Presentation of the project

The problem

The idea of this project stems from the desire to use the As7265 X spectrometer in order to perform spectral analysis of materials. The opportunity to use it in the marine environment came from blue growth, the theme chosen for the university project of this IOT course. So it was also intended to use it in the spectral analysis of liquids, i.e. sea water or even lake water for aquaculture.
There are quantities to take under control in marine aquaculture
See also Group-Project-for-IOT-class-in-La-Sapienza-2021/PRESENTATION.pdf at main · robertobruzzese/Group-Project-for-IOT-class-in-La-Sapienza-2021 (github.com)
We intend to use spectrophotometer to measure and monitor quantities.

Exisisting approaches

And so this approach is entirely experimental and there are currently no known similar approaches. At the present time, there are only a few scientific articles that have used this spectrophotometer to determine the quality and sugar content of fruit or to determine the level of glucose in water solution .
See for example the following article "Non-Invasive In-Vitro Glucose Monitoring Using Optical Sensor and Machine Learning Techniques for Diabetes Applications" read at (PDF) Non-Invasive Glucose Monitoring Using Optical Sensor and Machine Learning Techniques for Diabetes Applications (researchgate.net)
or “A portable spectrometric system for qualitative prediction of soluble solids content of apples with a pre-calibrated multispectral sensor chipset” read at Sensors | Free Full-Text | A Portable Spectrometric System for Quantitative Prediction of the Soluble Solids Content of Apples with a Pre-calibrated Multispectral Sensor Chipset (mdpi.com) .

The solution system Idea

For this reason, we can definitely say that our approach is unique and therefore highly experimental, as it aims to determine the quality parameters of seawater "In vitro", i.e. directly by immersing the spectrometer in the water. In vitro since it is not possible in vivo.

The Smart Buoy

The main and central hardware component of the system the smart buoy. So the idea is to put the S7265x Spectrophotometer in an IP 69 box attached the submerged part of the smart buoy.
This box is impermeabile box and therefore waterproof, resistant to water infiltration and can be submerged in a liquid to a certain depth without water infiltration.
The depth at which the box is mounted depends on the length of the capillary steel tube to which it is attached.
The smart buoy is equipped with solar panels, with an antenna, an anchor and inflatable buoyancy belt.

Architecture of the System

Obviously the buoy inside contains all the circuitry and to get the electrical wires from the sensor to the circuits, they will run inside the capillary tube. In this way it will be possible to take spectrophotometric measurements directly in the water. The data will reach the Arduino board connected to it, and these will then be transferred to the board on board B-L072Z-LRWAN1 and then sent to the concentrator connected to the thing network and finally to the internet.
Therefore the main components of the system are the spectrophotometer, the Arduino board, the B-L072Z-LRWAN board, the solar power components. Distant on the coast there will be installed a concentrator.