**Group 2 - Topic Proposal**

**Automated ship classification from satellite images using Deep Learning**

Subject: Deep Learning

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**Overview**

The rapid growth of remote sensing technologies using satellite images has helped in building surveillance and security systems for water bodies [1]. Maritime monitoring is essential for a lot of government bodies to catch hold of any criminal activities that are happening in international waters. Many illegal activities like unlawful fishing, hijacking of ships, encroachment of sea borders, illicit exchange of sea cargo, accidents, and military attacks [2]. Deep learning techniques have been increasingly used in remote sensing applications to classify images or detect objects.

**About dataset**

This dataset provides maritime scenes of optical aerial images from the visible spectrum.

The MASATI dataset contains colour images in dynamic marine environments, and it can be

used to evaluate ship detection methods. Each image may contain one or multiple targets.

in different weather and illumination conditions. The dataset is composed of 6212

satellite images are labelled according to the following seven classes: land, coast, sea,

ship, multi, coast-ship, and detail.

**Deep Learning Techniques**

For this project, we will be using CNN architecture as the baseline model for classification and pre-trained models like VGG, Inception, and ResNet. We will also be using a special architecture of combining CNN architecture for extracting features (neural code) which are eventually classified by the k-Nearest Neighbour method (KNN) model. Our implementation is mostly based on architectures mentioned in the work done by Antonio-Javier, Antonio Pertusa and Pablo Gil [1]. We will be using the TensorFlow and Sklearn frameworks because of their ease of usage and comprehensive documentation. The F1 score will be the primary metric for judging the performance of the models.

Rough Schedule: - Data pre-processing, analysis (April 10th), Modelling, fine-tuning (April 20th), Documentation and GitHub (April 24th)

**References**

[1] Feng, Y., Diao, W., Sun, X., Yan, M., & Gao, X. (2019, August 14). *Towards automated ship detection and category recognition from high-resolution aerial images*. MDPI. Retrieved April 20, 2023, from https://www.mdpi.com/2072-4292/11/16/1901

[2] Baltruschat, I. M., Nickisch, H., Grass, M., Knopp, T., & Saalbach, A. (2019, April 23). *Comparison of deep learning approaches for multi-label chest X-ray classification*. Nature News. Retrieved April 14, 2023, from <https://www.nature.com/articles/s41598-019-42294->8