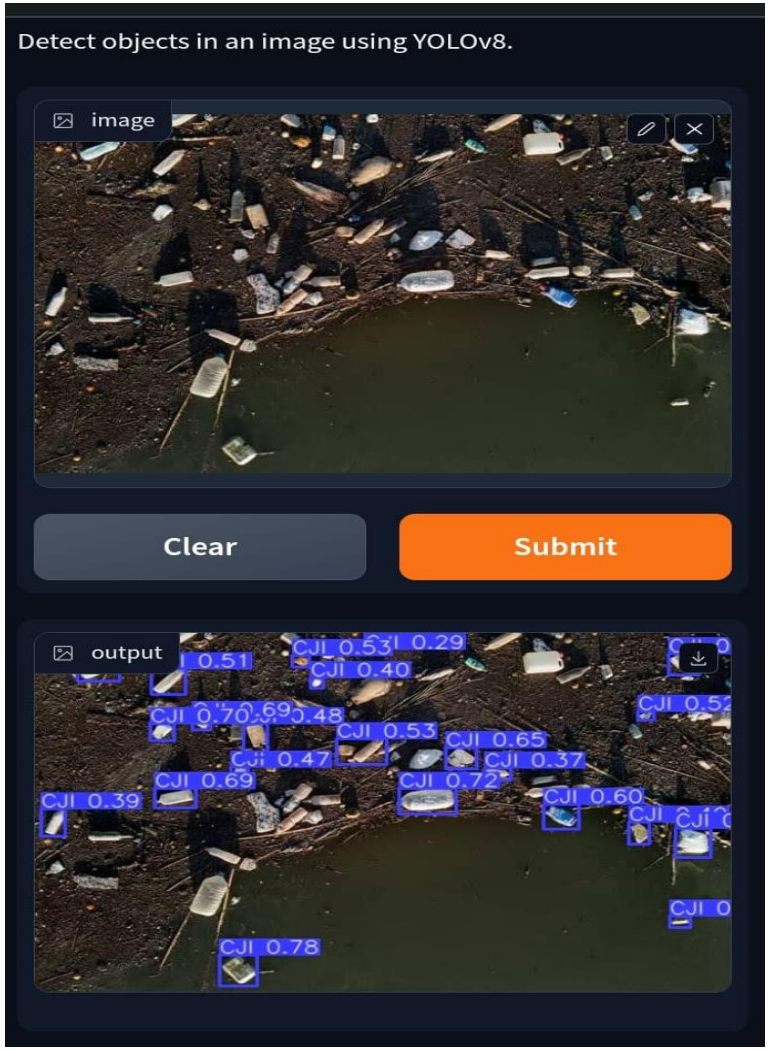
Accurate and efficient detection of plastic waste

Geotagging of detected plastic waste

Scalability and easy deployment

Increased awareness of plastic pollution

Improved decision-making for local authorities



Effectiveness of the Model

The effectiveness of the model was evaluated using the mean average precision (mAP) metric.
The mAP is a measure of the accuracy of the model, and it is calculated by averaging the precision and recall scores for all classes.
The model achieved a mAP of 65% on the validation dataset.
This is a good score, and it indicates that the model is able to detect plastic waste with a high degree of accuracy. The model was also evaluated by plotting the detections on a number of images. The plots showed that the model was able to detect plastic waste of various sizes and shapes.
Overall, the results of the evaluation indicate that the model is effective at detecting plastic waste in drone images.

Working of the Model

The model works by first dividing the image into a grid of cells. Then, the model applies a convolutional neural network (CNN) to each cell to extract features. The features are then used to classify the objects in each cell.

The model uses a YOLOv8 object detection model. YOLOv8 is a fast and accurate object detection model that is designed for real-time applications. The model is able to detect objects of various sizes and shapes. The model was trained on a dataset of drone images that contain plastic waste. The dataset includes images of plastic waste in rivers. The model was trained using the transfer learning method. Transfer learning is a technique that allows you to use a pre-trained model as a starting point for training a new model. This can save time and improve the performance of the new model. The steps involved in the training process, such as data preparation, model selection, and hyperparameter tuning.

The challenges of training a model to detect plastic waste, such as the variability of the appearance of plastic waste. The potential improvements that could be made to the model, such as using a larger dataset or using a different model architecture.

Innovation in the solution

The use of a drone to collect images of plastic waste is an innovative approach to monitoring plastic pollution. Drones can fly over large areas quickly and easily, and they can capture images of plastic waste that would be difficult to see from the ground.

The use of object detection to identify plastic waste in drone images is also an innovative approach. Object detection is a powerful technique that can be used to identify objects of various sizes and shapes. This makes it a valuable tool for monitoring plastic pollution, which can come in a variety of forms.

The use of transfer learning to train the model is another innovative aspect of the solution. Transfer learning is a technique that can be used to save time and improve the performance of a new model. This is because it allows you to use a pre-trained model as a starting point for training the new model.

Scalability of the solution

The solution is scalable in terms of the number of drones that can be used. The solution can be used with a single drone, or it can be used with a fleet of drones. This makes it possible to scale the solution to meet the needs of different applications. The solution is scalable in terms of the size of the dataset that can be used to train the model. The solution can be trained on a small dataset, or it can be trained on a large dataset. This makes it possible to improve the performance of the model as more data becomes available. The solution is scalable in terms of the number of images that can be processed by the model. The solution can process a small number of images, or it can process a large number of images. This makes it possible to use the solution to monitor large areas for plastic pollution. Overall, the solution is scalable in a number of ways. This makes it a viable solution for large-scale applications. The potential improvements that could be made to the solution to improve its scalability, such as using a cloud-based platform.

Business Value of the solution

The solution can help businesses to reduce their environmental impact by reducing the amount of plastic waste that they generate. The solution can help businesses to comply with environmental regulations by providing them with data on the amount of plastic waste that they are generating. The solution can help businesses to improve their brand image by demonstrating their commitment to environmental sustainability. The solution can help businesses to save money by reducing the cost of waste disposal. Overall, the solution has the potential to provide businesses with a number of benefits, including environmental, regulatory, and financial benefits.

The specific benefits that the solution could provide to different types of businesses, such as manufacturing businesses, retail businesses, and foodservice businesses. The potential market size for the solution, both in terms of the number of businesses that could benefit from the solution and the total amount of plastic waste that could be reduced by using the solution. The competitive landscape for the solution, and how the solution could differentiate itself from other solutions on the market.

Final **Remarks**

The solution is a significant step forward in the fight against plastic pollution. It is a scalable, accurate, and cost-effective solution that can be used to monitor plastic pollution in a variety of environments. The solution has the potential to make a real difference in the world. It can help to reduce the amount of plastic waste that is entering our oceans and waterways, and it can help to protect our environment for future generations. The solution is still in the early stages of development, but it has the potential to revolutionize the way that we monitor plastic pollution. With further development, the solution could become a standard tool for environmental monitoring and waste management.

The challenges that still need to be addressed in order to make the solution a commercial success. The opportunities that the solution presents for businesses and governments to take action on plastic pollution. The call to action for businesses and governments to adopt the solution and help to make a difference in the fight against plastic pollution.

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Thank you

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