

HABTRAIL

An ML predictive model for the monitoring
and tracing of Harmful Algal Bloom





1. Problem: HABs

- Environmental
- Social
- Economical
- Health (loss of lives)

2. Existing Approach

- Traditional
- Remote Sensing

LIMITATIONS

- Expensive
- Time demanding
- Low Accuracy (Chl-a) Est.
- Prone calaboration Error
- Prone to Technical Error

3. Improved Solution AI Application

- Higher accuracy (Chl_a) Est.
- High AccU. (HABs) prediction
- Allow the Ass. of Var. Explo
- Cheap
- Near to real time prediction
- Allows room to address False alert (through hyperparameter tuning)

Data (S2/3 MSI OLCI)

- S2/3 MSI DATA
- Public data

4. Model



Web & Mobile Application



Citizen Scientist Approach



Remote Sensing Approach



Fully Automated Data Pipelines



Deep Learning HAB Detection Model

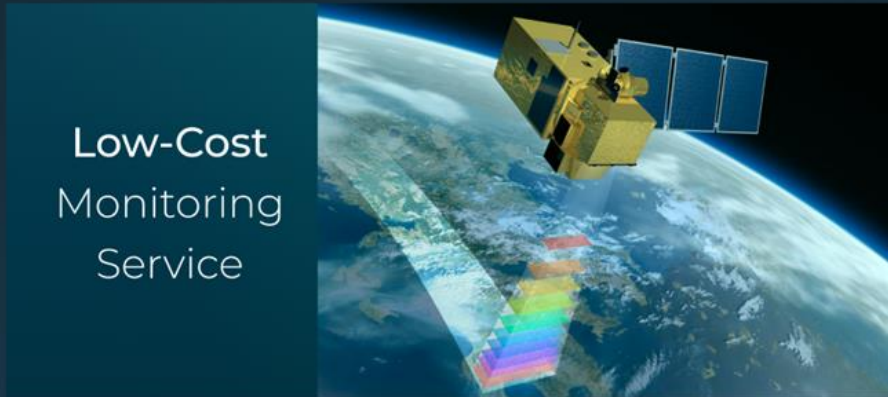


Early Warning System

Dashboard

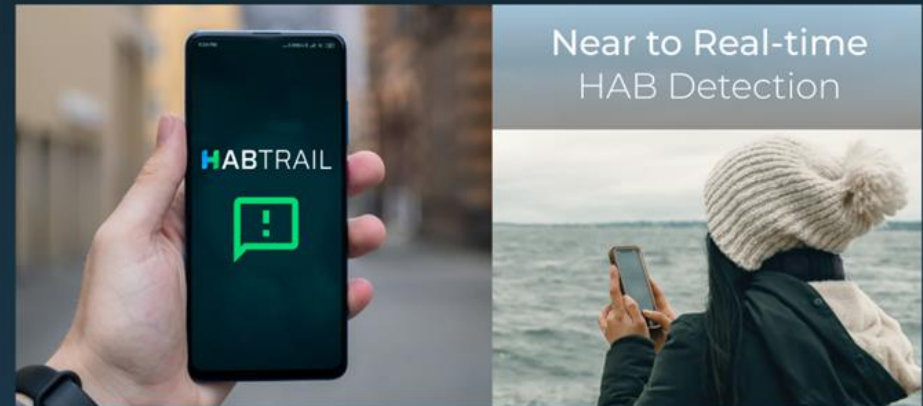
Mobile App

Satellite Monitoring With Subscription Model



- Tackle Harmful algal blooms;
- Detect and monitor HABs expansion;
- Water quality Pigments;
- Sentinel 2 & 3.

