University College Dublin

COMP47250 Team Software Project
Project Plan - HAB Detection System
Team: Gradient Descent

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1 Project Objectives

This project aims to develop a web-based Harmful Algal Bloom (HAB) detection and prediction system based on the HABNet architecture proposed by Hill et al. (2020). HABs pose significant risks to marine ecosystems, aquaculture operations, and public health, with traditional detection methods relying on periodic manual sampling that leads to delayed response times.
Our system will implement a spatiotemporal "datacube" approach combined with deep neural networks to achieve high-accuracy HAB detection and prediction capabilities. The primary objectives include:
Core Technical Objectives:

- Develop an automated datacube generator for processing remote sensing data from MODIS-Aqua/Terra satellites and Sentinel-3 sensors
- Implement and train deep learning models (NASNet-Mobile backbone with LSTM) for HAB event classification
- Create a minimum viable reproduction achieving ¿90% detection accuracy and 80% prediction accuracy
- Build a real-time web-based dashboard for HAB monitoring and prediction

User-Centered Objectives:

- Provide marine biologists and environmental agencies with early warning capabilities (up to 8 days ahead)
- Enable aquaculture operators to implement timely mitigation measures
- Support public health officials in issuing timely advisories for recreational water use

Success will be measured through technical performance metrics (detection/prediction accuracy), user evaluation feedback, and system scalability demonstrations using cloud infrastructure.

2 Project Plan

2.1 Sprint Overview

Our development follows an agile methodology with 2-week sprints aligned with project milestones:

Sprint	Dates	Deliverables & Goals
Sprint 1	20/5 - 2/6	Team formation, environment setup, initial data source exploration
Sprint 2	3/6 - 16/6	MVP development, basic datacube pipeline, simple classifier

Sprint 3	17/6 - 30/6	Model training, interim presentation preparation, web interface prototype
Sprint 4	1/7 - 14/7	Advanced model implementation, cloud deployment, user testing framework
Sprint 5	15/7 - 28/7	System integration, performance optimization, comprehensive evaluation
Sprint 6	29/7 - 11/8	Final testing, documentation, presentation preparation
Sprint 7	12/8 - 19/8	Final report completion, system refinements

2.2 Key Dates

- **9/6/2025:** Project Plan submission
- **23/6/2025:** Interim Presentation & MVP Demo
- **4/8/2025:** Final Presentation & Complete System Demo
- **19/8/2025:** Final Report submission

3 Roles

4 Architecture

5 Data Plan

6 GitHub Repository

7 Team Management