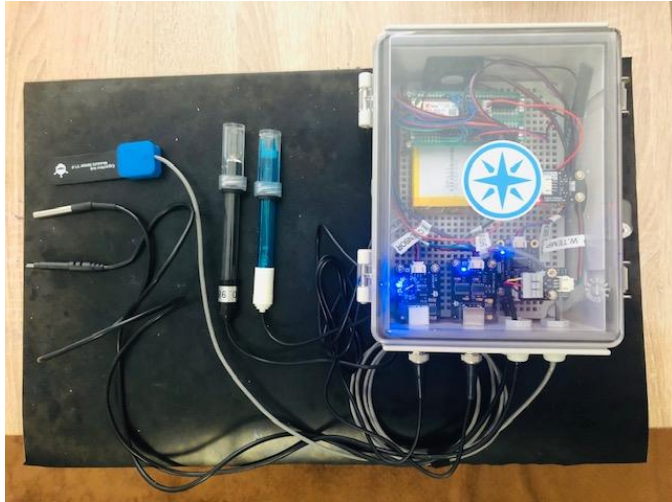


xElectron version 1



The xElectron system comprises of two stages, collection of data using sensors and logging and interpretation of data for analysis.

Stage 1 - Data collection

This stage uses Particle Electron and sensors to measure, Ambient and Water Temperature, Humidity, Air Quality, Soil Moisture, Light Intensity, Total Dissolved Solids, Ph and Electrical Conductivity. The data is sampled every 10 minutes and sent to Particle Cloud via particle data SIM.

Stage 2 - Data logging

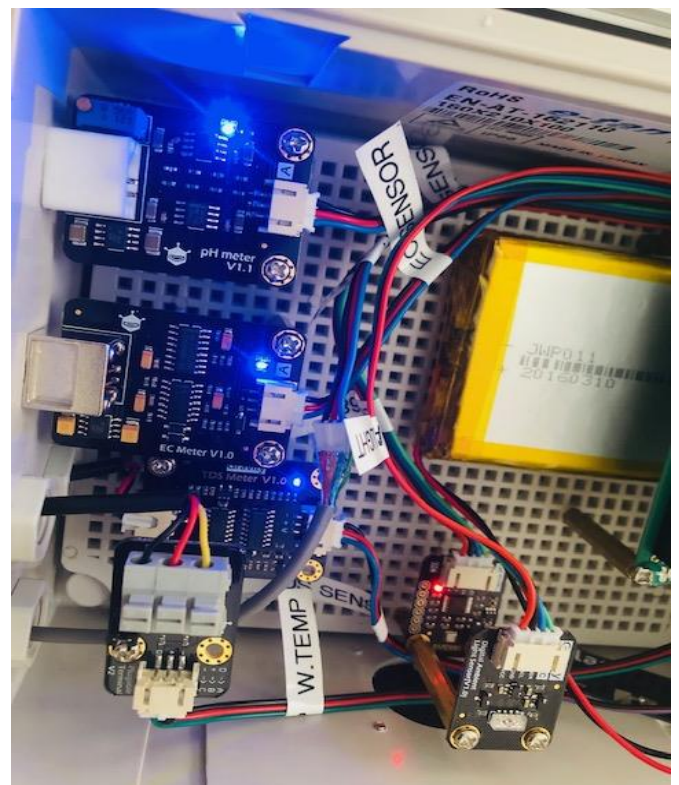
The data logging stage uses Google Cloud service running LAMP. The Google Cloud Virtual Machine receives data from the Particle Electron variable on Particle Cloud and logs the rows of data to the MySQL database. Grafana is used for charting to provide visualization of the collected data using a web browser.



