* **Project Title -**
* **High-Level Project Summary:**

Our project is a user-friendly mobile application developed using Flutter, designed to address the challenge of connecting people to the intricate world of aquatic ecosystems in a location of their choice. By allowing users to select a specific place, our application serves as a multifaceted solution. It checks the water quality, identifies endangered species residing in the water, provides guidance on how to protect these species, and offers insights into the water's source. This comprehensive approach not only informs users about their environment but also fosters a sense of responsibility for the conservation of these vital ecosystems. Our project aims to bridge the gap between people and the hidden aquatic world, enhancing awareness and enabling informed decisions about water-based activities**.**

* **Detailed Project Description:**

Our project is a comprehensive mobile application developed using Flutter, designed to address the challenge of connecting people with aquatic ecosystems. Here's a detailed description of our project's functionalities and goals:

Functionality:

Location-Based Selection: Users can choose a specific location where they plan to engage with the water.

Water Quality Assessment: The application retrieves the water quality data for the chosen location. Our app employs machine learning, deep learning and computer vision techniques to identify water quality (if it’s drinkable or swimmable or not).

Endangered Species Identification: Users receive educational information about these species, raising awareness about their significance and conservation status.

Conservation Guidance: We offer actionable recommendations on how users can actively contribute to the protection of these endangered species and their habitats. This includes suggestions for responsible water-based activities and eco-friendly practices.

Water Source Insights: Users can learn about the origin of the water in their chosen location.

Benefits:

Empowerment: Our app empowers users with knowledge about their environment, fostering a sense of responsibility for the conservation of aquatic ecosystems.

Safety: Water quality data ensures that users can assess water safety for swimming and other activities.

Education: Users gain insights into endangered species and conservation efforts, promoting environmental awareness.

Responsible Recreation: The app encourages responsible water-based recreation, reducing the ecological impact on aquatic ecosystems.

Goals:

Our primary goal is to create a user-friendly and informative tool that enhances users' connection to the aquatic world.

We aim to instill a sense of responsibility for the preservation of these ecosystems.

We hope to bridge the gap between the hidden aquatic world and recreational water activities.

Development Tools:

Programming Language: Dart (for Flutter app development), python

Framework: Flutter, VS code, Google Collab & Kaggle

Tool: Figma

Data Sources: Water quality data and satellite images for the Benchmark oil spill (SAR images from sentinel-1)

Techniques: Deep learning and computer vision for Water quality detection as well as oil spill detection.

Our project aspires to make a significant impact by promoting environmental awareness, responsible recreation, and the preservation of vital aquatic ecosystems. It leverages modern technologies to empower users with knowledge about their chosen water bodies, making informed decisions that benefit both the environment and themselves.

* **Space Agency Data:**
* [**NOAA’s water quality portal**](https://coast.noaa.gov/digitalcoast/topics/water-quality.html)
* [**Open Data Portal of the Climate Change Initiative**](https://climate.esa.int/en/odp/)
* **Hackathon Journey:**
* Space Apps Experience: Our Space Apps experience was highly collaborative, allowing us to learn the importance of teamwork under time constraints. The volunteers provided invaluable support and guidance throughout the process.
* Inspiration for Challenge: We were inspired to choose this challenge due to the alarming rate of water pollution, recognizing the pressing need for a solution that combines environmental awareness and user engagement.
* Project Development Approach: Our approach to developing the project involved creating an intuitive Flutter mobile application that leveraged machine learning, deep learning and computer vision techniques. We conducted extensive research to identify relevant datasets and data sources to address the challenge effectively.
* Overcoming Setbacks: As a team, we encountered setbacks and challenges along the way. To resolve them, we remained resilient and focused on our goal of creating an impactful solution. We collaborated closely, sought expert guidance when needed, and iterated on our project to overcome obstacles.
* Expressing Gratitude: We extend our gratitude to all the volunteers who contributed to our Space Apps journey, with special thanks to Ahmed Ismail for his unwavering support and for connecting us with the right mentors when required. Their dedication and assistance played a crucial role in our project's success.
* **References:**
* [NOAA’s water quality portal](https://coast.noaa.gov/digitalcoast/topics/water-quality.html)
* [Open Data Portal of the Climate Change Initiative](https://climate.esa.int/en/odp/)
* GitHub:

1) [python\_for\_microscopists](python_for_microscopists/076-077-078-Unet_nuclei_tutorial.py%20at%20master%20·%20bnsreenu/python_for_microscopists%20·%20GitHub)

2) [Semantic-Segmentation-Architecture](https://github.com/nikhilroxtomar/Semantic-Segmentation-Architecture/blob/main/TensorFlow/deeplabv3plus.py)