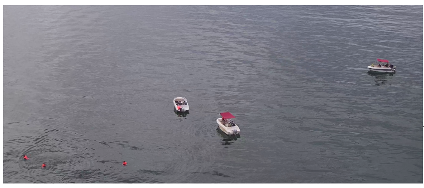
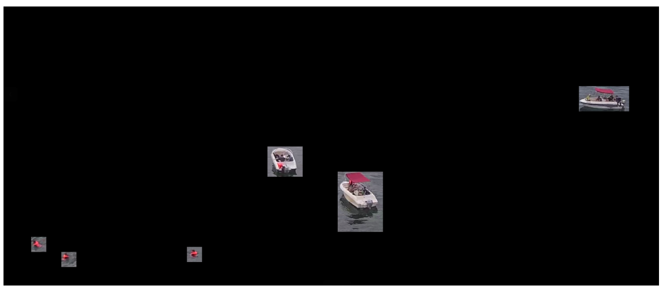
Bachelorarbeit

Maritime Visual Anomaly Detection Using Autoencoders

Detecting objects of interest in maritime scenarios, such as ships, people or wreckage, is of vital importance for search-and-rescue- and safety-critical missions. Traditional methods, relying on deterministic statistical evaluations of images, often fail to work when faced with a multitude of different objects‘ appearances. With the rise of deep learning, many methods for ship or people classification have been proposed. These supervised methods rely on vast amounts of labeled data. However, this data is expensive to acquire and often objects of interest are not know a priori. In contrast, unlabeled imagery of open water is easy to acquire. This motivates the use of unsupervised methods in the context of maritime anomaly detection. In principle, not only can objects of interest be known a priori be detected but also other anomalies.

In this bachelor thesis, the student should explore several autoencoder architectures and analyze their benefits, downsides and potential in maritime anomaly detection. In particular, it should be investigated how the presence of waves and foam affect the performance of an autoencoder. Can reoccuring wave patterns effectively be subtracted such that interesting regions remain present? How large does a network need to be and how fast can an autoencoder be while remaining robust to diverse conditions.
Several benchmarks can be used as testbeds, such as Airbus ship data set, SeaDronesSee and others. They should be compared to other methods, such as supervised methods for ship and swimmer detection. Optionally, modifications to existing autoencoders or introducing new architectures are possible. Also using Fourier transformations is possible.





Kontakt

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