



# Image-Based Identification and Health Assessment of Coral Reefs in Trincomalee Using Convolutional Neural Networks

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**Abstract:** Coral reefs are one of the most biodiverse and play an important role in the ecosystem that support a vast array of marine life and provide numerous ecological and economic benefits. But, due to various anthropogenic factors such as climate change, ocean acidification, pollution and overfishing they are at risk. Therefore, it is vital for the conservation actions, they need to be identified and assesses their status. This study presents, using deep learning techniques, specifically U-net architectures in Convolutional Neural Network (CNN) for the identification and image segmentation of coral reefs in Sri Lanka. Satellite dataset was compiled from freely available Google Earth Pro with resolution of 1980x1970 pixels ( 1.56 cm) with 30ft depth in Trincomalee. QGIS spatial analysis tools were used to calculate the rugosity index value (RIV). RIV will help to state the healthiness of the coral reefs using the roughness on their surface. This research initiates the attempt in using deep learning techniques for Sri Lankan coral identification using the remote sensing techniques. Results indicated that the coral reefs were successfully detected with a high degree of accuracy of F1score=0.8626. This shows the effectiveness of these deep learning models in accurately identifying corals even with a freely available satellite image with this particular resolution. In future, by acquiring the high resolution images the accuracy can even enhanced.

**Keywords:** Convolutional Neural Network (CNN), U-net architecture, Rugosity Index Value, Coral reef, Trincomalee .