GATORBYTE – A LOW-COST MOBILE REAL-TIME WATER RESOURCE MONITORING PLATFORM

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For many water resource managers (WRMs), real-time, high-frequency and accuracy monitoring systems are inaccessible due to their high acquisition costs. These systems have proprietary software and hardware making them applicable to limited scenarios. Moreover, the data from these systems are from a few fixed locations in the water body of interest. These limitations ultimately lead to lack for high frequency actionable information, preventing WRMs from taking mitigative steps against water pollution events at the source of pollution in timely manner. The goal of the GatorByte platform is to develop a compact, low-cost, high-frequency spatiotemporal datalogger. The platform is open-source, hence WRMs can easily alter the designs and the software to suit their needs. The primary components of the system include- datalogger, cloud-based server/datastore, web-based visualization tool. The datalogger can be configured as a station (fixed location), or a buoy (mobile). In both configurations, the datalogger is built using inexpensive and widely available sensors and peripherals, a 3D-printed enclosure, and a custom Printed Circuit Board (PCB), bringing the cost of the datalogger down to under $1500. The open-source nature of the platform allows WRMs to incorporate a cellular-modem to allow the broadcast the sensor data to interested entities in real-time. Currently, the datalogger includes four low-cost and compact sensors- temperature, pH, dissolved Oxygen, and electroconductivity, a 4G-capable microcontroller, an onboard SD-card storage for backups, and Bluetooth module for on-filed diagnostics. The buoy variant additionally incorporates a GPS module for geolocation, and an accelerometer for sensing velocities. Hence, the GatorByte platform provides a low-cost, compact, and open-source solution for monitoring spatiotemporal variation in water quality. The system can be easily modified to be deployed in other environmental monitoring applications like weather monitoring, or air quality monitoring.

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