What’s up with Water?

Executive Summary :

* Water is a vital resource for our planet, and its importance cannot be overstated. It affects our plants, health, and marine creatures, among other things. However, water pollution has become a significant problem in recent years, leading to detrimental effects on the environment. In order to address this challenge, we have developed an application that aims to raise awareness about water conservation and help users make informed decisions about water usage.
* Our application utilizes location tracking to identify the nearest lakes or seas to the user. Additionally, it gathers information about the source of the water to predict its quality and suitability for various purposes. By analyzing the location and source data, we can also assess the potential impact of climate change or water quality on marine animals, thus identifying areas where fish populations may be at risk of extinction.
* The primary objective of our application is to spread awareness among individuals about the importance of water and the need to conserve it. By providing users with information about their local water sources and the potential consequences of water pollution, we aim to empower them to take proactive steps to protect this precious resource.

Problem Definition :

* The problem we are addressing is the increasing pollution of water sources and its detrimental effects on plants, human health, and marine creatures. Water pollution has become a significant environmental issue, leading to the decline and extinction of numerous sea animals every year. This problem is of utmost significance as it threatens the delicate balance of ecosystems and poses risks to human well-being.

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Background & Literature Review :

* Extensive research and efforts have been made to mitigate water pollution and its impacts. Various studies have highlighted the sources and causes of water pollution, including industrial waste, agricultural runoff, and improper waste disposal. Additionally, research has explored the consequences of water pollution, such as the disruption of aquatic ecosystems, decline in water quality, and adverse health effects on humans and marine life.
* Existing solutions to address water pollution include wastewater treatment technologies, stricter environmental regulations, and public awareness campaigns. Efforts have also been made to monitor water quality through the development of sensor technologies and remote sensing techniques.
* However, despite these efforts, water pollution remains a pressing issue. There is a need for innovative approaches that combine technological advancements, education, and public engagement to effectively address this challenge. Our application aims to bridge this gap by providing users with real-time information and raising awareness about the importance of water conservation and pollution prevention.

Methodology:

* Our methodology for solving the problem of water pollution and conservation revolves around the following step-by-step process:

1. User Location Detection: Our application will utilize location tracking to determine the user's current location accurately. This information will serve as the basis for further analysis and recommendations.

2. Data Collection: We will gather data about the nearest water bodies, including lakes and seas, in the user's vicinity. This data will include information about the water source, quality, and potential environmental factors affecting it.

3. Machine Learning Analysis: Using machine learning models and computer vision techniques, we will analyze the collected data to determine the source of water and its quality. This analysis will also help us assess the suitability of the environment for marine life, particularly fish populations.

4. Risk Assessment: Based on the analysis of the water source, quality, and environmental factors, we will evaluate the potential risks to the marine ecosystem and the likelihood of fish extinction in the area. This assessment will provide valuable insights into the urgency of conservation efforts.

5. Recommendations and Awareness: Drawing from the results of the analysis, our application will provide recommendations to users on how they can contribute to water and fish conservation. These recommendations may include water-saving practices, responsible waste disposal methods, and participation in local conservation initiatives.

* tools:
  + Figma for doing the UI/UX process.

technologies:

* Flutter.
* Firebase.
* Our methodology aligns with the challenge's specific requirements by utilizing AI, machine learning, and computer vision technologies to analyze the location, water source, and quality. It also addresses the need for awareness and education by providing users with real-time information and actionable recommendations for water and fish conservation.

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Solution:

* Our solution will tackle the challenge by allocating the user’s environment to detect the source of water and its quality and also determine if this environment is suitable for fish to live, or if the fish are threatened with extinction. Based on the previous analysis we will recommend ways to save the water and fish to save the environment.

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Value Proposition:

* Our application targets all age groups, children to encourage them to save their environment, fishermen to let them know the sea animals in this area whether they can fish here or not, and know the kinds of water creatures which live here.
* We also allocate the nearest lake or sea and alert the user if there is anything threatening his life.
* We also seek to protect fish which are threatened with extinction.
* We detect the quality of water.

Role of Team Members:

* Our team has a variety of skills:
* Coding
* Soft Skills
* Researching
* Video Editing
* Excel
* Flutter
* Machine Learning
* Computer Vision
* Deep Learning
* Software

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Workflow Strategy:

* First, we will study the datasets and our resources.
* Second, apply preprocessing on the data and extract the needed features.
* Third, apply machine learning, computer vision models, and analysis of the data.
* Fourth, we will develop our application.

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Resources:

- [JPL Science: ROMS - Regional Ocean Modeling System (nasa.gov)](https://science.jpl.nasa.gov/projects/roms/)

- [OBB | Funded Projects (nasa.gov)](https://cce.nasa.gov/ocean_biology_biogeochemistry/funded_projects.html)

- [Water Quality (noaa.gov)](https://coast.noaa.gov/digitalcoast/topics/water-quality.html)

- [Environment and Climate Change Canada Open Government Portal](https://open.canada.ca/data/en/organization/ec?page=1)

- [Open Data Portal (esa.int)](https://climate.esa.int/en/odp/#/dashboard)

*Team name:* ***Aquiers***

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