Use Case (UC-3) Document: Biological Feature Detection

Description:

This use case involves creating a pipeline to identify biological life in an image of the Arctic. The user will take a set of images, grid the raw images into “patches”, log into the head node of a supercomputer, submit the job to the batch scheduler, wait for the compute node to process the pipeline (analyze the image), return an updated image and a confirmation if biological life is present or not in the image to the user. The set of images will be analyzed in parallel for very large sets to be analyzed efficiently.

Actors:

User (initiating), Head Node (participating), Batch Scheduler (participating), Compute Node (participating), Convolutional Neural Network (participating)

Preconditions:

-High resolution satellite image which may or may not contain Arctic biological life.

Postconditions:

-Updated image with identified biological life.

-Updated neural network.

Flow of events for main success scenario:

-User logs into head node to access HPC system.

-User submits job with set of images to batch scheduler.

-Scheduler finds optimal time for job to be processed.

-Scheduler sends job to compute node.

-Compute node executes job, analyzes the images, creates output file and sends file back to user.

Requirements:

-Language: Python

-Library: Pytorch

-Convolutional neural network to identify seals in each image.

-Input set of high resolution satellite images