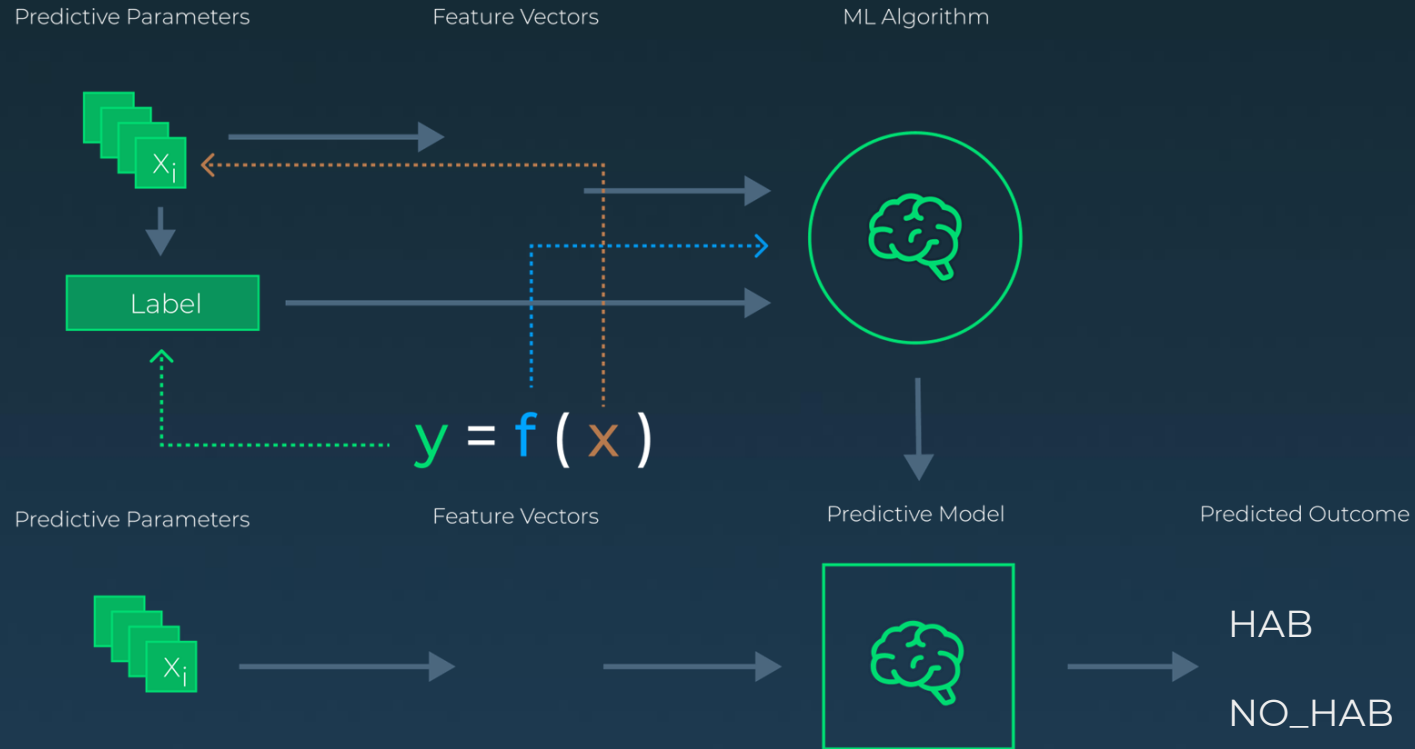
Free mobile APP For the general public



- Upload picture of a suspicious water body;
- Quick results.