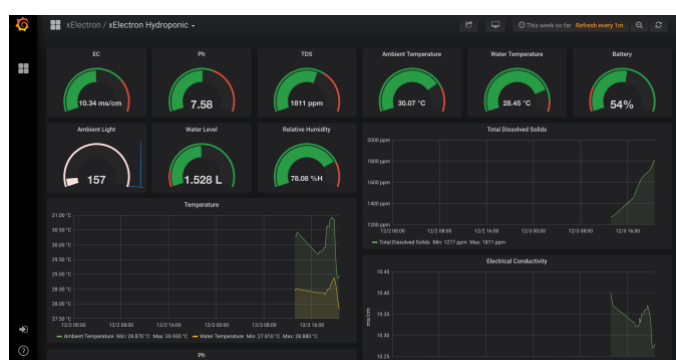
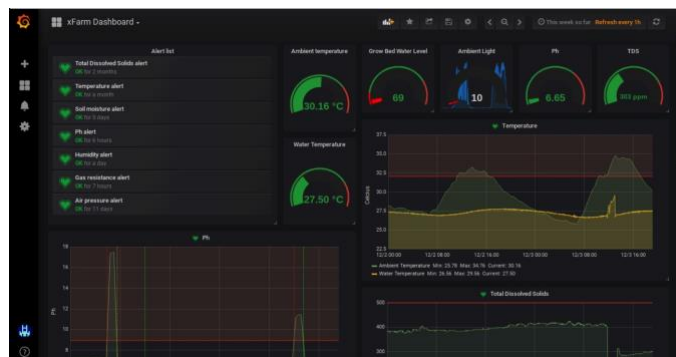
Customizable Sensor Array



The xElectron can be customized to include a specific sensor that is available on the market e.g. ,Water Turbidity, Dissolved Oxygen, ORP, Anemometer, etc.



Grafana is used to provide the chart visualization of the data collected and it is preseted via a web browser, xFarm Analytics © 2018.



xElectron Array

- **BME680 Environmental Sensor**
 - DFRobot BME680 Environmental Sensor is a low power gas, pressure, temperature & humidity sensor based on BOSCH BME680 sensor. It is a 4-in-1 multi-functional MEMS environmental sensor which integrates VOC (Volatile Organic Compounds) sensor, temperature sensor, humidity sensor and barometer.
- **Ph Meter**
 - DFRobot Ph Meter
 - Analog pH meter, specially designed for Arduino and has built-in simple, convenient and practical connection and features. It has an LED which works as the Power Indicator, a BNC connector and PH2.0 sensor interface.
- **Total Dissolved Solids Meter**
 - TDS (Total Dissolved Solids) indicates that how many milligrams of soluble solids dissolved in one liter of water. In general, the higher the TDS value, the more soluble solids dissolved in water, and the less clean the

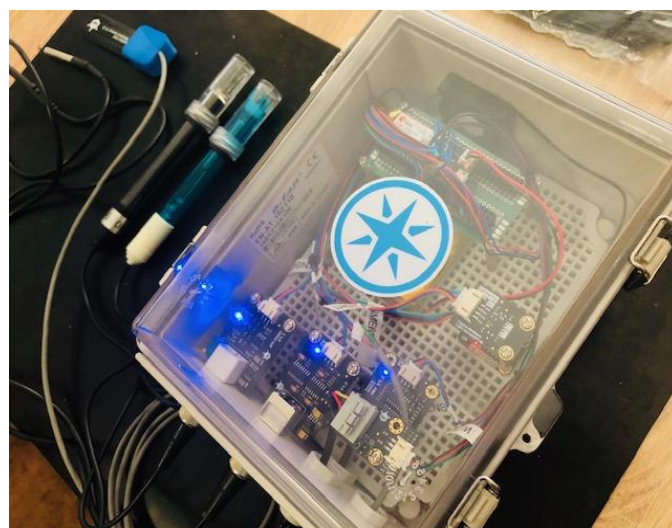
water is. Therefore, the TDS value can be used as one of the references for reflecting the cleanliness of water.

- **Temperature Sensor**
 - This is a waterproofed version of the DS18B20 Arduino Temperature sensor. Handy for when you need to measure something far away, or in wet conditions. While the sensor is good up to 125°C the cable is jacketed in PVC so we suggest keeping it under 100°C.
- **Ambient Light**
 - This module help you to detect the light density and reflect the analog voltage signal back to Arduino controller.
- **Electrical Conductivity Sensor**
 - DFRobot Analog Electrical Conductivity meter V1.0

xFarm ® is founded on 2018, committed on adopting new technologies to innovate sustainable farming. We have engineered an array of environmental sensors with historical logging to help visualize and analyze data – accessible online or from a cloud service.

To check on the visualization tool, please visit <http://bit.ly/xFarmTheFuture>

Please browse this link for the xElectron Dashboard: <http://bit.ly/xElectron>



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