Zeynep Aydin

Capstone Title: AquaDetect: A CNN for Coral Recognition

Capstone Abstract: In this paper, we propose creating and training a Convolutional Neural Network (CNN) to automate the differentiation between healthy and bleached corals, as coral reefs are severely threatened by pollution, disease, and habitat destruction. Our proposed model aims to increase accuracy and efficiency, as current visual surveys and traditional image processing methods could be labor-intensive and time-consuming. We also suggest that the proposed model could be used in Remote Operated Vehicles (ROVs) to automatically detect and mark vulnerable reef habitats, providing critical information for timely decisions, conservation efforts, and environmental analyses.

In the paper, we highlight the challenges we faced in the initial stages of the project and the modifications we made to the approach. We shifted our focus to differentiating healthy corals from bleached ones using a larger dataset, and used the “Healthy and Bleached Corals Image Classification” dataset from Kaggle. CNN architecture was our primary approach to solve the problem. We provide details of the pre-processing, model building, and training stages, as well as the testing and evaluation results. Furthermore, we compare multiple learning models in their accuracies. We conclude that our proposed approach could make a significant improvement in detecting and monitoring coral bleaching and provide a better opportunity for mitigating potential threats to these delicate ecosystems.