**Project Proposal – Rip current detector**

Rip current are deadly sea currents mostly appearing on sandy coasts such as Israel’s Mediterranean shore. These currents are very strong and can reach up to , faster than an Olympic swimmer while responsible for most of the death by drowning in Israel’s coasts. Almost all cases of drowning due to rip current are during lifeguards’ off-hours or unsupervised coasts, this is because the rip current are easy to detect by professional lifeguards. Our project goal is to mitigate the lifeguard work by using Deep Learning methods.

For the last years the main approach to detect rip current was by using classical methods such as optical flow [2] and aggregating video frames and detecting Haar like features [3]. On February 2021 a paper published by A. de Silva presented Deep Learning approach to detect the rip current using R-CNN with regional aggregation. In addition, a website contains thousands of ground truth images of rip currents area edges labeled by NOAA[[1]](#footnote-1) experts were published for free use.

We first aim to restore paper’s results to accurately detect the rip current region. At this stage the correct example will be defined by the Intersection over Union (IoU) above threshold value of 0.3 and our benchmark would be to beat the averaged accuracy achieved by F-RCNN (0.983). In addition, we plan to correctly classify the severeness of the rip current and that’s by using the ratio between height and width of each square, as the ratio is higher so does the severeness of the rip current. This latter would be measured using multi class accuracy.

[1] Akila de Silva, Issei Mori, Gregory Dusek, James Davis, Alex Pang, Automated rip current tection with region based convolutional neural networks, Coastal Engineering, Volume 166, 2021, 103859, ISSN 0378-3839, https://doi.org/10.1016/j.coastaleng.2021.103859.

1. National Oceanic and Atmosphere Association [↑](#footnote-ref-1)