Early Warning Modelling

Machine Learning Algorithm Scheme



HABtrail System Overview

A HAB Detection, Monitoring and Warning System

HABTRAIL



Web & Mobile Application



Citizen Scientist Data Interface



Remote Sensing Data Interface



Fully Automated Data Pipelines



Deep Learning HAB Detection Model



Early Warning System

Citizen Scientist Data Interface



User Input
Picture of a Water Body
from Smartphone
or Drone



Data Pre-Processing
Fully Automated Data Pipeline

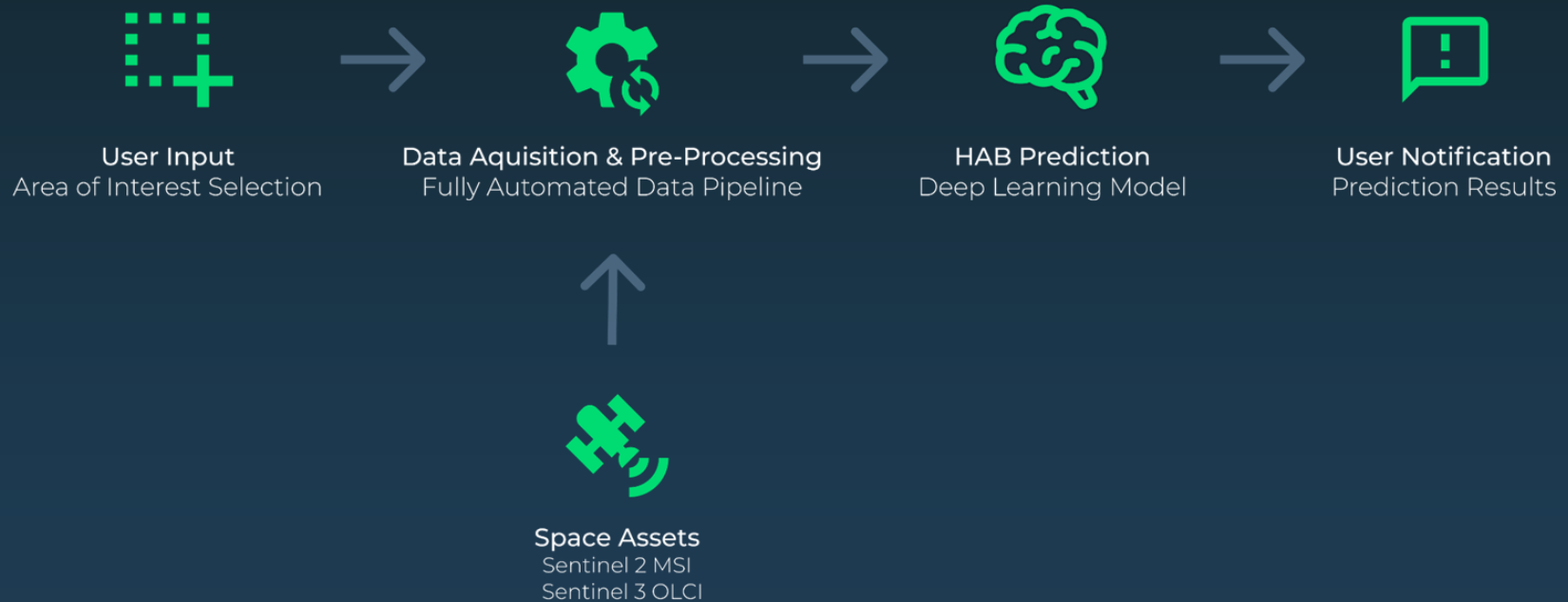


HAB Prediction
Deep Learning Model



User Notification
Prediction Results

Remote Sensing Data Interface

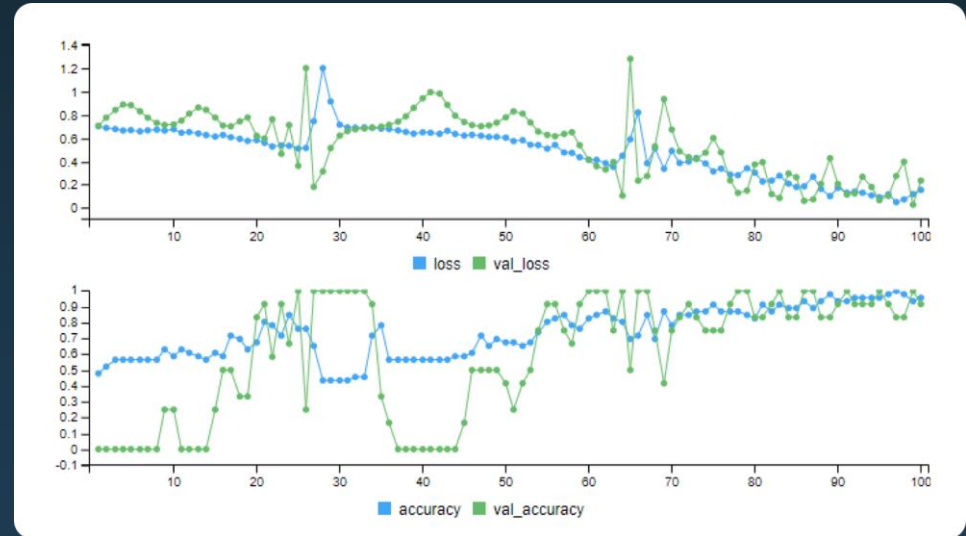


Model Assessment - Preliminary Results

Confusion Matrix and Statistics

Accuracy	0.9292
Precision	0.9231
Specificity	0.9796
Kappa Value	0.91038
P-Value	2.2e-16

Predictive Plot with epoch/batch size = 100



HABtrail Team



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Find out more at

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