GPRS

The collected data from various water sensors are sent to the cloud with the help of the GSM module.

We use ubidots as the Cloud service to store the data from the sensor nodes. Ubidots is an open application platform which is designed to establish a meaningful connections between people and the things around them. It allows integration of various devices and apps which can upload data to the web. It has real-time data collection, processing and data visualization.

To connect to Ubidots service, the Arduino must have the server address of the cloud service together with the API Key of the channel to modify and the field in the channel to update. The Arduino sketch executes the code by collecting sensor data, and then establishing a connection using GSM and uploading data to the catalogued channel field(s).

Step By step commands:

AT+CGATT? -- checks if GPRS is attached? n=1 if attached

AT+CIPMUX=n -- use n as 0 for single connection  
 or use 1 for multiple connections

AT+CSTT=”apn”,”username”,”pass” -- Sets APN, user name and password

AT+CIICR -- Brings up wireless connection

AT+CIFSR -- Get local IP address if connected

AT+CIPSTART=“TYPE” , “domain”, “port” -- Establishes a connection with a server. Type can be UDP or TCP

AT+CIPSEND -- Sends data when the a connection is established.

AT+CIPCLOSE -- Closes the connection

GPS Module (SimCom 28)

GPS module is used to get the location of datasets of water samples collected from the water bodies. SIM28 is used as the GPS module since it gives high performance and reliable assisted GPS. This is a standalone L1 frequency GPS module in a SMT type with MTK high sensitivity navigation engine, which allows you to achieve the industry’s highest levels of sensitivity, accuracy, and Time-to-First-Fix (TTFF) with lowest power consumption.

This GPS module gives out data in a series of standard strings of information which is called the National Marine Electronics Association (NMEA) protocol.

So, $GPGSA is a certain type of NMEA sentence, and $GPRMC is a different type of NMEA sentence.

In this project, we require only the latitudes and longitudes. Hence mainly focus on $GPRMC type strings.The longitudes and latitudes obtained by using string filtering algorithm are now tagged with the water data samples. Now we have geo-tagged data which is sent to the cloud storage as well logged in SD card for further data analysis and water monitoring.