**ABSTRACT**

The main aim of this project is to perform image classification based on data generated from satellites to the security centers, performing image classification can be used for several purposes starting form detection of any security concerns in borders to identifying any damaged or broken ships stuck up in the sea body as well as locating any pirate ships in the sea body posing a threat to other voyagers.

The main iterations or steps of the project is mentioned in the following steps:

* Data Gathering
* Data training
* Data Shuffling
* Object Detection
* Pixel Enhancement
* Data Masking
* Batch Visualization
* Applying Deep Learning Models
* Testing and Validation

Now, what does this image classification do? is nothing but determine the category of the image depending on the image specifications. Let us say that there are three similar kind of species zebras and one tortoise recorded in the image, during image classification we categorize the image to a certain type of post doing this we then focus on each zebra individually this step is called localization, then we perform semantic segmentation on the data to specify the object class i.e., fixing the targets for training and testing datasets. Furthermore, we perform instance segmentation wherein we segregate each zebra.

As soon as we obtain the image, we perform Run Length Encoding (RLE) to identify the dimensions of the image. Then we segregate the data into two formats test and train data, we use random sampling for providing a much-balanced data, post this using image data generator the data is transformed into an augmented data. The architecture we plan to use is U-NET model which is fast and precise also increase the strength of the pixels as the images we obtain from the satellite are not always good in clarity. Using this U-NET architecture we can increase the resolution of the end output image, CNN (convolutional neural network) is also used to perform image classification and recognize ships in the images after classification. ANN (Artificial Neural Networks) is also used for image recognition and clearly specify the boundaries of the images.

In this project we obtained the dataset from Kaggle, the images received from satellite has an earth surface that includes waterbodies, land, buildings and roads. By using CNN the image is classified weather it has ship or not ,below is the Yolov algorithm that will be used for the project for image classification and detection of the object in water

A screenshot of a computer

Description automatically generated with low confidence

Technologies used for this project are python (version 3) for training and testing the data, deep learning concepts for pixel resolution and object identification, machine learning for cleaning and training and testing the data,

**Software Specifications:**

* Jupiter notebook,
* Google Collab
* windows 10 and above.

**Hardware Specifications**:

* 1TB hard disk
* 16 GB RAM
* 2GB graphic card.

The focus of this project is to develop a object detection system which detects ships from satellite images. YOLO algorithm is used for ship detection and provide great accuracy.

The future Scope of this project would be to precisely identify the model of the ship, locating the geographical location the ship is sailing in, predict climatic conditions.

**Git Link**

[**https://github.com/rohitkalyan/ShipDetectionUsingDeepLearning.git**](https://github.com/rohitkalyan/ShipDetectionUsingDeepLearning.git)