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Aqua$_{2.}$O

Data Acquisition

One of the most significant priority of the project was the analysis of the supplied sensor. So, we:

- Studied the properties and the composition of the sensor and how to extract useful information from its signals;
- Generated a chart that would express the behavior of the sensor at different levels of water-flow rate, comparing the obtained diagram with the poor datasheet available on the web;

Data Acquisition

- Analyzed the sensor behaviors at different water temperatures to check for any anomalies;
- Installed two additional hall sensors to verify if their contribution can improve the information carried from the original sensor;

Data Acquisition

From the analysis performed, we concluded that:

- The sensor is influenced by the magnetic field generated by the magnetized helix. When the blades of the helix are near to the sensor, it detect a big value of the magnetic field and a impulse signal is transmitted.
- Placing additional sensors near the original one, we does not obtain significant improvement.
- The temperature does not affect the behavior of the sensor.

Data Transfer

After having acquired the data from the sensor, we had the necessity to transfer the data on a platform able to store the information and perform analysis on them. We implement different approach:

- First approach: save the data on a SD card

  Simple solution, easy to implement, but not portable for the replication of the system.

- Second approach: send the data on the ThingSpeak web platform

  A very interesting solution, because the platform allow to store and analyze the data through Matlab (integrated on it), but the free version allow to sent a single request every 20 second.

Data Transfer

- Third approach: send the data on Node-Red

  Great solution, intuitive to implement, but not simple to store all the useful information (think about the timestamp of the requests).

- Final approach: send the data on a web server

  The final solution store the data in a web server implemented in a VM instantiated on AWS. The data are storage in a MySQL database Server. This guarantee a completely platform independent and customizable system.

Next Steps

- Analyze and compare the behavior of a different sensor that works with an other principle respect to the supplied sensor.
- Modify the Arduino sketch in order to manage two sensors (one attached to the cold water tube, the other connected to the hot water tube) with a single microcontroller.